Transactions of the Wisconsin State Agricultural Society, including proceedings of the state agricultural convention, held in February, 1882, with practical and useful papers. Vol. XX 1881/1882

Wisconsin State Agricultural Society
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TRANSACTIONS

OF THE

WISCONSIN STATE AGRICULTURAL SOCIETY,

INCLUDING

PROCEEDINGS OF THE STATE AGRICULTURAL CONVENTION, HELD IN FEBRUARY, 1882, WITH PRACTICAL AND USEFUL PAPERS.

VOL. XX.—1881-82.

PREPARED BY
GEORGE E. BRYANT, SECRETARY.

MADISON, WIS.:
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1882.

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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 modification 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 matters 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 incidental 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 com-

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

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

Names.	Residence.	Names.	Residence.
Fifield, L	Chicago.	Greene, N. S	Milford.
Fifield, D. E	Janesville.	Greenleaf, E. B...	Milwaukee.
Fifield, E. G.....	Janesville.	Greenman, C. H ..	Milton.
Finch, Lorin.....	Bradford.	Greenman, H. D..	Milwaukee.
Firmin, F. H.....	Madison.	Gregory, J. C.....	Madison.
Fisher, C. C.....	Center.	Grinnell J. G	Adams.
Fisher, Elijah.....	Newark.	Groom, John	Madison.
Fisher, S. S	Center.	Grubb, W. S.....	Baraboo.
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.
Fox, A. O.....	Oregon.	Harrington, N. H.	Delavan.
Fratt, N. D.....	Racine.	Harris, Jas.....	Janesville.
Frank, A. S	Madison.	Harvey, J. W.....	Knoxville, Ten.
Frank, Geo. R.....	Boscobel.	Hasbrouck, W....	Eau Claire.
Frankfurth, Wm ...	Milwaukee.	Hastings, S. D....	Madison.
Freeman, C. F.....	Milwaukee.	Hausmann, Jos...	Madison.
Friedman, Ignatius.	Milwaukee.	Hawes, J. F	Madison.
French, Jonathan...	Madison.	Hawes, W. N.....	Verona.
Fuller, M. E	Madison.	Hayes, A. J.....	Milwaukee.
Fuller, F. D.....	Madison.	Hazleton, Geo. C .	Boscobel.
Fuller, E. W	Madison.	Hazen, Chester ...	Ladoga.
Furlong, Thos. T...	Chicago.	Helfenstein, J. A .	Milwaukee.
Furlong, John.....	Milwaukee.	Hempsted, H. N..	Milwaukee.
		Hicks, J. H	Oshkosh.
Gammons, Warren .	Middleton.	Hibbard, W. D ..	Milwaukee.
Gates, D. W. C	Madison.	Hibbard, Wm. B..	Milwaukee.
Gaylord, Aug	New York City.	Higbee, A. T	Stoughton.
Gernon, George	Madison.	Hill, H. J	Madison.
Gibbs, Chas. R	Whitewater.	Hill, James H	Madison.
Gilbert, Thomas....	Oregon.	Hill, J. W. P	Belleville.
Giles, H. H	Madison.	Hill, P. B	Milwaukee.
Gillett, R. E.....	Tomah.	Hill, Robert.....	Milwaukee.
Gilman, H	Burke.	Hill, H. D.....	Oakfield.
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.	Hodson, C. W	Janesville.
Grady, F. M.....	Fitchburg.	Hœflinger, Carl...	Wausau.
Graham, Alexander.	Janesville.	Hogan, Gilbert ...	Janesville.
Grant, S. B.....	Milwaukee.	Hollister, R. M ...	Janesville.
Grant, Albert.....	Milwaukee.	Holmes, A. M ...	Milwaukee.
Graves, R. A	Ripon.	Holt, David	Madison.
Graves, S. W.....	Rutland.	Holton, Edward D.	Milwaukee.
Green, Anthony	Milwaukee.	Hoven, Matt.....	Madison.
Green, Geo. G.....	Milwaukee.	Hopkins, B. B...	Milwaukee.
Green, Richard.....	Middleton.	Hopkins, James ..	Madison.
Green, Samuel	Fitchburg.	Hopkins, E. C....	Milwaukee.

Names.	Residence.
Hoskins, J. W.	Milwaukee ....
Hoskins, Alfred	Janesville .....
Houston, Peter	Cambria .....
Hoyt, J. W	Madison .....
Hulbert, E.....	Oconomowoc..
Hume, Wm.....	Oshkosh .....
Hutchins, C. A....	Fond du Lac ..
Hutson, J. S.....	Stoughton.....
Hudson, John.....	Madison .....
Huntley, D.	Appleton.....
Hyde, Edwin.....	Milwaukee ....
Ilsley, Chas. F	Milwaukee ....
Inbusch, J. H.	Milwaukee ....
Ingram, A. C.....	New York ....
Jacobs, William....	Madison .....
Jackman, Hiram ...	Chicago.....
Jeffery, Geo.....	Smithville.....
Jenks, S. R.....	Madison .....
Jenkins, J. C	Janesville .....
Jerdee, L. P.....	Madison .....
Jerdee, M. P.....	Madison .....
Johnson, Jno., Jr...	Madison .....
Johnson, M. B	Janesville .....
Johnson, Joseph....	Hartland .....
Johnson, John	Milwaukee ....
Johnson, John A ...	Madison .....
Johnson, Hugh L ..	Milwaukee ....
Johnson, John	Milwaukee ....
Jones, E. D	Bjorn ... .
Jones, C. H	Sun Prairie....
Jones, John N.....	Madison .....
Kellogg, Geo. L	Janesville .....
Kiewert, Emil.....	Milwaukee ....
Kent, A. C	Janesville .....
Kershaw, C. J.. ...	Milwaukee ....
Kershaw, W. J	Milwaukee ...
Keyes, E. W.....	Madison .....
Kimball, M. G.....	Sheboygan ....
Kimball, John.....	Janesville .....
Kingsley, Geo. P ...	Springfield ....
Kingston, J. T.....	Necedah .....
Kiser, W. C	Madison .....
Kiser, J. C	Oregon .....
Klauber, Samuel	Madison .....
Knight, E..	Sun Prairie....
Kneeland, Moses ...	Milwaukee ....
Kneeland, James ...	Milwaukee ....
Knowles, Geo. P ..	Fond du Lac ..
Knowles, Geo	Milwaukee ....
Knapp, G. A	Fond du Lac ..
Knapp, J. G.....	Tamps, Flor...
Knapp, Wm. A.....	Fond du Lac ..
Koss, Rudolph	Milwaukee ....
Ladd, M. L.....	Sugar Creek...
Lamb, F. J.....	Madison .....

Names.	Residence.
Landauer, Max	Milwaukee.
Lapham, Henry....	Summit.
Larkin, B. F.....	Madison.
Larkin, C. H	Milwaukee.
Larkin, Daniel ...	Madison.
Larkin, William ...	Madison.
Lawrence, W. A ...	Janesville.
Lawton, J. G	Green Bay.
Lazier, Ed.....	Madison.
Learned, J. M	California.
Leidersdorf, B.....	Milwaukee.
Leitch, W. T	Madison.
Leitch, W. T., Jr...	Vienna.
Leslie, John.....	Madison.
Lester, Waterman..	Janesville.
Lewis, Herbert A ..	Madison.
Lewis, John L....	Madison.
Lindsey, E. J.....	Milwaukee.
Little, Thos. S.....	Janesville.
Lloyd, Lewis	Cambria.
Lockin, John.....	Fond du Lac.
Lockwood, John...	Milwaukee.
Ludington, H.....	Milwaukee.
Ludington, James .	Milwaukee.
Ludlow, A	Monroe.
Lucy, O. K...	Columbus.
Lyman, H.....	Dakota.
Lynch, T. M.....	Janesville.
Lynde, W. P.....	Milwaukee.
Lysaght, Wm.....	Belleville.
Main, Alex. H.....	Madison.
Mann, A. L.....	Fitchburg.
Mann, J. E.....	Sun Prairie.
Mann, Henry.. ...	Milwaukee.
Mann, Curtis	Oconomowoc.
Macy, J. B	Fond du Lac.
Manwaring, Wm ..	Black Earth.
Marshall, Samuel..	Milwaukee.
Martin, A. C	Ashton.
Martin, C. L.....	Janesville.
Martin, Nathaniel .	Monroe.
Martin, S. W	Madison.
Mason, Geo. A.....	Madison.
Masters, E. D.....	Jefferson.
Mathews, A. K	Milwaukee.
Matteson, Clinton..	Rosendale.
Matts, J. H. B.....	Verona.
Maxson, O. T.....	Waukegan.
May, A. C.....	Milwaukee.
Mayhew, T. J.....	Milwaukee.
Mayhew, J. L	Milwaukee.
McCarty, F. D.....	Fond du Lac.
McComber, S D...	New Lisbon.
McConnell, M. N..	Dartford.
McConnell, T. J ...	Madison.
McCormick, J. G ..	Madison.
McCullagh, And ...	Emerald Grove.

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

Names.	Residence.	Names.	Residence.
Rodgers, D. J	Milwaukee.	Spencer, R. C....	Milwaukee.
Rogers, J. S.....	Burlington.	Squier, Thomas H.	Waterloo.
Rogers, Anson	Janesville.	Stannard, A. C...	Milton.
Rogers, H. G.....	Milwaukee.	Stark, Charles A..	Milwaukee.
Ross, James.....	Botany Bay.	Steele, Chester....	Milwaukee.
Rowe, Richard W ..	Madison.	Stevenson, Isaac..	Marinette.
Rowe, W. E	Mazomanie.	Stevens, Geo. C...	Milwaukee.
Ruggles, J D	San Francisco.	Stevens, J. T	Madison.
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.	Stillson, Adelbrett	Oshkosh.
Sanderson, Edw....	Milwaukee.	St. John, J. W...	Janesville.
Sanderson, R. B	Madison.	Stockman, John..	Milton.
Sarles, John H.	Boscobel.	Stone, G.....	Beloit.
Schute, Charles	Milwaukee.	Storm, Wm.....	Madison.
Schutt, U	Janesville.	Stowe, LaFayette .	Sun Prairie.
Scott, S. B.....	Milwaukee.	Street, Richard ...	Waukesha.
Seville, James....	Merrimac.	Sutherland, C.....	Syene.
Sexton, Kellogg....	Milwaukee.	Swain, Wm. W...	Madison.
Sexton, W. F.....	Milwaukee.		
Simmons, C. J.....	Monroe.		
Sinclair, Jeff.....	Milwaukee.	Tallman, W. H...	Janesville.
Sharp, J. W.....	Iowa.	Taylor, E.....	Mukwanago.
Shaw, J. B	Milwaukee.	Taylor, W. R.....	Cottage Grove.
Sheldon, A. H.....	Janesville.	Tenney, H. A	Madison.
Sheldon, D. G...	Madison.	Tenney, D. K	Chicago.
Sheldon, S. L	Madison.	Tenney, Samuel...	Durham Hill.
Shepherd, C.....	Milwaukee.	Terry, A. H.....	Milwaukee.
Sherman, Amaziah .	La Prairie.	Terwilliger, Jas...	Syene.
Sherman, George...	La Prairie.	Thorson, John...	Milwaukee.
Sherman, J. M	Burnett.	Tibbits, Geo. M ..	Milwaukee.
Sherwood, J. C. ...	Dartford.	Tierney, K	California.
Shipman, S. V.....	Chicago.	Thompson, W. H.	Chicago.
Skelley, Charles....	Janesville.	Thorp, J. G.....	Eau Claire.
Skinner, George J..	Sio'x Fall, D.T.	Todd, J. G.....	Janesville.
Skinner, E. W.....	Turner, D. T.	Tolford, J. W	Neillsville.
Slaughter, Geo. H ..	Madison.	Torgerson, Lars...	Madison.
Sloan, I. C	Madison.	Torrey, R. D.....	Oshkosh.
Slocum, G. A..	Chicago.	Townley, John ...	Moundville.
Smith, Wm. E.. ...	Milwaukee.	Treat, R. B.....	Chicago.
Smith, Winfield....	Milwaukee.	Treat, George E ..	Milwaukee.
Smith, Angus	Milwaukee.	Twining, M. S....	Magnolia.
Smith, Adam.....	Burke.		
Smith, J. B.....	Milwaukee.		
Smith, S. W.....	Janesville.	Van Brunt, W. A.	Horicon.
Smith, H. L...	Janesville.	Van Cott, Albert B	Chicago.
Smith, M. C.....	Janesville.	Van Etta, Jacob ..	Madison.
Smith, S. B	Vernon.	Van Kirk, N	Milwaukee.
Smith, J. Maurice ..	Chicago.	VanNorstrand, A. H	Green Bay.
Smith, J. M.....	Green Bay.	Van Schaick, I. W.	Milwaukee.
Snell, H.....	Madison.	Van Slyke, N. B .	Madison.
Spaulding, William.	Janesville.	Vaughan, O. A...	Lodi.
Spencer, James C...	Milwaukee.	Viall, Andrus.	Madison.

Names.	Residence.	Names.	Residence.
Vilas, Chas. H.....	Cleveland, O.	Wightman, H	Black Earth.
Vilas, L. M	Eau Claire.	Wilcox, C. T	Janesville.
Vilas, Wm. F	Madison.	Wilkins, A. W....	Milwaukee.
		Wiley. O. S.....	Benton Harbor, Mich.
Ward, A. J.....	Madison.		
Waggstaff, S	Oshkosh.	Williams, C. H....	Baraboo.
Wackerhagen, E....	Racine.	Williams, D.....	Darien.
Wait, J. B.....	Waitsville.	Williams, Daniel .	Summit.
Warren, Albert.....	Madison.	Williams, G. G ...	Whitewater.
Warren, J. H.....	Albany.	Williams, J. P....	Janesville.
Webster, James	Danville.	Williams, Randall	Janesville.
Webster, Martin...	Fox Lake.	Williams, S. B....	Madison.
Webb, James A	Janesville.	Williams, S. G....	Janesville.
Welch, W.....	Madison.	Wilson, Wm.....	Westport.
Wells, Daniel L	Milwaukee.	Wilson, Zebina ...	Palmyra.
Werner, John	Sauk.	Wood, J. W	Baraboo.
West, Henry	Madison.	Wooiley, J. T.....	Milwaukee.
West, S. C.....	Milwaukee.	Wootton, Robert..	Madison.
West, Henry M.....	Milwaukee.	Worthington, B. M	Madison.
Whaling, J. M.....	Milwaukee.	Worthington, Geo.	Milwaukee.
Wheeler, Geo. F ...	Waupun.	Wright, D. H.....	Madison.
Wheeler, Guy	La Prairie.	Wright, Geo.....	Mt. Horeb.
Wheeler, L. A.	Milwaukee.	Wright, J. S.....	Emerald Grove.
Wheelock, W. G....	Janesville.	Wright, Josiah S..	Janesville.
Wheelright, J	Middleton.	Wylie, Geo. W...	Elkhorn.
Whiting, W. F	Milwaukee.		
Whitney, W. F	Milwaukee.	Young, J. E	Janesville.
Wicks, Thomas	Milwaukee.		
Wight, O. W	Milwaukee.	Zweitusch, Otto...	Milwaukee.

OFFICERS OF THE SOCIETY.

1882.

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 — J. S. McDONALD, FOND DU LAC.
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.
J. W. WOOD, BARABOO.
H. D. HITT, OAKFIELD.
L. G. ARMSTRONG, BOSCOBEL.
CLINTON BABBITT, BELOIT.
WM. H. MORRISON, ELKHORN.

TWENTIETH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE AGRICULTURAL SOCIETY.

To His Excellency, General JEREMIAH M. RUSK,

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 1881–1882.

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 Patty House in Fond du Lac, September 26, 1881.

Present, President Fratt, Vice-Presidents Boyce, Warren, Morrison, Martin, Pilgrim, Stilson and Dore, and Treasurer Miner, and Messrs. Babbitt, Fox, Arnold, 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.

That it was with real sorrow that he announced to the board the death, at Minneapolis, Minnesota, on the 22d ultimo, of the Hon. Satterlee Clark, so long a member of this board — always faithful, always zealous in attending to the department which for so many years he had presided over.

On motion of Secretary George E. Bryant, Dr. C. L. Martin, J. H. Warren and Eli Stilson were appointed a committee to present resolutions commemorative of Vice President Satterlee Clark.

On motion of W. W. Field, the secretary was directed to hold open the books of entry until Tuesday noon.

TUESDAY EVENING, September 27.

Board met, president in chair; quorum present. On motion, voted that the superintendents of horses and cattle permit no persons inside of the show rings except judges and necessary attendants.

WEDNESDAY EVENING, September 28.

Board met, president in the chair.

Messrs. Towne and Wells, citizens of Fond du Lac and exhibitors at the fair, appeared before the board, and on behalf of the citizens and exhibitors asked that the fair, on account of the severe rain storms, be extended the next week.

On motion, the consideration of said request, with petition accompanying the same, was laid over until subsequent meeting.

THURSDAY EVENING, September 29.

Board met, and on motion of W. W. Field, a board meeting was called for Friday morning at 9 o'clock, at the office of the secretary on the fair grounds, and all matters pending were by said motion laid over until that time.

FRIDAY, September 30, 1881 — 9 o'clock A. M.

Board met at the office of the secretary on the fair grounds, President Fratt in the chair.

Vice President Boyce moved that, in consequence of the severe storms of rain, and hence inadequate receipts to meet the premiums and expenses of the present fair, that the president and secretary be authorized to make a loan to meet the liabilities of the society, and to mortgage any property of the society to secure the payment of the same. Carried.

On motion of Clinton Babbitt, it was voted to continue the fair on Saturday, and that the entrance fee be twenty-five cents.

FRIDAY EVENING — 7 P. M.

Board met, Vice President Stilson in the chair.

Hon. A. A. Arnold moved that the thanks of the board be rendered to the Fond du Lac Light Guard, Capt. Brasted, for their efficient services as track patrol, and that the city of Fond du Lac be complimented on having such a splendid body of men. Carried.

On motion of Cyrus Miner, the Monroe cornet band were complimented for their faithfulness to duty.

On motion of Dr. W. H. Fox, the secretary was directed to procure a suitable testimonial of silver, at an expense not to ex-

ceed ten dollars, and present the same to John Seirvert, the young man who found and returned a sum of money to the owner, as a token of the regard of this board, for duty honestly performed.

SATURDAY MORNING — 9 A. M.

Board met at office of secretary on fair grounds, President N. D. Fratt presiding, and having adjusted all matters of difference which had arisen, and after auditing accounts and directing that premiums be paid at once in full, adjourned.

GEO. E. BRYANT,
Secretary.

DECEMBER MEETING.

STATE AGRICULTURAL ROOMS,
December 7, 1881.

As provided by the by-laws and pursuant to published notice, the executive board met in their rooms in the capitol, December 7, 1881. 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 7, 1881, and which may be found in the volume of transactions for 1881–82, 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.

The committee appointed to draft resolutions commemorative of Hon. Satterlee Clark presented the following:

Resolved, That the members of the Wisconsin State Agricultural Society have learned in sorrow of the death of Vice President Satterlee Clark.

Resolved, That in the death of Satterlee Clark this society loses a faithful officer, and a most zealous and devoted friend.

Resolved, That the widow and family of Mr. Clark has the sympathy of

this board and society, in this great affliction, in the loss of their kind husband and indulgent father.

Resolved, That these resolutions be spread upon the records of the society.

C. L. MARTIN,
(Signed) J. H. WARREN,
ELI STILSON.

Which were unanimously adopted.

On motion, adjourned.

GEO. E. BRYANT,
Secretary.

FEBRUARY MEETING.

STATE AGRICULTURAL ROOMS,
MADISON, February 6, 1882.

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, J. S. McDonald, John S. Dore and J. T. Kingston, and additional members, H. D. Hitt, J. W. Wood, W. H. Morrison, Wm. H. Fox, L. G. Armstrong, A. A. Arnold and Secretary George E. Bryant.

President N. D. Fratt in the chair.

Reports of superintendents were read to the board.

TUESDAY, February 7.

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

The premium list was examined and revised.

On motion of Vice President D. T. Pilgrim, the secretary was instructed to meet other secretaries of neighboring states and arrange for a circuit of fairs for the better accommodation of exhibitors from abroad.

Voted, that President N. D. Fratt, Secretary Geo. E. Bryant, Vice President C. L. Martin, Vice President John S. McDonald and Hon. A. A. Arnold be appointed a committee to locate fair and name time of holding same.

Upon request, Mrs. J. E. Irish, Mrs. John Bascom, Mrs. Willet S. Main and Mrs. John W. Sterling appeared before the board on

behalf of and representing the "Woman's Temperance Union of Wisconsin," and in most eloquent language appealed to the board to prohibit the sale of beer and ale at their great annual shows. The secretary was directed to draw the following resolution:

Resolved, That at the exhibitions held by this society in the future, beer and ale be excluded.

The secretary was asked the amount of revenue obtained from the sale of lots for the vending of beer, and replied from $500 to $600. Thereupon certain persons present agreed to make up to the society that amount. The resolution then passed.

On motion, adjourned.

GEO. E. BRYANT.
Secretary.

MADISON, March 1, 1882.

To Hon. N. D. FRATT:

Dear Sir — I have the honor to report, that by direction of the board, I met in Chicago the secretaries of Minnesota, Illinois, Chicago and St. Louis fairs, and the following circuit of fairs was agreed upon: Minnesota, September 3d to 9th; Wisconsin, September 11th to 16th; Chicago, September 18th to 23d; Illinois, September 25th to 30th; St. Louis, October 1st.

Your obedient servant,
GEO. E. BRYANT.

The committee for locating state fair met at agricultural rooms in capitol, and located the same for 1882 at Fond du Lac, September 11th to 16th.

N. D. FRATT,
President.

SOCIETY MEETING.

ELECTION OF OFFICERS.

FOND DU LAC, September 29, 1881.

In accordance with the requirements of the constitution, and after due notice by the secretary, the life members of the Wiscon-

sin State Agricultural Society convened at the common council rooms in the city of Fond du Lac, at 8 o'clock P. M., to elect officers. President Fratt in the chair. The president said the society was convened for the purpose of electing officers for 1882, and other constitutional work.

Hon. W. W. Field moved that a committee of nine be raised, one to be appointed by the chair, and that each congressional district appoint one; which motion prevailed, and the following named gentlemen were appointed to said committee:

State at large — W. W. Field; 1st District — N. Cheeney; 2d District — Dr. Fox; 3d District — J. H. Warren; 4th District — D. T. Pilgrim; 5th District — Geo. P. Knowles; 6th District — Eli Stilson; 7th District — J. S. Dore.

The committee, by Hon. W. W. Field, its chairman, reported as follows:

President — N. D. Fratt.

Vice Presidents — 1st, Dr. C. L. Martin; 2d, A. A. Boyce; 3d, J. H. Warren; 4th, D. T. Pilgrim; 5th, John S. McDonald; 6th, Eli Stilson; 7th, John S. Dore; 8th, J. T. Kingston.

Secretary — Geo. E. Bryant.

Treasurer — Cyrus Miner.

Additional Members Executive Board — Clinton Babbitt, Beloit; W. H. Fox, Oregon; A. A. Arnold, Galesville; J. W. Wood, Baraboo; H. D. Hitt, Oakfield; L. G. Armstrong, Boscobel; W. H. Morrison, Elkhorn.

Hon. A. A. Arnold moved that the name of Chester Hazen be substituted for that of H. D. Hitt, which motion did not prevail. On motion, the report of the committee was accepted and adopted, and the gentlemen recommended by the committee were declared the officers of the society for the year A. D. 1882.

On motion, adjourned.

GEO. E. BRYANT,
Secretary.

ANNUAL MEETING.

STATE AGRICULTURAL ROOMS,
December 7, 1881.

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 7, 1881, bearing the approval of the executive board.

TREASURER'S REPORT

For the year ending December 7, 1881.

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 7, 1881.

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 7, 1881.

Respectfully submitted,

C. MINER,
Treasurer.

RECEIPTS.

Balance on hand December 1, 1880	$702 49
Amount from state appropriation	2,000 00
Amount from sale of tickets	8,415 00
Amount from entry fees	1,348 46
Amount from rent of ground	1,181 57
Amount from advertising	100 00
Amount from sale of forage	55 57
Amount from sale of fuel	9 18
Amount from Onondaga Salt Co	80 00
Amount from Keenan & Hancock	25 00
Amount from membership	420 00
	$14,337 27

DETAILED STATEMENT OF DISBURSEMENTS.

No.	To whom and for what.	Amount.
1	C. Miner, expenses December meeting	$9 35
2	Kiser, W. C., marshal	31 50
3	Daggett, J., labor	8 00
4	Wood, W., prem	6 00
5	Halson, F., repairing stamp	1 00
6	Booth, W. A., express	4 05
7	Gaffney, J. H., prem	7 00
8	Nichols, J. H., express	1 35
9	Crurie, John, prem	12 00
10	Chapman, C. P., prem	75 00
11	Madison Manufacturing Company, work	11 54
12	Patterson, J. M., prem	1 00
13	Babbitt, C., superintendent	24 73
14	Bowles, Thos., prem	15 00
15	Regom, Wm., prem	16 20
16	Nichols, J. H., express	1 25
17	Stillman, Mrs. W. D., prem	1 00
18	Riley, E. F., prem	10 00
19	Bryant, Geo. E., expenses	2 50
20	Parker, F. E., telegraph	50
21	Dean, E. B	11 00
22	Daniels, B., prem	10 00
23	Daten, J. D, prem	4 00
24	Wilson, N., prem	8 00
25	London, A., prem	25 50
26	Trenton, E., prem	2 00
27	Herchenger, Geo., prem	10 00
28	Booth, W. A., express	2 20
29	Clark, Satterlee, expenses board meeeting	10 50
30	Hazen, C., expenses board meeting	12 50
31	Hizer, C., expenses board meeting	15 00
32	Warren, J. H., expenses board meeting	19 75
33	Boyce, A. A., expenses board meeting	14 00
34	Dore, J. S., expenses board meeting	18 40
35	Morrison, W. H., expenses board meeting	12 00
36	Arnold, A. A., expenses board meeting	16 58
37	Babbitt, C., expenses board meeting	11 25
38	Miner, C., expenses board meeting	10 95
39	Pilgrim, J. T., expenses board meeting	12 00
40	Field, W. W., expenses July meeting	9 50
41	Bryant, Geo. E., office expenses	5 00
42	Parker, F. E., telegraph	70
43	Ross, C., prem	65 00
44	Baldwin, Mrs., prem	2 40
45	Wilcox, C. T., prem	6 00
46	Scott, C., prem	3 00
47	Husted, Mrs. J. R., prem	1 50
48	Fisher, S. D., printing	11 25
49	Billings & Detloff, work	50
50	Davidson, A. L., reporter	135 00
51	Nichols, J. H., express	2 10
52	Cook, Geo. B., engineering	6 60
53	Parker, F. C., telegraph	95
54	Dean, J. B., clerk	10 00

No.	To whom and for what.	Amount.
55	Bryant, Geo. E., secretary's salary	$450 00
56	Clark, Sat., expenses at April meeting	4 00
57	Arnold, A. A., expenses at April meeting	17 15
58	Bryant, Geo. E., expenses to Fond du Lac	4 00
59	Vilas & Bryant, prem	10 00
60	Gaul, J. M., goods	5 00
61	First National Bank	90 00
62	Nichols, J. H., prem	2 00
63	Kelly, Geo B., silver prem	403 56
64	Bryant, Geo. E., expenses to Fond du Lac	5 50
65	Brownson, C. E., telegraph	2 25
66	Bryant, Geo. E., secretary's salary	450 00
67	Nichols, J. H., express	2 60
68	Anderson, C., repair	4 00
69	Welch, Wm., prem	6 00
70	Nichols, J. H., express	40
71	Bryant, Geo. E., telegraph	4 05
72	Park, W. J., goods	3 70
73	Bryant Geo. E., expenses to Fond du Lac	5 50
74	Riley, Geo., livery	3 00
75	Racine Silver Plate Co	11 40
76	Aller, L. F., books	10 40
77	Bryant, Geo. E., expenses to Fond du Lac	8 50
78	Harvey, B. C., prem	25 00
79	Memhard, F., freight	7 10
80	Booth, W. A., express	2 65
81	Weber, W. F., printing	3 00
82	Dean, E. B., clerk	32 00
83	Bross, C. C., telegraph	1 50
84	Church, Wm., advertising	20 00
85	Lackin, J. W., advertising	20 65
86	Nichols, J. H., express	2 60
87	Hand. J. I., book	3 75
88	Ruff, P., advertising	3 00
89	Bryant, Geo. E., expenses to Fond du Lac	3 00
90	Nichols, J. H., express	1 65
91	Grover, F. B., assistant machinery department	10 00
92	Pierce, A. J., assistant machinery department	25 00
93	Bryant, Geo. E., expenses to Fond du Lac	3 00
94	Kutchin & Elliott, show bills	18 00
95	Rep. and News, advertising	2 50
96	Nichols, J. H., express	7 70
97	Bryant, Geo. E., post bills	3 50
98	Bryant, Geo. E., expenses	4 00
99	Ripon Free Press, advertising	2 50
100	Sumner, J. M., goods	8 71
101	Booth, W. A., express	11 65
102	Nichols, J. H., posters	244 40
103	Democrat Co., printing	30 50
104	Nichols, J. H., express	3 80
105	Church, Wm., advertising	12 00
106	Schofield, C. L., prem	2 50
107	Parker, Frank E., telegraph	3 60
108	Slaughter, W. C., clerk	10 00
109	Pierce, A. J., work in machinery department	10 00
110	Bryant, Geo. E., expenses to Fond du Lac	6 00
111	Beatley, C. R., post bills	1 50
112	Vilas & Bryant, court expenses	7 00
113	Bryant, Geo. E., expenses	20 00

No.	To whom and for what.	Amount.
114	Void	
115	Malone, B. W., post bills	$2 00
116	Pierce, A. J., work in machinery department	10 00
117	Swanson, J., repair flags	2 00
118	Dean, E. B., clerk	28 00
119	Slaughter, B. C., clerk	12 00
120	Haggies, N. L., dray	2 50
121	C. & N. W. R. R., freight	7 92
122	Pierce, A. J., expense in machinery department	11 00
123	Doubleday, Geo., prem	45 60
124	Stoddard, A., assistant in horse department	28 00
125	Shaake, S., prem	160 00
126	Dore, J. S., superintendent educational department	24 00
127	Dore, Mrs. J. S., asst. superintendent educational dept	7 00
128	Dore, J. S., expenses	60
129	Morrison, W. H., superintendent poultry	24 00
130	Arnold, A. A., superintendent cattle	28 00
131	Stilson, Eli, superintendent gates	32 00
132	Olcott, J. B., gate attendant	10 50
133	Bryce, A. A., superintendent forage	28 00
134	Gay, Wm. M., assistant forage department	15 00
135	Raymond, Wm., labor	9 75
136	Kocher, John, night watch	10 00
137	Brasee, A., assistant superintendent cattle	28 00
138	Snyder, Frank, assistant police cattle	12 00
139	Pattleford, J. R., prem	53 00
140	Cantard, A., prem	20 00
141	Ells, H., prem	12 00
142	Hillman, D. H., prem	4 00
143	Philbrook, S. A., assistant superintendent poultry	31 50
144	Brinkerhoof, F., prem	4 00
145	Hazen, C., superintendent sheep and swine	24 00
146	Randall, A., prem	54 00
147	Randall, R., prem	30 00
148	Burton, A. E., police	12 00
149	Darling, J. B., prem	11 00
150	Laughter, L. F., prem	25 00
151	Field, W. W., paper	50
152	Shaffer, Ella, assistant fine arts	3 00
153	Shaffer, Sarah, assistant fine arts	6 00
154	Jones, Mrs. A. R., assistant fine arts	42 00
155	Warren, J. L., watch	12 00
156	Stockton, J. C., prem	1 50
157	Leaf, Wm. B., assistant superintendent forage	20 00
158	Genter, F., gate attendant	21 00
159	Warren, A., gate attendant	21 00
160	Void	
161	Wells, Wm., prem	20 00
162	Jeffries, Geo., gate attendant	21 00
163	Void	
164	S. H. and A. C. Joiner, prem	101 00
165	Harve, D., prem	40 00
166	Johnson, D., prem	250 00
167	Corning, J., prem	20 00
168	Little, Thos., prem	100 00
169	Cole, John A., prem	59 00
170	McComber, H. E., prem	10 00
171	Smith, Miss Minnie, prem	5 00
172	Andrews, S. W., prem	20 00

No.	To whom and for what.	Amount.
173	McNutt, George, prem	$10 00
174	Clark & Mugers, use of horse	6 00
175	Crippin, D. S., assistant marshal	27 50
176	Westonelt, H., prem	3 00
177	Hauer, J. M., prem	20 00
178	Hazen, C., prem	155 00
179	Wells, W. H., prem	10 00
180	Horglin, J. W., prem	65 00
181	Huntly, D., prem	40 00
182	Ringrose, L. F., prem	39 00
183	Stowe, L. F., night watch	12 00
184	Jeffries, Geo., prem	38 00
185	Flint, Mrs. Julia A., prem	5 00
186	Reed, Wm., prem	60 00
187	Stowe, L. F., lumber	2 65
188	Parker, C. W., night watch	12 00
189	Wood, J. W., prem	39 00
190	Newton, H. W., prem	48 00
191	Vivian, M., prem	20 00
192	Keyes, Geo., prem	9 00
193	Cornell, Geo., prem	2 00
194	Hitt, H. D., superintendent manufactures	20 00
195	Clark, D. J., assistant superintendent manufactures	31 50
196	Clark, Harry, advertising	3 00
197	North, W. C., labor	12 00
198	Stockton, J. C., police	9 00
199	Kutchin & Elliott, printing	1 00
200	Mickle, John M. A., prem	15 00
201	Mickle, R. K., prem	10 00
202	Qurick, W. J., prem	15 00
203	Qurick, H. F., prem	5 00
204	Carpenter, J., prem	3 00
205	Lewis, G. W., prem	8 00
206	Waters, Mrs. E. C., prem	1 00
207	Jeffries, Geo., prem	10 00
208	Gough, Eddie, drayage	3 75
209	Hoaglin, Mrs. C., prem	20 00
210	Hanks, Chas., labor	4 50
211	Parker, Mrs. A. D., prem	3 00
212	Larany, J. N., prem	75 00
213	Wilkie, Mrs. W., prem	2 00
214	Leard, Wm., prem	3 00
215	Giddings, Mrs. D. C., prem	18 00
216	Warringer, A., prem	6 00
217	Hanchett, Miss A., prem	1 00
218	Pilgrim, D. T., prem	82 00
219	Pilgrim, D. T., superintendent horticulture	36 00
220	Pilgrim, D. T., paper	3 00
221	Pilgrim, D. T., prem	24 50
222	Pieffer, Geo., labor	6 00
223	Hautze, E., prem	44 50
224	Pieffer, Geo., prem	71 50
225	Austin, E. J., prem	47 00
226	Fowler, B. F., prem	25 00
227	Fowler, B. F., prem	10 00
228	Walton, Mrs. G. F., prem	1 00
229	Meekin, F. H., prem	15 00
230	Wagstoff, S. M., gate attendant	10 00
231	Wagstoff, S. M., prem	11 00

No.	To whom and for what.	Amount.
232	Mattie, E., and son, prem	$12 00
233	Worthny, Miss Ida, prem	2 00
234	Hatch, D., prem	10 00
235	Lucher, M. F., labor	9 00
236	Baker, J. M., assistant superintendent agriculture	21 00
237	Featherstone, H., labor	12 00
238	Martin, C. L., expenses	28 00
239	Lallier, Geo., evergreens	2 00
240	Hicks, J. H., secretary's clerk	12 00
241	Costello, D., prem	6 00
242	Warren, J. H., marshal	24 00
243	Simmons, G. S., advertising	10 00
244	Haslee, W., police	7 50
245	Snowe, T., prem	20 00
246	Kellogg, Geo. J., prem	5 00
247	Kellogg, Geo. J., watch	4 00
248	Kellogg, Geo. J., prem	6 00
249	Ott, Geo. W., prem	7 50
250	Dillon, Mrs. J. W., prem	3 00
251	Philips, T. J., police	7 50
252	Palmer, Wm, police	7 50
253	Bonnell, J., police	7 50
254	Collings, W., police	7 50
255	Barsaw, H., police	7 50
256	Williams, David, president's clerk	24 50
257	Bull, W., police	7 50
258	Peiffer, Miss Kate, prem	32 00
259	Martz, W., police	7 50
260	Jeffries, H., police	7 50
261	Rodwell, night police	8 00
262	Starks, S. J, police	7 50
263	Temprettie, J. K., prem	20 00
264	Hill J., labor	12 00
265	Carter, S. M., prem	4 00
266	Henry, W. F., prem	50 00
267	McDougal, Geo. W., assistant superintendent grounds	31 50
268	Crank, Miss Mattie, prem	3 00
269	Chadbourn, C., prem	15 00
270	Hoffman, H. H., labor	12 00
271	Norton, S. J., prem	24 00
272	Raymond, A., police	9 00
273	Wells, F. M., prem	15 00
274	Calkins, J. S., police	13 00
275	Rose, Allie, prem	12 00
276	Parsons, F. F., labor	14 00
277	Fratt, N. D., president's expenses and sundries	130 80
278	Bringine, H. S., labor	15 00
279	Miner, C., treasurer's expenses and sundries	48 00
280	Flack, J. W., prem	60 00
281	Brownell, I. C., treasurer's clerk	21 00
282	Smith, H. A., treasurer's clerk	21 00
283	Void	
284	Gordon, L. D., treasurer's clerk	21 00
285	Atwood, Chas., treasurer's clerk	21 00
286	Hall, A. G., treasurer's clerk	14 00
287	Heimstreet, E. B., treasurer's clerk	17 50
288	McNutt, G., prem	100 00
289	Hunkins, J. C., police	10 00
290	McNutt, G., prem	45 00

No.	To whom and for what.	Amount.
291	Wells, W. H., prem	$38 00
292	Wells, N. L., prem	62 00
293	Wells, L. M., prem	5 00
294	Benton, E., hardware	3 50
295	Bullis & Robbins, hack	1 00
296	Wagner, M. & Co., crape	4 88
297	Stewart, J. R., prem	8 90
298	Stewart, J. R., prem	1 50
299	Church, Wm., paint signs	4 25
300	Field, W. W., superintendent fine arts	60 00
301	Clevathan, Chas. C., painting	5 00
302	Main, A. H., sundries	3 40
303	Main, A. H., assistant treasurer	36 00
304	Henwood, N. A., treasurer's clerk	21 00
305	Van Slyke, S., secretary's clerk	36 00
306	Hale, J., teaming	1 50
307	Haxley, H. E., advertising	2 00
308	Dodd, H. H., electric light	200 00
309	Box sundries	8 16
310	Patty, Mrs., prem	2 00
311	Stamwad, H., post bills	22 00
312	Smith, R. H., prem	75 00
313	Broder, assistant superintendent horses	21 00
314	Stoddard, Chas., assistant superintendent horses	31 50
315	Babbitt, C., superintendent horse department	36 00
316	Babbitt, C., rolling track	1 75
317	Rand, H. H., gate attendants	18 00
318	Dodd, H. H., electric light	5 00
319	Micheljohn, C., prem	10 00
320	Stokes, G. H., prem	3 00
321	Sickles, D., watch	3 00
322	Bohn, J., prem	16 00
323	Home of Friendless, dinner tickets	8 33
324	Losselyoung, labor	10 50
325	Henery, John, police	7 00
326	Moore, Mrs. H. C., prem	2 00
327	Griffith & Moore, prem	25 00
328	Strany, J. L., prem	3 00
329	Griffith & Son, prem	75 00
330	Griffith, Moore, prem	5 00
331	Spoor, A. L., watch	10 00
332	Losselyoung, M., carpenter	14 00
333	Home of Friendless, dinner tickets	19 33
334	Helmer, O. L., feed	33 75
335	Whittlesey, J. C., prints for draping	9 89
336	Hart, S., watch	16 00
337	Wilkie & Daner, prem	2 00
338	Aldrich, J. W., clerk	12 00
339	Roberts & Dwight, advertising	3 25
340	Britton, C. L., work on bank	24 75
341	Atwood, M., watch	14 00
342	Atwood, M., labor	3 00
343	McIntosh, Miss C. M., prem	2 00
344	Stilson, Eli, prem	210 00
345	Stilson, Miss Hattie, prem	3 00
346	Raven, L. C., dinner tickets	6 05
346½	Kutchin & Elliott, advertising	6 50
347	Raven, S. C., labor	8 75
347½	Bounke, M., prem	4 00

No.	To whom and for what.	Amount.
348	Baptist church, dinner tickets	$81 66
349	Hiner, Mrs., prem	5 00
350	Hartman, P., prem	10 00
351	De Grand & Gidding, shafting	150 78
352	Post, W. H., use of furniture	18 75
353	Pagoe, Andrew, livery	50 50
354	Void	
355	Jones, Ed., prem	3 84
356	Farnsworth, J., prem	26 00
357	Jones, A. R., prem	3 00
358	Hoskins, J. A., prem	3 84
359	Wheeler, watch	10 00
360	Dawes, C. P., prem	16 00
361	Zinke Bros., forage	32 53
362	Doblan, F., prem	66
363	Gilbert, Mattie, prem	1 00
364	Clark, J., prem	3 00
365	Kelly, F., hay	424 58
366	Trelson, L., straw	155 05
367	Parker, C. W., watch	5 50
368	Button, C. H., goods	11 78
369	Gwinson, T., dray	1 50
370	Kent, Nellie, prem	5 00
371	Codd, Pat, watch	17 00
372	Govet, A. L., pump	4 00
373	Ault, J., teaming	4 00
374	Pratt, Wm., police	2 00
375	Western Union Telegraph	1 38
376	Pettibone, C. J., prints	2 00
377	Austin, W. J., ex. machine department	47 50
378	Krag, W., teaming	1 00
379	Locking, J. W., printing	14 81
380	Benton, H. C., coal	37 69
381	Benton, Mrs. H. C., prem	2 00
382	Kinniniment, R., prem	5 00
383	Kerd, Julia, care ladies' hall	10 00
384	Kalk & Kent, paper for fine art hall	1 60
385	Stamord, Henry, clerk	45 00
386	Reader, F., use of tent	2 00
387	Void	
388	Locking, J. W., secretary's clerk	20 00
389	Pierce, A. J., assistant machinery department	15 00
390	Hoyt, F. C. G. E., prem	15 00
391	Hughes & Otis, goods	21 69
392	Loper, C. J., prem	5 00
393	Walding, W. A., watch	18 00
394	Gile, B. S., prem	2 50
395	Hober, And., prem	1 20
396	Swan, A., dinner tickets	1 33
397	Bobbins, C. S., prem	10 00
398	De Long, A. E., clerk	5 00
399	Fox, A. C., prem	105 00
400	Davis, Thos., prem	17 00
401	Palmer, N. N., prem	10 00
402	Hiemstreet, E. B., clerk	14 00
403	Roberts, A. C., prem	60 00
404	McCall, Louisa, prem	2 00
405	Wadley, C. T., prem	91 80
406	Kitzerow, Wm., prem	46 00

No.	To whom and for what.	Amount.
407	Brown, C. E., telegraph	$8 55
408	Nichols, J. H., express	5 30
409	Clum, H. A., prem	8 00
410	Clum, H. A., prem	3 00
411	Bryant, Geo. E., secretary's salary	450 00
412	Pierce, A. J., court expenses	65 00
413	Pierce, A. J., assistant superintendent machinery	3 00
414	Pierce, A. J., assistant superintendent machinery	2 00
415	Memhard, F., cartage	3 00
416	Calkins & Watrous, paper	52 50
417	Hoot, E., prem	5 00
418	Stuart, J. K., prem	54 60
419	Kimer, John, posting bills	1 75
420	Russell, Morgan & Co., bills	50 00
421	Hare, S. H., clerk	10 00
422	Slaughter, B. C., clerk	30 00
423	Pollard, W. W., letterings	1 75
424	Mallay, J. P., prem	100 00
425	Harrington, C. F., prem	15 00
426	Angell, C. E., prem	3 00
427	Delevard, A. L., prem	3 84
428	White, H. L., prem	1 00
429	Sloan, Wm	24 00
430	Kiser, J. C., prem	145 00
431	Kiser, Wm. C., prem	90 00
432	Evenson, W. H. D., drayage	2 75
433	Baxter, Geo., clerk	18 00
434	Palmer, H., prem	17 50
435	Sprecher, John, prem	35 00
436	Bowles, Mrs., prem	30 00
437	Henry, S. A., prem	4 00
437½	Dusinbury, J., prem	3 00
438	Parkis, H. C., posting bills	1 75
439	Phiff, W. A., prem	10 00
440	Bosford, Wm. W., prem	110 00
441	Johnson, J., prem	17 00
442	Boyce, A. A., expenses	3 00
443	McFarland, J., labor	23 50
444	McFarland, H., labor	6 50
445	Owen, J. E., prem	47 00
446	Wyman, Ed, prem	4 00
447	Case, J. I., prem	35 00
448	Case, J. I., prem	26 20
449	Baker, Geo., prem	192 00
450	Baker, N. H., prem	160 00
451	Thomas, Wm. B., prem	11 00
452	Rawson, L., prem	25 00
453	Johnson, Miss A. E., prem	1 00
454	Alark, A., posting bills	1 50
455	Paddleford, J. A., prem	4 00
456	Joiner Bros., prem	4 00
457	Smith, J. M., prem	5 00
458	Dore, S. M., prem	8 00
459	Fuller, Frank, prem	10 75
460	Fuller, Frank, clerk	11 25
461	Slaughter, B. C., clerk	12 00
462	Cantwell, M J., printing	149 25
463	Tearunine, W. H., prem	54 50
464	Campbell, J. S., prem	3 84

No.	To whom and for what.	Amount.
465	Roe, J. P., prem	$5 00
466	Leonard, S. S., prem	12 00
467	De Haven, prem	25 00
468	Brabason, J. B., prem	73 50
469	Bodr, T. W., prem	5 75
470	Blandenberg, A. C., prem	3 00
471	Abland, Wm., prem	6 00
472	Johnson, J., prem	160 00
473	Buchanon, D., prem	25 00
474	Durand, H. L., prem	115 00
475	Friday, H., prem	5 00
476	Kasson, D. W., prem	2 75
477	Fitz Henry, Robt., weighing hay	2 27
478	McIntyre, J. W., sawdust	6 00
479	Shrug, Henry, carpenter	442 74
480	Shiny, H., carpenter	7 00
481	Galbraith, J. & I., prem	10 00
482	Wilson, E., prem	24 00
483	Moore, J. W., prem	120 00
484	Booth, W. A., express	1 65
485	Bradley, C. T., prem	174 00
486	Pierce, A. J., prem	20 00
487	Doubleday, Geo. E., prem	34 40
488	Swenson, T., clerk	32 00
489	Williams, Robert, prem	10 00
490	Percy, W. D., prem	10 00
491	Tuffley, T. H., police	12 00
492	Rhodes, B., prem	4 58
493	Custard, A., prem	7 68
494	Payne, Wm., horse book	1 50
495	Vilas & Bryant, witness fees	2 00
496	Frink, J., prem	2 00
497	McComal, W. N., prem	40 00
498	Bennett, E. N., prem	39 00
499	Bennett, E. B., police	12 00
500	Banford, H. J., prem	22 68
501	Witter, F., prem	3 84
502	Boyce, A. A., prem	5 00
503	Morton, Hugh, prem	2 00
504	Woodley, C. T., prem	11 40
505	Hessling, R., prem	5 00
506	McConnell, Wm., prem	35 00
507	Sumner, A., prem	3 84
508	Atwood, David, printing	24 00
509	Smith, Hiram, prem	8 33
510	Loomis, H. K., prem	3 84
511	Kantner, J., prem	3 84
512	Kennedy, E. C., prem	3 84
513	Springham, Wm., prem	3 84
514	Kuentz, David, prem	3 84
515	Soukan, F., prem	3 84
516	Danforth, W. W., prem	3 84
517	Colson, E. N., prem	3 00
518	Humbert, A. G. P., prem	87 00
519	Rawson, L., prem	30 00
520	Pierce, A. J., court expenses	10 00
521	Pierce, A. J., court expenses	40 00
522	Bryant, Geo. E., expenses at Patty House	14 80
523	Dean, E. B., clerk	28 00

No.	To whom and for what.	Amount.
524	Blodgett, A. J., prem	$55 00
525	Thompson, T., prem	10 00
526	Park, W. J., goods	2 75
527	Morrison, J., prem	11 00
528	Dodd, H. B., express	2 05
529	Mathar Bros., prem	3 84
530	Haldu Bros., prem	3 84
531	Rich, C., prem	3 84
532	Bryant, Geo. E., prem	145 00
533	Parker, S., prem	10 00
534	Thaler, H., prem	1 00
535	Booth, W. A., express	1 10
	Total amount of orders	$13,943 97
	Paid dinner tickets	114 00
	Paid orders of 1880, Nos. 259, 359, 422, 433	44 08
		$14,102 05
	Unpaid orders, Nos. 453, 457, 466, 470, 475, 491, 496, 506, 509, 511, 512, 513, 514, 515, 516, 527, 529, 530, 531, 533, 534, 535	140 99
		$13,961 06
	Balance on hand	376 21
		$14,337 27

On motion, the chair appointed Geo. H. Slaughter, Jacob Van Etta and Deming Fitch 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 7, 1882.

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,

G. H. SLAUGHTER,
J. VAN ETTA,
D. FITCH.

On motion, the report was accepted and adopted.

On motion, Hon. A. A. Arnold, Dr. J. H. Warren, Clinton Babbitt, Seth Fisher and Geo. E. Bryant were elected delegates to the National Agricultural Convention at Washington January, 1882.

On motion, adjourned.

GEO. E. BRYANT,
Secretary.

EXHIBITION OF 1881.

OPENING ADDRESS.

By Hon. N. D. FRATT, President.

Fellow Members of the State Agricultural Society, Ladies and Gentlemen: It is with peculiar pleasure that I come before you on this occasion. This is the first great gathering of farmers in our annual agricultural fair in this beautiful portion of our noble state of Wisconsin. Yet, in the history of our State Society, it must not be forgotten that Fond du Lac has been intimately and prominently associated with us. The Wisconsin State Agricultural Society was organized at Madison, March 12, 1851, and this organization was completed by the election, as its first president, of Erastus W. Drury of Fond du Lac. Considering *now* the organization and *life* of this society, its struggles and growth and development during this period of over thirty years, until it becomes in a degree commensurate with the wonderful spread and varied interests of our State, well may we find peculiar pleasure in standing in this place, which, if not the birth place of our society, is of greater importance to us in giving the wise supervision and guidance we found in our first president.

Then, and now! How things are changed since then! Then — it seems a short enough time to look over the intervening space — then we had not a railroad in the state, scarcely a reaper, a mower or even a grain drill. Then we had scarcely one of the great inventions for material progress which have revolutionized the world. Think for one moment of the long miles to and from market, the heavy drafts of grain one way, the loads of lumber back. Think of the fearful labor of cutting all the acres of grain with the heavy swinging cradle, all the grass with the slow-moving scythe; and despite all the poetry which has been written by those who practically knew nothing about it, *we*, who were in it,

and a part of it, can heartily thank God that it is all passed away forever. Now, by the wonderful inventions of this age, the farmer is brought into the front ranks in the great onward march of the world. By the railroad and the steamship *space* is annihilated, and the markets of the world are brought to his door. By the telegraph and the telephone *time* is annihilated, and he can daily and hourly learn the changing conditions of the crops in all parts of the world; he can hear the bellowings and the growlings of the bulls and the bears in the stock and produce exchanges of the great cities, and can himself form an intelligent judgment of prospective prices, and dictate terms to the buyers, rather than ignorantly submit to those imposed by local dealers or agents; and as matter of education, these inventions bring us close to all the movements and doings of the great world we live in. These movements and events are made tributary to our growth and discipline as *men*. We *hear* the debates in the British Parliament on the Irish land bill. We know what the Nihilists are doing in Russia and Germany. We hear the groans of famine stricken millions in China or India. An earthquake in South America, or the islands of the sea, shakes our own casements. The good and the evil, victories of war and victories of peace, all discoveries of science are now brought directly to us, and we are a great part of this active, enterprising, and, let us hope, ever advancing march of the world of humanity. How *great* a part we form of this progression we cannot realize. Let us, from a comprehensive view of our relations to the world, descend a little to a consideration of those relations to our own country in particular. Let us do this, not in a spirit of foolish conceit or vain glory, but as matter of proper encouragement to us as farmers, to a class which needs it, and to give us that due sense of the relative value of our efforts, compared with those of the commercial and professional world, which will enable us to realize that in *usefulness*, in dignity, and in *honor*, our calling stands *second* to *none*. This is specially desirable for our young men, who have too great a tendency to forsake the certainty and independence of the farm for the speculation and often slavish anxiety and cares of commerce and the professions.

In considering the relations we bear to the nation, let us first know and feel that we, as a class, form the basis, and speaking reverently, the *source* of all national prosperity; all the *wealth* of the nation comes from the producing classes. Of course these classes include with us the mining and manufacturing interests.

But all outside of these, with very few exceptions, are in a secondary and lower sense useful, for they are go-betweens, middlemen, our servitors, handling our produce, returning our capital, often fleecing us, it is true, as servants will, but still serving, exchanging, ministering, and not producing, developing or creating. They are like the boy supplying the wind to the church organ. They may cause a stoppage of the music, but they can not create it. We constitute this broad basis of national prosperity, because we are the direct producers of the wealth which sets and keeps in operation all the vast and varied machinery of national and social order; all the comforts, and most of the joys and refinements of life are the results of this wealth. To realize this, it is only necessary to go to a sterile country, or to a sterile, mountainous part of our own country, or to any country where bad laws or political disorder prevents agricultural prosperity, and the poverty and degradation of the people contrast very painfully with the life of order and intelligence and refinement to which we are becoming more and more accustomed. And further, the farmer stands at the head of all other industries, because the success and prosperity of all depends upon his success and prosperity; if he fails, all fail. The farmer starts the mill and the factory, the plane and the loom, the foundry and the forge. He builds up our great cities, and our prosperous villages. His industry causes to be peopled our great marts of commerce; it is the very substratum upon which we have builded and will continue to build all our industries. It is the very sheet anchor of our hope as a nation. This relation of agricultural prosperity to the progress of civilization and refinement, and even of national virtue, has always existed, and it can be shown historically from the examples of ancient nations, and from observation of the present condition of nations the world over at the present day. When, from any cause, a nation ceases to protect and honor

agriculture as the source of its wealth and prosperity, that nation begins to decline; it drops out of the rank of progressive nations, and becomes a monument, and a warning, that only in honorable, virtuous and intelligent labor is security and progress, and even life itself. We constitute the basis of this nation's prosperity also as owners of the soil; we furnish the conservative element of *stability* to the republic. The possession of this landed interest makes us cautious. Slow — perhaps too slow — in the reception of new ideas and theories; but this very care and conservatism, combined with the intelligence which is necessary to success in our business, make us a most valuable and indeed an essential element in political and social order. Among many other good things concerning the American farmer, the Hon. H. G. Davis told the United States senate in January last, that "our liberties were conquered, and our constitution made mainly by farmers, and to them, in any great crisis, we must look for the safe-keeping and protection of both." As a rule the agricultural classes have always been devoted to liberty, peace, and good order, and have been the friends of established society, and the enemies of disorder, wrong, change, violence, and unjust revolution; they constitute the forces of conservatism in all governments, and especially in ours. It is in the cities and great commercial centers that rings, strikes, frauds, trades unions, centralization and consolidation are born, fostered, and best flourish, while in the agricultural districts the tendency is in the opposite direction. Washington, in one of his messages to congress, said: "It is not to be doubted that, with reference either to individual or national welfare, agriculture is of primary importance." In proportion as nations advance in population and other circumstances of maturity, this truth becomes more apparent and renders the cultivation of the soil more an object of public patronage. Institutions for promoting it grow up supported by the public purse; and to what object can it be dedicated with greater propriety? Now, after a few facts in regard to a national support and advancement of this great interest, I will very briefly consider some of the questions which more immediately concern us as a society. First considering the importance of agriculture to the nation: What is the nation doing for agri-

culture? What ought it to do? What are other nations doing for agriculture within their limits? What is the nation doing for agriculture? It *has* a "department of agriculture." It is foreign to my purpose now to consider whether its work is well or ill done, or even what should be the sphere of its operations. It is enough now to know the interest taken by the general government in this department, as shown, not by the demands upon it for seeds and plants by congressmen, to curry favor with constituents, but by the annual appropriations made from the public treasury to enable it to carry on properly its functions. There has been an annual appropriation of $84,634 as the average allotment during its existence. When it is noted that the last census shows that one-half the people of this country are either directly engaged in agriculture or wholly dependent upon it for support, this sum seems indeed insignificant. In the year 1877, when a greater sum than ever before was appropriated, $174,686 served the department of agriculture, while $14,837,375 was allotted to the treasury department; and by consolidating the appropriations for the same year, the war and navy departments, military and naval establishments, we have a total of $50,117,824 for defense, which was two hundred and eighty-six times as much as that allotted for production. Let each one of us for himself ponder the question, what the nation *should do* in behalf of this overwhelming interest. Ponder it in the light of the government's appropriations for railroads, mail steamships, and other interests which are often of corporate or even of a private character. Then consider what other nations are doing. The most prosperous of them are those which pay most in aiding the development of scientific agriculture from the public treasury as matter of national importance.

In 1877:	
Austria and Hungary expended for agriculture	$5,495,125
France, for agriculture and commerce	20,534,210
Russia, for agriculture and public lands	14,826,184
Prussia, for agriculture	2,612,340
Italy, for agriculture and commerce	2,716,995
Sweden, for agriculture	651,737
Great Britain, for agriculture	795,590
United States, as before mentioned	174,686

Thus we see the little kingdom of Sweden, with a population less than that of the state of New York, does more than three

times as much to foster production than is done by this great Nation. Well may we consider the lesson given by the unexampled prosperity of France since the war with Prussia, in connection with an annual appropriation of over twenty millions of dollars in the interest of agriculture and commerce. These are questions of the greatest national importance, and it will be well for us to carry them with us, and let them influence us in the choice of our senators and representatives to the general government. In looking over the labors and results of the year, we must acknowledge that the elements have been greatly against us. Unchanging prosperity is not the lot of man, and the farmer's calling is no exception. Yet no great calamity has befallen us. Our crops are below the amounts expected; yet we have enough, and a surplus, and prices rule above the average. Throughout the nation a prosperity prevails in most departments of human effort which is almost unexampled. The lesson which is most forcibly impressed upon us by events is the greater need of mixed husbandry. Please to understand that I do not mean that all farmers in all places are alike to grow everything. Some sections of the state are from the character of the soil, or from nearness to large cities, or from facility for transportation, specially favored with regard to special products; and indeed nearly every farmer, from these and other causes, may more profitably pursue one line of thought and labor than others, and may make the others subsidiary to the one. But let him not depend too exclusively on any one product. To the average farmer that which will enable us to add to the *fertility* of the *farm*, and supplies us year by year, even though the season be unfavorable, something which will be in demand, and yield us the ready money for pressing needs, till we have a more favorable season. We must remember that the great markets of the world are brought constantly nearer to us. We are finding the needs of the world; and the world is finding our ability to supply its wants. As matter of experiment, fresh apples of the crop of 1880 were sent direct to Germany. The consignment consisted of one hundred and twelve barrels of Spitzenbergs, Baldwins and Greenings; in less than twenty-four hours after their delivery at Coburg, every barrel was sold at $4.50 to $5 per barrel, and the demand was far from being satis-

fied. A few years since we were importing flax seed for our own needs at the rate of three hundred thousand bushels per month; now we have sold for shipment to Europe, within a few weeks past, one million bushels of seed. Of our wheat crop, which from winter killing and loss by chinch bug and the Hessian fly we have supposed would be very light, recent most reliable estimates place at four hundred and twenty million bushels, within sixty million bushels of that of last year, and only thirty million bushels less than that of 1879, and out of that we exported one hundred and seventy-eight million bushels. There is a surplus on hand of fifty million bushels of wheat left over from last year, and this added to this year's supply gives us four hundred and seventy million bushels to meet home and foreign requirements. Prosperity to the country generally means prosperity also to the Wisconsin farmer, however local failures may cause temporary depression.

The dairy interest must have its ups and downs as well as other branches of farming. The year 1879 was specially unfavorable, but 1880 was remarkably prosperous. This year, although in the first of the season prices were low, the greater cost of meat and other influences have caused such an advance in the price of butter and cheese that the dairymen are again jubilant. On the whole, the dairy business of the state has had a steady and rapid growth, and more than kept pace with the same business in other parts of the country. Ten years ago the production of butter in Wisconsin was in round numbers twenty-two million pounds; in 1876, fifty million pounds; in 1877, sixty-two million pounds; in 1878, sixty-three million pounds; in 1879, sixty-four million pounds, and in 1880, sixty-five million pounds. Of cheese, during the same years — 1870, one million five hundred thousand pounds; in 1876, seventeen million pounds; in 1877, twenty-one million pounds; in 1878, twenty-four million pounds; in 1879, twenty-five million pounds, and in 1880, twenty-seven million pounds. This is certainly a very flattering showing of the dairy products of Wisconsin. The cloud which overshadows the prospects of Wisconsin dairymen now is the adulteration of good products, and the manufacture of poor cheese and

false imitation of butter in the articles oleomargarine and sueine. It seems as though state and national legislation were necessary to check this growing evil. Dairymen are, from their "associations" and discussions therein, abler than others to comprehend this evil and the remedy. But they need the assistance of all our agriculturists to bring the necessary "moral suasion" to bear upon our law makers. Stringent laws, vigilantly executed, can alone secure the prosperity of this most important industry.

Last year the growth of sorghum sugar was recommended. The introduction of the Minnesota early amber cane has given a greater impetus to this culture, and its success, as a branch of northern agriculture, seems to be only a question of time. There can be but little doubt that the state will soon be able to produce all the sugar necessary for home consumption.

It seems a matter of necessity at this time that something should be said on the new mode of preserving fodder for cattle by means of silos. This mode of preserving green fodder for winter use seems to be passing from the region of doubt and experiment to that of certain and practical value. Great claims are made for it by its advocates, and those who have tried it most, claim most for it. It is to revolutionize our agricultural system. It is to have a special influence upon dairy farming. It is to cause at least three head of cattle to be kept where one was kept before. The ensilage or preserved fodder is said to contain all the elements of healthy growth and nutrition. It is said to be preferred by cattle to the best hay. The milk produced from it is said to be proved by analysis to be richer than the best milk with which it was tested.

This system is being thoroughly tried, and will be judged by its merits. There are many silos already built, and being built in the state, so that we shall all soon know their value, and be ready to profit by whatever of good may be developed for us. It seems to be but the application to green fodder for stock of the principle we find now so necessary in domestic economy, that of preserving fruits and vegetables, by canning, as nearly as possible in a natural condition, for use out of their season. This for us works perfectly, and is an invaluable gain. Let us not be hasty

to condemn what is new, because it *is* new and startling. "Make haste slowly," and be sure you are right, then go ahead, are excellent mottoes when properly applied; but in some matters we never *can* know the right without experimenting in the region of uncertainty. Our friends are making these experiments. They are public benefactors, and we shall rejoice in their success. This enterprise is very new; August Goffart began his experiments in 1850, and made his first silos in 1852; Mr. Mills, of Pompton, New Jersey, began to experiment in the fall of 1876. The first was the pioneer in France, where the system originated; and the latter is one of the most successful of our farmers in its application, and claims to have discovered a principle of the greatest benefit in the construction of silos and in the preservation of the fodder. It is proper at this time, when we have considered the relation of the farmer to the country, that we take some notice of railroads of the day, and his relation to them. They have rendered possible such a gathering of people as you see here to-day, and such a magnificent show of our products from all parts of the state. Justice demands an acknowledgment of our obligations to the railroads. It is not enough to admit this, coupled with the assertion "that after all it is in connection with the furtherance of their own interests." This is "damning with faint" praise. We should make this acknowledgment with an enlightened and generous sense of it, for these railroads have been and are managed with regard to the general good; with a lively perception of all that will conduce to the development and lasting prosperity of the country. True it is that these corporations combine with a view to the public weal chiefly and primarily or the promotion of their own growth and financial success. So do we, and so do all classes and professions. We *know* that as the farmer chiefly supports the railroads, so the railroads are absolutely essential to the success of the farmer. It is easy to see that no two interests are so closely related and mutually dependent as are these. It can be shown that this relation is so intimate that the increase in the production of grain throughout the United States for several years past has tallied with the increase of mileage of the railroads for the same years. *Each* has made *possible*

and *necessary* the growth of the other. Since the close of our civil war the mileage of railroads has increased in the United States from thirty-four thousand to ninety-four thousand miles. The farmer has had the chief advantage in this increased facility of transportation. In proportion to this *increase* of mileage has been the decrease of *cost* of transportation. The farmer certainly has not been the loser.

This is no time to attempt to show all the benefits resulting to agriculture from the railroad system of the United States. They really transcend *all* calculations. Edward Atkinson, of Massachusetts, in an elaborate paper on the "Railroad and the Farmer," says it can be proved, and will be proved, when Poor's manual of 1881 is issued, that the reduction of the rates of freight on all lines of railroads in the United States has been fully $320,000,000 a year for the past ten years. The revenue of the United States, for the same period, was $317,000,000 a year. The railroad managers can therefore prove that they have made such a reduction in their charges for moving the freight of the United States, during the past ten years, as to have equaled the sum levied upon the people during the same period, for the payment of national expenses as well as for the reduction of the national debt.

Now, who enjoys the benefit or greater part of this saving but the farming community? The fact is that agriculture, the railroads, and all the other great interests of the country, are essential parts of a great organic whole. All dependent, and in the prosperity of each is involved the prosperity of all.

In conclusion, permit me to indulge the hope that this exhibition of the best products of our fields, our pastures, our orchards, our vineyards and our workshops will enhance in the minds of all the blessing and dignity of labor, and the high honor of our callings. We present you here to-day, the best results of the skill and the industry of our well ordered people. From the most primitive employment to the highest realm of fine art, we present you the best specimens of the capabilities of the soil and climate of this land of sunshine and fertility. May you all find interest and profit in it, and carry to your homes new hopes, new aspirations,

and lessons of practical advantage for the labors of the year to come.

I convey to you the welcome of the State Board of Agriculture, and sincerely hope that this exhibition may confer upon all who witness it, social enjoyment and profitable instruction. That it will encourage industry and skill by inspiring in us an honorable spirit of emulation, and, above all, energize a patriotic love for our glorious old state. Thanking you for your kind attention, I now declare the twenty-eighth annual exhibition of the State Agricultural Society open to the public.

PREMIUMS AWARDED.

DEPARTMENT A.— HORSES.

CLASS 1.— *Roadsters.*

Stallion 4 years old and over: 1st premium, Dr. H. P. Strong, Beloit; 2d premium, J. I. Case, Racine.

Stallion 3 years old and over: 1st premium, S. D. Doubleday, Whitewater; 2d premium, H. E. Macomber, New Lisbon.

Stallion 2 years old and under 3: 1st premium, Dr. H. P. Strong, Beloit; 2d premium, W. D. Perry, Ripon.

Sucking stallion, foal: 1st premium, B. Randall, Hustisford; 2d premium, T. J. Norton, Fond du Lac.

Brood mare 4 years old and over, with foal by her side: 1st premium, B. Randall, Hustisford; 2d premium, R. K. Meiklejohn, Waupun.

Filly 3 years old and under 4: 1st premium, C. T. Bradley, Milwaukee; 2d premium, Dr. H. P. Strong, Beloit.

Filly 2 years old and under 3: 1st premium, B. F. McLaughlin, Peebles; 2d premium, B. F. McLaughlin, Peebles.

Filly 1 year old and under 2: 1st premium, W. H. Wells, Jr., Fond du Lac; 2d premium, B. Randall, Hustisford.

Sucking filly foal: 1st premium, R. O. Roberts, Cambria.

Stallion and five of his colts at 4 years of age: 1st premium, S. D. Macomber, New Lisbon.

CLASS 2.— *Horses for all work.*

Stallion 4 years old and over: 1st premium, Dr. C. F. Harrington, Madison; 2d premium, H. O. Bailey, Caldwell's Prairie.

Stallion 3 years old and under 4: 1st premium, S. S. Leonard, Cedarburg; 2d premium, Daniel Castello, Fond du Lac.

Stallion 2 years old and under 3: 1st premium, R. H. Smith, Waupun; 2d premium, R. H. Smith, Waupun.

Stallion 1 year old and under 2: 1st premium, J. R. Paddleford, Oshkosh; 2d premium, J. R. Paddleford, Oshkosh.

Sucking stallion foal: 1st premium, M. Rourke, Empire; 2d premium, Hugh Martin, Eden.

Brood mare 4 years and over, with foal by her side: 1st premium, T. J. Norton, Fond du Lac; 2d premium, J. A. Paddleford, Oshkosh.

Filly 3 years old and under 4: 1st premium, J. A. Paddleford, Oshkosh; 2d premium, John Chrisman, Fond du Lac.

Filly 2 years old and under 3: 1st premium, Horace Ellis, Waupun; 2d premium, Horace Ellis, Waupun.

Filly 1 year old and under 2: 1st premium, J. A. Paddleford, Oshkosh; 2d premium, J. A. Paddleford, Oshkosh.

Sucking filly foal: 1st premium, T. J. Norton, Fond du Lac; 2d premium, J. R. Paddleford, Oshkosh.

CLASS 3.— *American Highly Bred Trotting Stock.*

Stallion of any age: 1st premium, Dr. H. P. Strong, Beloit. Diploma.

Span of stallions driven together and owned by one party: 1st premium, H. E. Macomber, grand silver medal.

Stallion and five of his colts in harness or not: 1st premium, S. D. Macomber, New Lisbon.

CLASS 4.— *Draft Horses — Pure Bred.*

Stallion 4 years old and over: 1st premium, R. O. Roberts, Cambria; 2d premium, H. J. Goldbright, Janesville.

Stallion 3 years old and under 4: 1st premium, A. Z. Blodgett, Waukegan; 2d premiun, A. Z. Blodgett, Waukegan.

Stallion 2 years old and under 3: 1st premium, Thos. Bowles, Janesville.

Stallion 1 year old and under 2: 1st premium, R. O. Roberts, Cambria.

Filly 2 years old and under 3: 1st premium, A. Z. Blodgett, Waukegan; 2d premium, Thos. Bowles, Janesville.

Filly 1 year old and under 2: 1st premium, A. Z. Blodgett, Waukegan.

Stallion and five of his colts at 4 years of age and under: 1st premium, R. O. Roberts, Cambria.

CLASS 5.— *Matched Horses and Mares.*

1st premium, A. Custard, Lind; 2d premium, R. H. Smith, Waupun.

Pair of roadsters: 1st premium, J. M. Haner, Sun Prairie; 2d premium, D. Johnson, Jefferson.

Pair of Clydes: 1st premium, R. O. Roberts, Cambria.

Pair of farm horses: 1st premium, Fred. H. Meeker, Fond du Lac; 2d premium, J. R. Paddleford, Oshkosh.

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

Gentleman's roadsters for single harness 4 years and over: 1st premium, C. T. Bradley, Milwaukee; 2d premium, J. W. Flack, Wausau.

Thoroughbred stallion any age: 1st premium, W. L. Wells, Lodi; 2d premium, G. McNutt, Oxford.

State Fair Trotting Sweepstakes for Foals of 1878.

1st premium, C. T. Bradley, Milwaukee; 2d premium, Geo. D. Doubleday, Whitewater.

The Wisconsin Trotting Stakes for Foals of 1877.

1st premium, R. H. Baker, Racine; 2d premium, C. T. Bradley, Milwaukee; 3d premium, J. I. Case, Racine.

DEPARTMENT B.—CATTLE.

CLASS 8.—*Short Horns.*

Bull 4 years old and over: 1st premium, John Sprecher, Madison; 2d premium, J. C. Kiser, Oregon.

Bull 3 years old and under 4: 1st premium, W. C. Kiser, Madison; 2d premium, W. W. Micklejohn, Fond du Lac.

Bull 2 years old and under 3: 1st premium, Eli Stilson, Oshkosh; 2d premium, J. C. Kiser, Oregon.

Bull 1 year old and under 2: 1st premium, D. Buchanan, Rio; 2d premium, W. C. Kiser, Madison.

Bull calf over 6 and under 12 months old: 1st premium, W. C. Kiser, Madison; 2d premium, Eli Stilson, Oshkosh.

Bull calf under 6 months old: 1st premium, W. A. Phipps, Fond du Lac; 2d premium, Eli Stilson, Oshkosh.

Cow 4 years old and over: 1st premium, J. C. Kiser, Oregon; 2d premium, W. C. Kiser, Madison.

Cow 3 years old and under 4: 1st premium, J. C. Kiser, Oregon; 2d premium, Eli Stilson, Oshkosh.

Heifer 2 years old and under 3: 1st premium, J. C. Kiser, Oregon; 2d premium, J. C. Kiser, Oregon.

Heifer 1 year old and under 2: 1st premium, Eli Stilson, Oshkosh; 2d premium, John Sprecher, Madison.

Heifer calf over 6 and under 12 months old: 1st premium, Eli Stilson, Oshkosh; 2d premium, Eli Stilson, Oshkosh.

Heifer calf under 6 months old: 1st premium, Eli Stilson, Oshkosh; 2d premium, J. C. Kiser, Oregon.

CLASS 9.—*Jerseys.*

Bull 3 years old and over: 1st premium, Chester Hazen, Ladoga; 2d premium, W. N. McConnell, Green Lake.

Bull 2 years old and under 3: 1st premium, H. S. Durand, Racine; 2d premium, Geo. E. Bryant, Madison.

Bull 1 year old and under 2: 1st premium, Geo. E. Bryant, Madison; 2d premium, Geo. E. Bryant, Madison.

Bull calf over 6 and under 12 months old: 1st premium, Robert Millan, New Lisbon; 2d premium, Geo. E. Bryant, Madison.

Bull calf under 6 months old: 1st premium, N. N. Palmer, Brodhead; 2d premium, W. N. McConnell, Green Lake.

Cow 3 years old and over: 1st premium, Geo. E. Bryant, Madison; 2d premium, H. S. Durand, Racine.

Heifer 2 years old and under 3: 1st premium, H. S. Durand, Racine; 2d premium, H. S. Durand, Racine.

Heifer 1 year old and under 2: 1st premium, W. N. McConnell, Green Lake; 2d premium, Geo. E. Bryant, Madison.

Heifer calf over 6 and under 12 months old: 1st premium, Geo. E. Bryant, Madison; 2d premium, Geo. E. Bryant, Madison.

Heifer calf under 6 months old: 1st premium, H. S. Durand, Racine; 2d premium, Geo. E. Bryant, Madison.

CLASS 10.— *Ayrshires.*

Bull 3 years old and over: 1st premium, J. Johnson, Hartland; 2d premium, Chester Hazen, Ladoga.

Bull two years old and under 3: 1st premium, D. Huntley, Appleton; 2d premium, Chester Hazen, Ladoga.

Bull 1 year old and under 2: 1st premium, J. Johnson, Hartland; 2d premium, Chester Hazen, Ladoga.

Bull calf over 6 and under 12 months old: 1st premium, Chester Hazen, Ladoga; 2d premium, D. Huntley, Appleton.

Bull calf under 6 months old: 1st premium, J. Johnson, Hartland; 2d premium, Chester Hazen, Ladoga.

Cow 3 years old and over: 1st premium, J. Johnson, Hartland; 2d premium, J. Johnson, Hartland.

Heifer 2 years old and under 3: 1st premium, Chester Hazen, Ladoga; 2d premium, J. Johnson, Hartland.

Heifer 1 year old and under 2: 1st premium, Chester Hazen, Ladoga; 2d premium, J. Johnson, Hartland.

Heifer calf over 6 and under 12 months old: 1st premium, J. Johnson, Hartland; 2d premium, D. Huntley, Appleton.

Heifer calf under 6 months old: 1st premium, D. Huntley, Appleton; 2d premium, J. Johnson, Hartland.

CLASS 11.— *Devons.*

Bull 3 years old and over: 1st premium, J. W. Morse & Son, Verona; 2d premium, George Baker, Hustisford.

Bull 2 years old and under 3: 1st premium, George Baker, Hustisford.

Bull 1 year old and under 2: 1st premium, L. Rawson, Oak Creek; 2d premium, J. W. Morse & Son, Verona.

Bull calf over 6 and under 12 months old: 1st premium, George Baker, Hustisford; 2d premium, L. Rawson, Oak Creek.

Bull calf under 6 months old: 1st premium, J. W. Morse & Son, Verona; 2d premium, J. W. Morse & Son, Verona.

Cow 3 years old and over: 1st premium, George Baker, Hustisford; 2d premium, George Baker, Hustisford.

Heifer 2 years old and under 3. 1st premium, George Baker, Hustisford; 2d premium, George Baker, Hustisford.

Heifer 1 year old and under 2: 1st premium, J. W. Morse & Son, Verona; 2d premium, George Baker, Hustisford.

Heifer calf over 6 and under 12 months old: 1st premium, J. W. Morse & Son, Verona; 2d premium, George Baker, Hustisford.

Heifer calf under 6 months old: 1st premium, J. W. Morse & Son, Verona; 2d premium, George Baker, Hustisford.

CLASS 14.— *Holsteins.*

Exhibition, not less than five head: 1st premium, Gillett & Moore, Fond du Lac; 2d premium, F. D. Laramy, Beloit.

CLASS 16.— *Herds.*

SHORT HORNS.

Bull and four cows or heifers over 2 years old: 1st premium, Eli Stilson, Oshkosh; 2d premium, J. C. Kiser, Oregon; 3d premium, W. C. Kiser, Madison.

JERSEYS.

Bull and four cows or heifers over 2 years old: 1st premium, H. S. Durand, Racine; 2d premium, Geo. E. Bryant, Madison.

AYRSHIRES.

Bull and four cows or heifers over 2 years old: 1st premium, J. Johnson, Hartland; 2d premium, Chester Hazen, Ladoga.

DEVONS.

Bull and four cows or heifers over 2 years old: 1st premium, George Baker, Hustisford.

SWEEPSTAKES.

Bull and four heifers under 2 years old: 1st premium, Eli Stilson, Oshkosh; 2d premium, J. W. Morse & Son, Verona.

Bull calf and four heifer calves, bred and owned by exhibitor: 1st premium, Eli Stilson, Oshkosh; 2d premium, J. C. Kiser, Oregon, Wis.

Bull and three of his get: 1st premium, Eli Stilson, Oshkosh.

Cow and three of her calves: 1st premium, J. C. Kiser, Oregon.

Special premium by KEENAN & HANCOCK, Stock Brokers, Chicago, Ill.— Herd of Jerseys, bull and four heifers, under 2 years old: 1st premium, Geo. E. Bryant, Madison.

Special premium by Racine Silver Plate Co., Racine, Wis.— Herd of Jerseys, bull and five heifers, under 1 year old: 1st premium, Geo. E. Bryant, Madison.

CLASS 14.— *Holsteins.*

Bull 3 years old and over: 1st premium, M. Brown, Ladoga; 2d premium, F. D. Laramy, Beloit.

Bull 2 years old and under 3: 1st premium, F. D. Laramy, Beloit; 2d premium, Gillett & Moore, Fond du Lac.

Bull 1 year old and under 2: 1st premium, Chester Hazen, Ladoga; 2d premium, W. J. Quick, Lamartine.

Bull calf over 6 and under 12 months old: 1st premium, F. D. Laramy, Beloit; 2d premium, A. F. Quick.

Bull calf under 6 months old: 1st premium, F. D. Laramy, Beloit, 2d premium, W. J. Quick, Lamartine.

Cow 3 years old and over: 1st premium, Gillett & Moore, Fond du Lac; 2d premium, F. D. Laramy, Beloit.

Heifer 2 years old and under 3: 1st premium, Gillett & Moore, Fond du Lac; 2d premium, Gillett & Moore, Fond du Lac.

Heifer 1 year old and under 2: 1st premium, Moore & Griffith, Fond du Lac; 2d premium, Moore & Griffith, Fond du Lac.

Heifer calf under 6 months old: 1st premium, Chester Hazen, Ladoga; 2d premium, J. Griffith & Son, Fond du Lac.

DEPARTMENT C.— SHEEP.

CLASS 17.— *American Merinos.*

Buck 2 years old and over: 1st premium, A. and P. Humbert, Caldwell's Prairie; 2d premium, S. W. Andrews, Juneau.

Buck 1 year old and under 2: 1st premium, A. and P. Humbert, Caldwell's Prairie; 2d premium, S. W. Andrews, Juneau.

Pen of three buck lambs: 1st premium, A. and P. Humbert, Caldwell's Prairie.

Pen of three ewes 2 years old and over: 1st premium, A. and P. Humbert, Caldwell's Prairie.

Pen of three ewes 1 year old and under 2: 1st premium, A. and P. Humbert, Caldwell's Prairie.

Pen of three ewe lambs: 1st premium, A. and P. Humbert, Caldwell's Prairie.

Buck and five ewes (winners of above excluded): 1st premium, A. and P. Humbert, Caldwell's Prairie; 2d premium, S. W. Andrews, Juneau.

CLASS 18.— *Long Wool.*

Buck 2 years old and over: 1st premium, G. W. DeHaven, Shuey's Mills; 2d premium, J. O'Malley, Waunakee.

Buck 1 year old and under 2: 1st premium, J. O'Malley, Waunakee; 2d premium, J. O'Malley, Waunakee.

Pen three buck lambs: 1st premium, J. O'Malley, Waunakee; 2d premium, J. O'Malley, Waunakee.

Pen of three ewes 2 years old and over: 1st premium, J. O'Malley, Waunakee; 2d premium, J. O'Malley, Waunakee.

Pen of three ewes 1 year old and under 2: 1st premium, J. O'Malley, Waunakee; 2d premium, G. W. DeHaven, Shuey's Mills.

Pen of three ewe lambs: 1st premium, J. O'Malley, Waunakee; 2d premium, George Keys, Empire.

CLASS 19.—*Downs.*

Buck 2 years old and over: 1st premium, A. O. Fox, Oregon.

Buck 1 year old and under 2: 1st premium, A. O. Fox, Oregon; 2d premium, A. O. Fox, Oregon.

Pen of three buck lambs: 1st premium, A. O. Fox, Oregon.

Pen of three ewes 2 years old and over: 1st premium, A. O. Fox, Oregon.

Pen of three ewes 1 year old and under 2: 1st premium, A. O. Fox, Oregon; 2d premium, A. O. Fox, Oregon.

Pen of three ewe lambs: 1st premium, A. O. Fox, Oregon; 2d premium, A. O. Fox, Oregon.

Buck and five ewes (winners of above excluded); 1st premium, A. O. Fox, Oregon.

SWEEPSTAKES.

Three fat wethers, 2 years old and over: 1st premium, A. O. Fox, Oregon; 2d premium, George Keys, Empire.

DEPARTMENT D.—SWINE.

CLASS 20.—*Large Breeds.*

Boar 2 years old and over: 1st premium, B. T. Fowler, Hart Prairie; 2d premium, E. S. Austin, Beloit.

Boar 1 year old and under 2: 1st premium, E. S. Austin, Beloit.

Breeding sow 2 years old and over: 1st premium, John A. Cole, Hustisford; 2d premium, E. R. Bement, Oregon.

Breeding sow 1 year old and under 2: 1st premium, John A. Cole, Hustisford; 2d premium, E. R. Bement, Oregon.

Breeding sow with litter of sucking pigs, not less than four: 1st premium, E. S. Austin, Beloit; 2d premium, John A. Cole, Hustisford.

Boar pig over 6 and under 12 months old: 1st premium, B. T. Fowler, Hart Prairie; 2d premium, E. S. Austin, Beloit.

Sow pig over 6 and under 12 months old: 1st premium, E. S. Austin, Beloit; 2d premium, B. T. Fowler, Hart Prairie.

Boar pig under 6 months old: 1st premium, E. Wait & Son, La Grange; 2d premium, E. Wait & Son, La Grange.

Sow pig under 6 months old: 1st premium, B. T. Fowler, Hart Prairie; 2d premium, John A. Cole, Hustisford.

CLASS 21.—*Middle Breeds.*

Boar 2 years old and over: 1st premium, A. Randall, Hustisford.

Boar 1 year old and under 2: 1st premium, J. E. Owen, Brooklyn; 2d premium, A. Randall, Hustisford.

Breeding sow 2 years old and over: 1st premium, J. E. Owen, Brooklyn; 2d premium, A. R. Bement, Oregon.

Breeding sow with litter of sucking pigs, not less than four: 1st premium, F. E. & E. Hoyt, Fond du Lac; 2d premium, J. E. Owen, Brooklyn.

Breeding sow 1 year old and under 2: 1st premium, E. R. Bement, Oregon; 2d premium, A. Randall, Hustisford.

Boar pig over 6 and under 12 months old: 1st premium, A. Randall, Hustisford; 2d premium, J. E. Owen, Brooklyn.

Sow pig over six and under 12 months old: 1st premium, A. Randall, Hustisford; 2d premium, E. R. Bement, Oregon.

Boar pig under 6 months old: 1st premium, A. Randall, Hustisford; 2d premium, Francis Brinkerhoff, Brandon.

Sow pig under 6 months old: 1st premium, J. E. Owen, Brooklyn; 2d premium, A. Randall, Hustisford.

CLASS 22.—*Small Breeds.*

Boar 2 years old and over: 1st premium, S. H. & A. E. Joiner, Janesville; 2d premium, S. H. & A. E. Joiner, Janesville.

Boar 1 year old and under 2: 1st premium, C. L. Robinson, Fond du Lac; 2d premium, John A. Cole, Hustisford.

Breeding sow 2 years old and over: 1st premium, S. H. & A. E. Joiner, Janesville; 2d premium, John A. Cole, Hustisford.

Breeding sow 1 year old and under 2: 1st premium, S. H. & A. E. Joiner, Janesville; 2d premium, John A. Cole, Hustisford.

Breeding sow with litter of sucking pigs, not less than four: 1st premium: S. H. & A. E. Joiner, Janesville; 2d premium, J. R. Paddleford, Oshkosh.

Boar pig over 6 and under 12 months old: 1st premium, S. H. & A. E. Joiner, Janesville; 2d premium, S. H. & A. E. Joiner, Janesville.

Sow pig over 6 and under 12 months old: 1st premium, S. H. & A. E. Joiner, Janesville; 2d premium, D. L. Heilman, Brandon.

Boar pig under 6 months old: 1st premium, S. H. & A. E. Joiner, Janesville.

Sow pig under 6 months old: 1st premium, S. H. & A. E. Joiner, Janesville; 2d premium, S. H. & A. E. Joiner, Janesville.

DEPARTMENT E.—POULTRY.

CLASS 23.

Trio light Brahma fowls: 1st premium, W. H. Turneaure, Clinton; 2d premium, J. R. Brabazan, Delavan.

Trio light Brahma chicks: 1st premium, J. R. Brabazan, Delavan; 2d premium, W. H. Turneaure, Clinton.

Trio dark Brahma fowls: 1st premium, W. H. Turneaure, Clinton; 2d premium, J. R. Brabazan, Delavan.

Trio dark Brahma chicks: 1st premium, W. H. Turneaure; 2d premium, J. R. Brabazan.

Trio Buff Cochin fowls: 1st premium, J. R. Brabazan.

Trio Buff Cochin chicks: 1st premium, E. Wilson, Lake Mills; 2d premium, H. L. White, Fond du Lac.

Trio Partridge Cochin fowls: 1st premium, J. R. Brabazan; 2d premium, W. H. Turneaure.

Trio Partridge Cochin chicks: 1st premium, W. H. Turneaure; 2d premium, E. Wilson, Lake Mills.

Trio White Cochin fowls: 1st premium, W. H. Turneaure; 2d premium, J. R. Brabazan.

Trio White Cochin chicks: 1st premium, W. H. Turneaure.

Trio American Dominique fowls: 1st premium, J. R. Brabazan; 2d premium, J. R. Brabazan.

Trio American Dominique chicks: 1st premium, J. R. Brabazan; 2d premium, J. R. Brabazan.

Trio Plymouth Rock fowls: 1st premium, W. H. Turneaure; 2d premium, W. H. Turneaure.

Trio Plymouth Rock chicks: 1st premium, W. H. Turneaure; 2d premium, A. Randall, Hustisford.

Trio Black Spanish (white face) fowls: 1st premium, J. R. Brabazan; 2d premium, Joel Johnson, Oshkosh.

Trio Black Spanish chicks: 1st premium, J. R. Brabazan; 2d premium, Joel Johnson, Oshkosh.

Trio White Leghorn fowls: 1st premium, J. R. Brabazan; 2d premium, W. H. Turneaure.

Trio White Leghorn chicks: 1st premium, W. H. Turneaure; 2d premium, J. R. Brabazan.

Trio Brown Leghorn fowls: 1st premium, J. R. Brabazan; 2d premium, W. H. Turneaure.

Trio Brown Leghorn chicks: 1st premium, W. H. Turneaure.

Trio Black Hamburg fowls: 1st premium, Joel Johnson, Oshkosh.

Trio Silver Spangled Hamburg fowls: 1st premium, E. Wilson, Lake Mills; 2d premium, Joel Johnson, Oshkosh.

Trio Silver Spangled Hamburg chicks: 1st premium, W. H. Turneaure; 2d premium, E. Wilson.

Trio Silver Spangled or Penciled Hamburg fowls: 1st premium, E. Wilson Lake Mills.

Trio Golden Spangled or Penciled Hamburg fowls: 1st premium, W. H. Turneaure.

Trio Golden Spangled or Penciled Hamburg chicks: 1st premium, W. H. Turneaure.

Trio Houdan fowls: 1st premium, J. R. Brabazan; 2d premium, W. H. Turneaure.

Trio Houdan chicks: 1st premium, J. R. Brabazan; 2d premium, W. H. Turneaure.

Trio Black Polish (white crest) fowls: 1st premium, W. H. Turneaure; 2d premium, J. R. Brabazan.

Trio Black Polish chicks: 1st premium, W. H. Turneaure; 2d premium, J. R. Brabazan.

Trio White Polish fowls: 1st premium, W. H. Turneaure.

Trio Silver Polish fowls: 1st premium, E. Wilson; 2d premium, W. H. Turneaure.

Trio Silver Polish chicks: 1st premium, W. H. Turneaure.

Trio Golden Polish fowls: 1st premium, W. H. Turneaure; 2d premium, J. R. Brabazan.

Trio Golden Polish chicks: 1st premium, J. R. Brabazan; 2d premium, J. R. Brabazan.

Trio Golden Seabright fowls: 1st premium, W. H. Turneaure.

Trio any other variety fowls: 1st premium, J. R. Brabazan, Delavan; 2d premium, Joel Johnson, Oshkosh.

Trio any other variety chicks: 1st premium, J. R. Brabazan.

Pair of Brown Red fowls: 1st premium, E. Wilson, Lake Mills.

Pair of Brown Red chicks: 1st premium, E. Wilson.

Pair Black Breasted Red Game fowls: 1st premium, Joel Johnson, Oshkosh; 2d premium, J. R. Brabazan.

Pair Black Breasted Red Game chicks: 1st premium, Joel Johnson; 2d premium, Joel Johnson.

Pair of Pyle fowls: 1st premium, Joel Johnson; 2d premium, E. Wilson.

Pair of Pyle chicks: 1st premium, E. Wilson, Lake Mills; 2d premium, G. H. Stokes, Fond du Lac.

Pair of any other variety of Game fowls: 1st premium, S. S. Guile, Fond du Lac; 2d premium, E. Wilson.

Pair of any other variety of Game chicks: 1st premium, G. H. Stokes, Fond du Lac; 2d premium, E. Wilson, Lake Mills.

Pair of Bronze turkey fowls, 1st premium, E. Wilson; 2d premium, J. R. Brabazan.

Pair of Bronze turkey chicks: 1st premium, E. Wilson; 2d premium, J. R. Brabazan.

Pair common turkey fowls: 1st premium, J. R. Brabazan.

Pair of geese: 1st premium, J. R. Brabazan, Delavan; 2d premium, George Keys, Empire.

Pair of Aylesbury ducks: 1st premium, J. R. Brabazan; 2d premium, J. R. Brabazan.

Pair of Rouen ducks: 1st premium, J. R. Brabazan; 2d premium, George Keys.

Pair of Muscovy ducks: 1st premium, J. R. Brabazan.

Pair of Cayuga ducks: 1st premium, J. R. Brabazan; 2d premium, J. R. Brabazan.

Greatest variety of poultry shown by one person: 1st premium, J. R. Brabazan.

Exhibition of fancy pigeons: 1st premium, J. R. Brabazan; 2d premium, W. H. Turneaure.

DEPARTMENT F.— AGRICULTURE.

CLASS 24.— *Field Products.*

Spring wheat (Club): 1st premium, D. T. Pilgrim, West Granville; 2d premium, T. Davis, Oshkosh.

Spring wheat (Rio Grande or China Tea): 1st premium, Theo. Herrling, Fond du Lac; 2d premium, D. T. Pilgrim, West Granville.

Spring wheat (Fife): 1st premium, D. T. Pilgrim, West Granville; 2d premium, Henry Freeley, Friendship.

Any other variety of spring wheat: 1st premium, D. T. Pilgrim, West Granville; 2d premium, J. N. Hoaglin, Lost Nation.

White winter wheat: 1st premium, J. M. Smith, Wausau; 2d premium, John Bohn, Fond du Lac.

Red winter wheat: 1st premium, W. R. Thomas, Watertown.

Rye: 1st premium, J. N. Hoaglin; 2d premium, W. R. Thomas, Watertown.

White oats: 1st premium, J. N. Hoaglin; 2d premium, H. Westervelt, Empire.

Black oats: 1st premium, D. T. Pilgrim; 2d premium, W. R. Thomas, Watertown.

Barley: 1st premium, D. T. Pilgrim; 2d premium, D. T. Pilgrim.

Buckwheat: 1st premium, D. T. Pilgrim; 2d premium, T. Davis, Oshkosh.

Flax seed: 1st premium, D. T. Pilgrim; 2d premium, H. A. Clum, Oshkosh.

Timothy seed: 1st premium, T. Davis, Oshkosh; 2d premium, D. T. Pilgrim, West Granville.

Clover seed: 1st premium, J. N. Hoaglin, Oshkosh; 2d premium, J. S. Dore, Neillsville.

Peas: 1st premium, J. S. Dore, Neillsville; 2d premium, T. Davis, Oshkosh.

Beans: 1st premium, H. A. Clum, Oshkosh; 2d premium, O. E. Angell.

Dent corn (white): 1st premium, Elijah Hart; 2d premium, H. A. Clum.

Dent corn (yellow): 1st premium, A. & P. Humbert, Caldwell's Prairie; 2d premium, J. W. Wood, Baraboo.

Flint corn (yellow): 1st premium, Wm. McClellan, Berlin; 2d premium, J. W. Wood, Baraboo.

Six pumpkins: 1st premium, J. W. Wood; 2d premium, George Lewis, Oshkosh.

Exhibition of field products grown in the state, including not less than five varieties of cereal grain, not less than twelve varieties in all, quality and number to be considered: 1st premium, D. T. Pilgrim, West Granville; 2d premium, T. Davis, Oshkosh.

CLASS 25.— *Garden and Vegetable Produce.*

Early Ruby potatoes: 1st premium, Mr. Deusenbury, Fond du Lac; 2d premium, J. W. Wood, Baraboo.

Early Rose potatoes: 1st premium, George Lewis, Fond du Lac; 2d premium, J. W. Wood, Baraboo.

Any other variety of early potatoes: 1st premium, Geo. Lewis, Fond du Lac; 2d premium, Ed. Wyman, Casco.

Peachblow potatoes: 1st premium, Wm. Ahlord, South Byron; 2d premium, James Coonell, Oakfield.

Any other variety of late potatoes: 1st premium, Wm. Ahlord, South Byron; 2d premium, Ed. Wyman, Casco.

Four quarts of Lima beans: 1st premium, E. Haentze, Fond du Lac; 2d premium, J. N. Hoaglin, Oshkosh.

Blood turnip beets: 1st premium, J. W. Wood, Baraboo; 2d premium, E. Haentze, Fond du Lac.

Long blood beets: 1st premium, E. Haentze; 2d premium, J. N. Hoaglin, Oshkosh.

Mangel Wurzel: 1st premium, John Clark, Fond du Lac; 2d premium, J. W. Wood, Baraboo.

Red Weatherfield onions: 1st premium, J. N. Hoaglin, Oshkosh; 2d premium, Geo. W. Ringrose, Wauwatosa.

Yellow Danvers onions: 1st premium, R. Kinnininent, Oakfield; 2d premium, A. & P. Humbert.

Any other variety of onions: 1st premium, E. N. Colson, Fond du Lac; 2d premium, R. Kinnininent, Oakfield.

Drumhead cabbage: 1st premium, J. N. Hoaglin, Oshkosh; 2d premium, E. Haentze, Fond du Lac.

Three Winnigstadt cabbage: 1st premium, J. N. Hoaglin; 2d premium, Geo. W. Ringrose.

Long orange carrots: 1st premium, J. N. Hoaglin, Oshkosh; 2d premium, Geo. W. Ringrose.

Horn carrots: 1st premium, Geo. W. Ringrose; 2d premium, J. W. Wood.

Head of cauliflower: 1st premium, Geo. W. Ringrose; 2d premium, E. Haentze, Fond du Lac.

Ten heads of celery: 1st premium, Geo. G. Ringrose; 2d premium, J. N. Hoaglin.

Twelve ears of early sweet corn: 1st premium, J. W. Wood; 2d premium, J. N. Hoaglin.

Twelve ears of late sweet corn: 1st premium, E. Haentze; 2d premium, J. N. Hoaglin.

Sample of egg plant: 1st premium, J. W. Wood; 2d premium, J. N. Hoaglin.

Six watermelons: 1st premium, J. N. Hoaglin.

Six nutmeg melons: 1st premium, J. N. Hoaglin; 2d premium, E. Haentze.

Parsnips: 1st premium, J. W. Wood; 2d premium, J. N. Hoaglin.

Twelve large red peppers: 1st premium, J. W. Wood; 2d premium, Geo. W. Ringrose.

Peck of vegetable oysters; 1st premium, J. W. Wood, Baraboo; 2d premium, J. N. Hoaglin, Oshkosh.

Six Hubbard squash: 1st premium, J. N. Hoaglin; 2d premium, Geo. W. Ringrose.

Largest squash of any variety: 1st premium, J. W. Wood; 2d premium, Henry Friday, Friendship.

Twelve tomatoes: 1st premium, E. Haentze; 2d premium, E. Haentze.

Flat turnips: 1st premium, J. N. Hoaglin; 2d premium, J. W. Wood.

Rutabagas: 1st premium, J. N. Hoaglin; 2d premium, J. W. Wood.

Exhibition grown by professionals in the state by exhibitor, including not less than five varieties of vegetables, nor less than twelve varieties in all, quality and number of varieties to be considered: 1st premium, J. W. Wood, Baraboo; 2d premium, E. Haentze, Fond du Lac.

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, quality and number of varieties to be considered: 1st premium, J. N. Hoaglin, Oshkosh; 2d premium, Geo. W. Ringrose, Wauwatosa.

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

Barrel of winter wheat flour: 1st premium, O. L. Helmer, Fond du Lac; 2d premium, Zinke Bros., Fond du Lac.

Barrel of spring wheat flour: 1st premium, Zinke Bros.; 2d premium, O. L. Helmer.

Exhibit of three cheese, not less than 150 pounds, made at any time, and awarded 40 points or over in a scale of 50 or perfection, designated grade No. 1, and drew a pro rata share of $100, as follows:

	Points.
Jas. A. Haskins, Banner	40
Mather Bros., Sheboygan	40
A. E Kennedy, Sheboygan	42⅔
Holden Bros., Sheboygan	40⅓
H. K. Loomis, Sheboygan	42
H. J. Bamford, Sheboygan	40
H. J. Bamford, Sheboygan	47
W. M. Danforth, Sheboygan	43⅔
F. Wedder, Sheboygan	43
Alvah Loomis, Sheboygan	43⅓
Danl. Koentz, Sheboygan	46⅔
John Kaestner, Sheboygan	40⅓
Wm. Springler, Sheboygan	40
S. A. Reckmeier, Sheboygan Falls	44⅔
C. Reich, Sheboygan Falls	45⅓
E. D. Jones, Fond du Lac	41
J. L. Campbell, South Byron	43⅔
A. D. Deland, Sheboygan Falls	40
A. H. Wheaton, Auroraville	40
Chester Hazen, Ladoga	41⅔
Chester Hazen, Ladoga	40⅔
A. Custard, Waupaca	42
A. Custard, Waupaca	42
G. W. Weeden, Sheboygan	41⅔
E. W. Hadcock, Ladoga	42⅔
F. Jankon, Sheboygan	41⅔

Special premium by American Dairy Salt Co. of Syracuse, N. Y., for 25 pounds of cheese salted with their salt: 1st premium, H. J. Bamford, Plymouth; 2d premium, E. W. Hadcock, Ladoga; 3d premium, E. W. Hadcock, Ladoga.

CREAMERY BUTTER.

Exhibit not less than 100 pounds, made at any time, and awarded 40 points or over in a scale of 50 points or perfection, designated "gilt edged," and drew a pro rata share of $100, as follows:

	Points.
T. W. Rhodes, Weyauwega	45¼
W. W. Whipple, Eldorado	42⅓
Hiram Smith, Sheboygan Falls	42⅓

DAIRY BUTTER.

Roll, print or package, not less than 20 pounds: 1st premium, W. N. McConnell, Green Lake; 2d premium, Mrs. Houghton, Oshkosh.

Special premium for butter by American Dairy Salt Co., for package of not less than 25 pounds, salted with their salt: 1st premium, W. N. McConnell, Green Lake; 2d premium, Mrs. Houghton, Oshkosh; 3d premium, D. Giddings, Fond du Lac.

Sample 10 pounds of honey: 1st premium, A. W. Schulze, Fond du Lac; 2d premium, A. A. Winslow, New Holstein.

Practical bee hive: 1st premium, A. W. Schulze.

Honey extractor: 1st premium, A. A. Winslow.

Extracted honey: 1st premium, A. A. Winslow; 2d premium, A. Schulze.

Best and largest display of apiarian supplies and fixtures: first premium, Giles Olm, Fond du Lac.

Ten pounds maple sugar: 1st premium, E. R. Goff, Chilton.

Gallon maple syrup: 1st premium, E. R. Goff, Chilton.

Gallon of amber cane syrup: 1st premium, A. J. Decker, Fond du Lac.

CLASS 27.— *Household Products.*

Loaf of graham bread: 1st premium, Mrs. W. Wilkie, Fond du Lac.

Loaf of white bread (hop yeast): 1st premium, Mrs. O. F. Lewis, Fond du Lac.

Loaf of white bread (milk raising): 1st premium, J. R. Brabazan, Delavan.

Loaf of Indian bread: 1st premium, Mrs. W. Wilkie, Fond du Lac.

Sponge cake: 1st premium, Miss Carrie A. Lewis, Fond du Lac.

Pound cake: 1st premium, Miss Carrie A. Lewis, Fond du Lac.

Jelly cake: 1st premium, Miss Carrie A. Lewis.

Cocoanut cake: 1st premium, Miss Carrie A. Lewis.

Chocolate cake: 1st premium, Miss Carrie A. Lewis.

Fruit cake: 1st premium, Allie Durand, Fond du Lac.

Largest exhibition of articles of above sorts: 1st premium, Miss Carrie A. Lewis.

Canned peaches: 1st premium, Mrs. J. N. Hoaglin, Oshkosh.

Canned plums: 1st premium, Mrs. H. J. Ray, Fond du Lac.
Canned currants: 1st premium, Mrs. J. N. Hoaglin.
Canned tomatoes: 1st premium, Mrs. H. J. Ray.
Canned gooseberries: 1st premium, Mrs. J. N. Hoaglin.
Canned raspberries: 1st premium, Mrs. J. N. Hoaglin.
Canned strawberries: 1st premium, Miss Carrie Phipps, Fond du Lac.
Canned grapes: 1st premium, Mrs. H. J. Ray.
Canned blackberries: 1st premium, Mrs. J. N. Hoaglin.
Canned pears: 1st premium, Mrs. W. Deusenbury, Fond du Lac.
Canned Hyslop crabs: 1st premium, Mrs. H. J. Ray.
Plum jelly: 1st premium, Mrs. H. J. Ray.
Currant jelly: 1st premium, D. Huntley, Appleton.
Red raspberry jelly: 1st premium, Mrs. H. J. Ray.
Crab apple jelly: 1st premium, Mrs. H. J. Ray.
Marmalade: 1st premium, Mrs. H. J. Ray.
Cucumber pickles: 1st premium, E. Haentze.
Mangoes: 1st premium, Mrs. H. J. Ray.
Cauliflower: 1st premium, Mrs. J. W. Wood, Baraboo.
Onions: 1st premium, Mrs. H. J. Ray.
Mixed pickles: 1st premium, E. Haentze.
Sweet pickles, peaches: 1st premium, Mrs. J. N. Hoaglin.
Apples: 1st premium, Mrs. J. N. Hoaglin.
Apple butter: 1st premium, J. R. Brabazan, Delavan.
Raspberry jam: 1st premium, D. Huntley, Appleton.
Tomato catsup: 1st premium, Mrs. H. J. Ray.
Largest exhibition of canned fruits, jellies, jams and pickles in glass jars: 1st premium, Mrs. H. J. Ray.

DEPARTMENT G.— FRUITS AND FLOWERS.

CLASS 28.— *Fruits by Professional Cultivators.*

Apples — greatest display of varieties not to exceed twenty: 1st premium, W. Reed; 2d premium, Geo. P. Peffer, Pewaukee; 3d premium, Geo. J. Kellogg, Janesville.
Apples — ten varieties adapted to the northwest: 1st premium, George Peffer, Pewaukee; 2d premium, W. Reed; 3d premium, Geo. J. Kellogg, Janesville.
Apples — five varieties adapted to the northwest: 1st premium, George Peffer; 2d premium, W. Reed; 3d premium, Geo. J. Kellogg.
Apples — largest variety of winter, not to exceed ten: 1st premium, W. Reed; 2d premium, Geo. Peffer; 3d premium, Geo. J. Kellogg.
Apples — five varieties of winter: 1st premium, Geo. Peffer; 2d premium, W. Reed; 3d premium, Geo. J. Kellogg.
Apples — show of ten varieties, large and showy: 1st premium, George Peffer; 2d premium, W. Reed; 3d premium, Geo. J. Kellogg.

Largest apple: 1st premium, George Peffer.
Heaviest apple: 1st premium, George Peffer.
Plate of Plumb Cider: 1st premium, W. Reed.
Plate of Haas: 1st premium, Geo. J. Kellogg.
Plate of Fameuse: 1st premium, Geo. J. Kellogg.
Plate of Walbridge: 1st premium, George Peffer.
Plate of Utter: 1st premium, H. Floyd.
Plate of Westerfield Seek-no-Further: 1st premium, George Peffer.
Plate of Tallman Sweet: 1st premium, George Peffer.
Plate of St. Lawrence: 1st premium, W. Reed.
Plate of Duchess of Oldenburg: 1st premium, George Peffer.
Plate of Willow Twig: 1st premium, Geo. J. Kellogg.
Plate of Wealthy: 1st premium, George Peffer.
Plate of Pewaukee: 1st premium, W. Reed.
Pears — greatest display of varieties: 1st premium, George Peffer.
Pears — three varieties: 1st premium, George Peffer.
Pears — Flemish Beauty: 1st premium, George Peffer.
Plums — greatest variety: 1st premium, George Peffer; 2d premium, W. Reed.
Plums — three varieties: 1st premium, George Peffer.
Plums — collection of native: 1st premium, George Peffer.
Plate of native: 1st premium, George Peffer.

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

Grapes — greatest display of varieties, five specimens: 1st premium, W. Reed; 2d premium, George Peffer; 3d premium, J. P. Roe, Oshkosh.
Grapes — ten varieties: 1st premium, W. Reed; 2d premium, J. P. Roe; 3d premium, Geo. J. Kellogg.
Grapes — five varieties: 1st premium, W. Reed; 2d premium, Geo. J. Kellogg; 3d premium, J. N. Hoaglin.
Grapes — single variety: 1st premium, J. P. Roe; 2d premium, W. Reed.
Three bunches of Concords on one cane: 1st premium, W. Reed; 2d premium, J. N. Hoaglin.
Three bunches of Delawares on one cane: 1st premium, J. N. Hoaglin; 2d premium, W. Reed.
Crabs by professional cultivators — greatest variety named: 1st premium, George Peffer; 2d premium, H. Floyd; 3d premium, Geo. J. Kellogg.
Crabs — Plate of Hyslop: 1st premium, W. Reed.
Plate of Transcendent: 1st premium, J. N. Hoaglin.
Plate of Whitney No. 20: 1st premium, H. Floyd.
Seedling crab: 1st premium, Geo. Peffer.
Sweepstakes on fruits of all kinds: 1st premium, Geo. Peffer; 2d premium, W. Reed; 3d premium, Geo. J. Kellogg.

CLASS 30.— *Fruits by Non-professional Cultivators.*

Apples — greatest display of varieties, not to exceed twenty: 1st premium, C. B. Dawley, Plymouth; 2d premium, Henry Palmer, Oregon, Wis.; 3d premium, D. T. Pilgrim, West Granville.

Apples — ten varieties adapted to N. W.: 1st premium, D. T. Pilgrim; 2d premium, George Jeffrey, Milwaukee; 3d premium, Henry Palmer.

Apples — show of ten varieties, large and showy: 1st premium, Geo. Jeffrey; 2d premium, D. T. Pilgrim; 3d premium, C. B. Dawley.

Apples — five varieties adapted to N. W.: 1st premium, D. T. Pilgrim; 2d premium, Henry Palmer; 3d premium, George Jeffrey.

Apples — largest variety of winter, not to exceed ten: 1st premium, C. B. Dawley; 2d premium, D. T. Pilgrim; 3d premium, Henry Palmer.

Apples — five varieties of winter: 1st premium, Henry Palmer; 2d premium, D. T. Pilgrim; 3d premium, C. B. Dawley.

Largest apple: 1st premium, C. B. Dawley.

Heaviest apple: 1st premium, D. T. Pilgrim.

Plate of Plumb Cider: 1st premium, Henry Palmer.

Plate of Haas: 1st premium, Henry Palmer.

Plate of Walbridge: 1st premium, D. T. Pilgrim.

Plate of Utter: 1st premium, Henry Balmer.

Plate of Westerfield Seek-no-Further: 1st premium, George Jeffrey.

Plate of Tallman Sweet: 1st premium, Henry Palmer.

Plate of St. Lawrence: 1st premium, Henry Taylor, East Middleton.

Plate of Duchess of Oldenburg: 1st premium, T. W. Rhodes, Weyauwega.

Plate of Willow Twig: 1st premium, Henry Palmer.

Plate of Wealthy: 1st premium, George Jeffrey.

Plate of Fameuse: 1st premium, George Jeffrey.

Pears — by non-professionals; greatest display of varieties: 1st premium, George Jeffrey; 2d premium, D. T. Pilgrim.

Pears, three varieties: 1st premium, Geo. Jeffrey; 2d premium, D. T. Pilgrim.

Pears, Flemish Beauty: 1st premium, D. T. Pilgrim; 2d premium, Geo. Jeffrey.

Pears, plate of Clapp's Favorite: 1st premium, D. T. Pilgrim.

Plums, by non-professionals, greatest variety: 1st premium, D. T. Pilgrim; 2d premium, Geo. Jeffrey.

Plums, three varieties: 1st premium, D. T. Pilgrim; 2d premium, Geo. Jeffrey.

Plums, collection of native: 1st premium, D. T. Pilgrim.

Plate of native: 1st premium, D. T. Pilgrim.

CLASS 31.— *Grapes by Non-professionals.*

Greatest display of varieties, five specimens: 1st premium, Jas. Farnsworth, Fond du Lac; 2d premium, V. Lowe, Beloit; 3d premium, Geo. W. Ringrose, Wauwatosa.

Grapes, ten varieties: 1st premium, V. Lowe; 2d premium, Jas. Farnsworth; 3d premium, Geo. Jeffrey.

Grapes, five varieties: 1st premium, Jas. Farnsworth; 2d premium, V. Lowe; 3d premium, Valentine Mangel, Taycheedah.

Grapes, single variety: 1st premium, V. Lowe; 2d premium, Jas. Farnsworth; 3d premium, Geo. W. Ringrose.

Grapes, three bunches of Concords on one cane: 1st premium, Jas. Farnsworth; 2d premium, Geo. Jeffrey.

Grapes, three bunches of Delawares on one cane: 1st premium, Jas. Farnsworth; 2d premium, Geo. Jeffrey.

Grapes, three bunches of Wordens on one cane: 1st premium, V. Lowe.

Grapes, three bunches of Wilder on one cane: 1st premium, James Farnsworth.

Grapes, single variety, quality to rule: 1st premium, Jas. Farnsworth; 2d premium, V. Lowe.

Crabs, by non-professionals, greatest variety named: 1st premium, Geo. W. Ringrose; 2d premium, Geo. Jeffrey; 3d premium, D. T. Pilgrim.

Plate of Hyslop: 1st premium, T. W. Rhodes.

Plate of Transcendent: 1st premium, Geo. W. Ringrose.

Plate of Whitney No. 20: 1st premium, Geo. Jeffrey.

Seedling crab: 1st premium, Geo. Jeffrey.

Collection of fruits of all kinds: 1st premium, Geo. Jeffrey; 2d premium, D. T. Pilgrim.

CLASS 34.— *Flowers by Professional Cultivators.*

Most artistically arranged floral design: 1st premium, Geo. W. Ringrose; 2d premium, A. P. Jones, Fond du Lac; 3d premium, E. Haentze, Fond du Lac.

Most tastefully arranged basket of flowers: 1st premium, E. Haentze; 2d premium, Geo. W. Ringrose.

Most tastefully arranged collection of cut flowers: 1st premium, Wm. Kitzerow, Milwaukee; 2d premium, Geo. W. Ringrose; 3d premium, E. Haentze.

Pyramidal bouquet: 1st premium, Wm. Kitzerow; 2d premium, Geo. W. Ringrose.

Pair of flat table bouquets: 1st premium, Wm. Kitzerow; 2d premium, E. Haentze.

Bouquet of everlasting flowers: 1st premium, Wm. Kitzerow; 2d premium, Geo. W. Ringrose.

Ten named dahlias: 1st premium, Wm. Kitzerow; 2d premium, E. Haentze.

Display of roses: 1st premium, Wm. Kitzerow; 2d premium, Geo. W. Ringrose.

Five named varieties of roses: 1st premium, Wm. Kitzerow; 2d premium, E. Haentze.

Display of verbenas: 1st premium, E. Haentze; 2d premium, Geo. W. Ringrose.

Show of pansies: 1st premium, Wm. Kitzerow.
Show of double petunias: 1st premium, Wm. Kitzerow.
Show of gladiolus: 1st premium, Wm. Kitzerow.
Show of tube roses: 1st premium, Wm. Kitzerow.
Show of greenhouse plants, not less than fifty nor more than one hundred varieties: 1st premium, E. Haentze; 2d premium, Wm. Kitzerow.
Twenty varieties of greenhouse plants in bloom: 1st premium, Wm. Kitzerow.
Ten geraniums: 1st premium, Wm. Kitzerow.
Six fuchsias: 1st premium, Wm. Kitzerow.
Display of flowers of all kinds grown by exhibitor: 1st premium, Wm. Kitzerow; 2d premium, E. Haentze.
Display of ornamental foliage plants: 1st premium, Wm. Kitzerow; 2d premium, E. Haentze.

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

Most artistically arranged floral design: 1st premium, K. F. Peffer, Pewaukee.
Most tastefully arranged collection of cut flowers: 1st premium, K. F. Peffer.
Most tastefully arranged basket of flowers: 1st premium, K. F. Peffer.
Pyramidal bouquet: 1st premium, K. F. Peffer.
Pair of round bouquets: 1st premium, K. F. Peffer.
Pair of flat table bouquets: 1st premium, K. F. Peffer.
Display of dahlias, not more than twenty varieties: 1st premium, K. F. Peffer; 2d premium, Mrs. A. A. Boyce, Dane, Wis.
Ten named dahlias: 1st premium, K. F. Peffer; 2d premium, Mrs. A. A. Boyce.
Display of roses: 1st premium, Miss Edith Kellogg, Janesville.
Five named varieties of roses: 1st premium, Miss Edith Kellogg.
Show of pansies: 1st premium, K. F. Peffer.
Show of gladiolus: 1st premium, K. F. Peffer.
Show of balsams: 1st premium, K. F. Peffer.
Show of greenhouse plants, not less than twenty-five nor more than fifty varieties: Mrs. D. C Giddings, Fond du Lac.
Dlsplay of flowers raised by exhibitor: 1st premium, K. F. Peffer.
Show of ornamental foliage plants, not more than ten varieties.

DEPARTMENT I.— MANUFACTURES.

CLASS 37.

Show of doors, sash, blinds, mouldings, and other house building materials by the manufacturer: 1st premium, S. Sylvester, Fond du Lac.

CLASS 38.

Steel wire: 1st premium, Wilkie & Dana, Fond du Lac.

CLASS 39.

Cooking stove for wood: 1st premium, Hartman & Peter, Fond du Lac.
Cooking range for families: 1st premium, John Rising, Fond du Lac.
Ornamental parlor stove: 1st premium, Hartman & Peter, Fond du Lac.
Display of stoves: 1st premium, J. R. Smith, by H. J. Hopkins, Fond du Lac.
Show of hollow ware: 1st premium, A. J. Brandette, Fond du Lac.

CLASS 40.

Largest display of britannia ware: 1st premium, C. E. Cornwell, Fond du Lac.
Largest display of gold and silver electro plating: 1st premium, Geo. B. Kelly, Racine Silver Plate Co., Racine.
Collection of glass, china and earthen ware: 1st premium, Pritchard & Richardson, Fond du Lac.

CLASS 42.

Sample of carbonate of lead: 1st premium, E. B. Heimstreet, Janesville.
Oxide of zinc: 1st premium, E. B. Heimstreet.
Mineral paint: 1st premium, E. B. Heimstreet.
Dyes: 1st premium, E. B. Heimstreet.
Potash: 1st premium, E. B. Heimstreet.
Bi-carbonate of potash: 1st premium, E. B. Heimstreet.
Show of perfumery: 1st premium, Dittler & Mitchell, Fond du Lac.

CLASS 43.

Double carriage: 1st premium, H. S. Benjamin, Milwaukee.
Single top buggy: 1st premium, Moliter Bros., Fond du Lac.
Single open buggy: 1st premium, Wm. Servis, Sheboygan.
Trotting wagon: 1st premium, Wm. Servis.
Pleasure wagon: 1st premium, Perkins & Clements, Fond du Lac.
Double sleigh: 1st premium, B. F. & H. L. Sweet, Fond du Lac.
Single sleigh: 1st premium, Wm. Servis.
Common farm wagon: 1st premium, B. F. & H. L. Sweet.
Fancy lumber wagon: 1st premium, Lenz & Ehlers, Fond du Lac.
Display of hubs, spokes, felloes and other wagon work: 1st premium, Webster Manufacturing Co., Menasha.

CLASS 44.

Parlor set: 1st premium, F. Sanders, Fond du Lac.
Center table: 1st premium, S. Endemiller, Fond du Lac.
Writing table or desk: 1st premium, Jesse Carpenter, Fond du Lac.
Dozen brooms: 1st premium, E. Enoegh, Lamartine.

CLASS 45.

Three trunks: 1st premium, D. C. & J. H. Lang, Fond du Lac.

Largest exhibition of sewed boots and shoes, one pair of each style, manufactured in the state: C. F. Youmans, Fond du Lac.

CLASS 46.

Specimen of print paper in variety, exhibited by manufacturer: G. W. Church, Fond du Lac.

CLASS 47.

Exhibition of woolen fabrics, manufactured in the state and exhibited by the manufacturer: 1st premium, John E. Sullivan & Co., Fond du Lac.

Fleece of American Merino wool: 1st premium, A. & P. Humbert, Caldwell's Prairie.

Suit of men's clothing: 1st premium, W. Leard, Oshkosh.

Suit of boys' clothing: 1st premium, W. Leard.

Exhibition of gents' hats and caps: 1st premium, W. Leard.

Exhibition of furs and fur goods: 1st premium, W. Leard.

DEPARTMENT J.—FINE ARTS.

CLASS 49.

Portrait in oil: 1st premium, James R. Stuart, Madison.

Original landscape in oil, work of exhibitor: 1st premium, Jas. R. Stuart.

Historical landscape in oil: 1st premium, Jas. R. Stuart.

Animal painting in oil: 1st premium, Miss Minnie C. Smith, Milwaukee.

Specimen of bird painting in water colors: 1st premium, S. A. Henry, Fond du Lac.

Crayon from photograph: 1st premium, J. R. Stuart.

Painting of game life in oil: 1st premium, J. R. Stuart.

Portrait in water colors: 1st premium, Jas. K. Pumpelly, Fond du Lac.

Collection of china painting: 1st premium, Mrs. Hiner, Fond du Lac.

Single piece of china painting: 1st premium, Allie A. Rose, Fond du Lac.

Water color painting on silk: 1st premium, Hattie V. Stilson.

Panel painting in oil: 1st premium, J. L. Strong, Fond du Lac.

Panel painting in water colors: 1st premium, Allie A. Rose.

Pencil drawing: 1st premium, Allie A. Rose.

Crayon drawing by exhibitor: 1st premium, Louise McCall, Fond du Lac.

Collection of paintings, water colors: 1st premium, Jas. K. Pumpelly.

Collection of oil paintings, not less than 15 pictures, 1st premium, Jas. R. Stuart, Madison.

India ink photograph: 1st premium, C. Chadbourne, Fond du Lac.

Specimen of steel engraving: 1st premium, A. C. Blankenburg, Fond du Lac.

Collection of photographs and other sun pictures: 1st premium, C. Chadbourne.

Collection of photographic copies of oil paintings: 1st premium, Julia A. Flint, Fond du Lac.

CLASS 50.

Samples of plain sewing, embracing the different stitches used in household sewing and repairing: 1st premium, Augusta Wehmeyer, Fond du Lac.
Fancy knitting work: 1st premium, Augusta Wehmeyer.
Cotton tidy: 1st premium, Mrs. M. M. Anderson, Rosendale.
Worsted tidy: 1st premium, Mrs. A. D. Parker, Fond du Lac.
Embroidered slippers, 1st premium, Jessie Morrison, Milwaukee.
Worsted embroidery: 1st premium, Allie A. Rose, Fond du Lac.
Needle work or floss embroidery, 1st premium, Augusta Wehmeyer.
Silk embroidery, 1st premium, Mrs. H. C. Moore, Fond du Lac.
Embroidered chair cover: 1st premium, Mrs. Patty, Fond du Lac.
Ottoman cover: 1st premium, Mrs. G. W. Lewis.
Sofa cushion: 1st premium, Mrs. A. D. Parker, Fond du Lac.
Specimen of hand braid work: 1st premium, Mrs. J. N. Hoaglin, Oshkosh.
Gent's dressing gown: 1st premium, Wm. Leard, Oshkosh.
Sample of work in wax: 1st premium, Nettie G. Gilbert, Fond du Lac.
Sample of work in feathers: 1st premium, Miss Addie Cronk, Eldorado Mills.
Sample of leather work: 1st premium, Mrs. E. C. Waters, Fond du Lac.
Specimen of bead work: 1st premium, Ida Worthing, Oakfield.
Sample of fancy netting: 1st premium, Mrs. W. Wilkie, Fond du Lac.
Exhibition of hair work: 1st premium, S. M. Carter, Fond du Lac.
Lamp mat: 1st premium, Mrs. G. F. Walton, Eldorado Mills.
Toilet set: 1st premium, Allie A. Rose, Fond du Lac.
Afghan: 1st premium, Mrs. C. H. Benton, Fond du Lac.
Exhibition of Honiton lace: 1st premium, Mrs. J. W. Dillon, Fond du Lac.
Exhibition of any other kind of lace: 1st premium, Mrs. A. A. Boyce, Dane, Wis.
Exhibition of Applique embroidery: 1st premium, Christina McIntosh, Fond du Lac.
Exhibition of Cretonne embroidery: 1st premium, Lillian C. Goddard.
Set of embroidered underclothes: 1st premium, S. M. Carter.
Picture embroidery: 1st premium, Miss Addie Cronk, Fond du Lac.
Exhibition in this entire class: 1st premium, Jesse M. Morrison, Elkhorn.
Sample of spatter work: 1st premium, Mrs. A. E. Johnson, Fond du Lac.
Specimen of plain sewing: 1st premium, Miss Nellie Kent, Fond du Lac.

CLASS 51.— *Domestic Manufactures.*

Rug of any material: 1st premium, Mrs. J. N. Hoaglin, Oshkosh; 2d premium, Mrs. W. H. Bryant, Fond du Lac.
Woolen stockings: 1st premium, Julia A. Flint, Fond du Lac.
Woolen socks: 1st premium, T. Davis, Oshkosh.
Two pounds woolen yarn: 1st premium, T. Davis.
Woolen mittens: 1st premium, Julia A. Flint.

Fringed woolen mittens: 1st premium, Mrs. M. J. Coffin, Fond du Lac.
White quilt: 1st premium, Ida Worthing, Oakfield; 2d premium, Mrs. D. C. Giddings, Fond du Lac.
Silk quilt: 1st premium, Mrs. E. C. Waters; 2d premium, Mrs. N. A. Knapp, Fond du Lac.
Log cabin quilt: 1st premium, Mrs. G. W. Swift, Fond du Lac; 2d premium, A. M. Darling, Fond du Lac.
Patch work quilt: 1st premium, Mrs. S. A. Henry, Fond du Lac; 2d premium, Mrs. J. Stockman, Milton.
Knit counterpane: 1st premium, Libbie Trelsoon, Fond du Lac; 2d premium, Miss Ella Gilmore, Oakfield.
Wrought counterpane: 1st premium, S. M. Carter, Fond du Lac; 2d premium, A. M. Darling, Fond du Lac.
Worsted scarf: 1st premium, Mrs. A. J. Clum, Oshkosh.
Wrought shawl: 1st premium, Miss Mary Eldridge.
Knitting or pleating: 1st premium, S. M. Carter, Fond du Lac.
Gent's shirt: 1st premium, Mrs. Ed. Kent, Fond du Lac.
Specimen of darning: 1st premium, Augusta Wehmeyer.
Specimen of patched mending: 1st premium, Augusta Wehmeyer.
Greatest variety of articles of millinery: 1st premium, Mrs. J. C. Whittlesey, Fond du Lac.
Lady's cloak, domestic manufacture: 1st premium, A. J. Clum, Oshkosh.

DEPARTMENT K.—EDUCATION AND NATURAL HISTORY.

CLASS 55.

Specimen of penmanship: 1st premium, Nellie Kent, Fond du Lac.
Best exhibition: 1st premium, Commercial College, Fond du Lac.

CLASS 59.

Collection of Wisconsin iron ore: 1st premium, Wm. T. Henry, Mineral Point.
Collection of Wisconsin lead ores: 1st premium, Wm. T. Henry.
Collection of Wisconsin zinc ores: 1st premium, Wm. T. Henry.
Collection of Wisconsin copper ores: 1st premium, Wm. T. Henry.
Collection of the economic minerals of Wisconsin: 1st premium, Wm. T. Henry.
Collection illustrating the birds of Wisconsin: 1st premium, Delos Hatch, Oak Center.
Collection of the insects of Wisconsin: 1st premium, Delos Hatch.
Display of minerals: 1st premium, Wm. T. Henry.

REPORTS OF SUPERINTENDENTS.

DEPARTMENT B.— CATTLE.

By Alex. A. Arnold, Superintendent.

At the state fair held at Fond du Lac in the fall of 1881 there was a fine representation in this department, there being two hundred and eighty head of cattle on exhibition, and all by breeders of Wisconsin. Of these seventy-six were Shorthorn, sixty-seven Jerseys, forty-six Devons, fifty-two Ayreshires and thirty-nine Holsteins. (A reference to the list of premiums awarded will show the names of the principal exhibitors.) To be brief, I will say that in each class the exhibition was commendable, there being many cattle that would be considered representative types of their breed. All things considered, I believe it the best exhibition of pure blooded cattle we ever had in the state by home breeders. It would not become me in this place to recommend any one particular breed of stock or that of any one of the various breeders, but I will say that the breeding of pure blooded cattle of all kinds, with proper care and attention, must pay better than a haphazard system.

If a farmer is too penurious to feed well, or too negligent to give his stock proper attention, it will make but little difference in the profits what breed of cattle he may have, or indeed if they are a mixture of all grades.

I would recommend the appointment of an awarding committee in each breed in advance of the fair, and that their names be published in the premium list. There is great labor and inconvenience in procuring suitable men to act as judges if picked up at the fair.

In this department this year there were no appeals taken, for which I have to thank both the good sense of the exhibitors and the good judgment of the gentlemen acting on the various committees of award in my department.

DEPARTMENT C.— SHEEP.

By CHESTER HAZEN, Superintendent.

The wool-growing interest in the state is in a prosperous condition. Wool-growers' associations in various sections are doing good work in this line of industry. In fact, I believe the wool growers of Wisconsin never have been in a more prosperous condition than they are at the present time. Although the entries at our state fair of 1881 were not as large as we would like to have seen them, still the exhibits in each class were equally meritorious to any previous exhibits for several years. The deficiency in exhibits was wholly due to the rainy weather and bad roads during fair week. I had the promise of exhibits from several parties in Fond du Lac, Green Lake and Winnebago counties, which were only prevented from exhibiting for the cause already mentioned.

DEPARTMENT D.— SWINE.

By CHESTER HAZEN, Superintendent.

The entries in this department were quite extensive, but not as large as at some previous fairs. The exhibits in all the classes were fully up to the former standard. The almost impassable condition of the roads in the country was probably the only reason why the exhibits in this department were not equal in magnitude, if not to exceed, the exhibits of former years. The favorable prices of pork the past season has been very satisfactory to the pork producers of Wisconsin; and more than an ordinary interest is manifested in the breeding of swine throughout the country. There is no one branch of agriculture that interests the average farmer of Wisconsin more than that of producing pork. And the increased demand for pork, caused by the adaptation of the product for various articles of food, which enter largely into the production of lard, butter (or sueine), and skimmed milk cheese, taking the place, in part, of full milk cheese, which contributes largely to the export products of our country, bids fair to make the interest one of great importance to the Wisconsin

farmer. While the improvements in breeding this stock have kept up with those of other farm stock of the northwest, we have good reasons to expect the continuance of such improvements in the future.

DEPARTMENT II.—MACHINERY.

By A. J. PEIRCE, Assistant Superintendent.

It has been truthfully said, "that on every field that bears a tempting harvest on its breast; on every brick in every building that was ever reared; on every book of value that was ever written; on every thought that burns to light the world; in every workshop and mine, and furnace, and factory — wherever labor sweats — are written the credentials of Nobility."

The inventive genius of America's inventors, through our extensive manufacturers, has once more placed on exhibition for inspection the largest exhibit — covering at least eight acres of ground — heretofore known to the State Agricultural Society, amounting in all to two hundred and eighty entries, of fine model and workmanship. While noticing many old and familiar machines, I could not without much admiration note the many evidences of valuable improvements and devices to simplify and strengthen nearly all machines on exhibition, showing to an observing people that the inventors and mechanics are making such strides to perfection as to make the dark ages to appear still darker. Noticeable, the plow, the harrow, self-binding machines, traction engines, windmills, vibrators, etc.,— all through the brain of inventors, backed up by the generous and lavish expenditure of millions of dollars by our persevering manufacturers, coupled with the thousands of gentlemanly experts and agents sent out by them to show up and explain in detail each and every machine, free, to the admiring thousands who visit the department for the purpose of seeing and profiting by the same. As I have had the supervision of the machinery department for four years past, it may not be out of place here to give some facts to show the growth in this department, especially in the amount of line shafting used to supply the demand. In 1878 we had only one

hundred and eighty feet, which at that time was sufficient for all purposes. I have added from year to year, until this year I was obliged to run three hundred and sixty-five feet, all of which belong to the society, and none to spare. With such a showing, it is no wonder that our machinery department is the envy of all others who have attempted to run line shafting as a feature of their fairs, in this state at least. In connection with this, the following estimated figures show the value of machinery on exhibition to be thirty-three thousand seven hundred and forty-nine dollars in the following exhibit in division H, class 37, of the State Agricultural Society for the year 1881, to wit:

Warder, Bushnell & Glessner, of Chicago, Ill., by O. A. Wells and G. W. Moulton — One Champion harvester and twine binder; one new mower; one light mower; one single reaper; one combined reaper and mower; two light single reapers — a very fine display.

R. H. Stockman, Milton Junction — One wind mill, etc.

Eclipse Wind Engine Co., Beloit — One wind mill and attachments.

Frank E. Day, Jackson, Mich.— One reaper; one mower; one combined reaper and mower.

West Depere Agricultural Works — One "Boss" thresher complete; one Workman seeder; and hingeless harrows, in variety.

P. V. Deterick & Co., Albany, N. Y.— One Lever Perpetual bailing press.

Geo. E. Mont, for McCormick — One harvester and twine binder; one Imperial combined reaper; one iron mower.

Wheel & Seeder Co., of Fond du Lac — One grain drill; one broadcast seeder and cultivator combined (iron bar); one broadcast seeder and Wood reaper.

C. C. Sherwin, Brandon — One land roller; one harrow.

G. I. Susan, Fond du Lac — One single reaper; one spring-toothed harrow; one straw cutter; one barrel churn; one horse rake.

J. I. Case, Racine — One traction engine; one separator.

Aulthouse, Wheeler & Co., Waupun — One wind mill and feed grinders.

R. A. Smith, Fond du Lac — One hay loader.

C. Aultman & Co., Canton, Ohio — One "Monitor" traction engine; one "New Model" vibrator thresher; one harvester and twine binder; one improved table rake reaper; also representing a full line of threshing machinery for all farming purposes; one wire binder; one reaper, sweep rake; one mower.

G. Steinhiller, Rockford, Ill.— One single reaper, J. P. Manny's patent; one mower; one "Nolden's" riding cultivator; one hay rake.

Sillerzahn & Young, West Bend — One feed-cutter and feed-mill combined; one feed-cutter.

H. Blodel, Fond du Lac — One combined seeder, cultivator and corn-cultivator; a novel and complete combination, durable, easily adjusted, a very perfect combination.

Fond du Lac Harrow Works — Three well made harrows; two truss whiffletrees.

Wilkie & Dana — Three "Red Jacket" plows.

Tolman & Clough, Oshkosh — Suction pumps; force pumps; stock pumps; tank pumps; cistern pumps; display of pumps; enameled tubing; wood tubing; porcelain tubing — fine display.

McDonald Manufacturing Company, Fond du Lac — One steam thresher, fine model; one traction engine; one separator; one horse power.

N. B. Gaston & Son, Beloit, Wis., by R. C. Wright, of Fond du Lac — One set stock scales, eighty thousand pounds; one sixteen hundred and drop-lever scale; one fourteen hundred scale; one eight hundred scale.

D. S. Morgan & Co., Chicago — One self-rake reaper, No. 2; one self-rake reaper, No. 3; one single mower.

A. H. Lewis, Fond du Lac — A variety of fine wood pumps; one wind-mill; two horse rakes, manufactured by J. H. Thomas & Sons; stubble and breaking plows; one riding cultivator; one walking cultivator; one harrow; one land pulverizer.

McGoncher, Milwaukee, Wis.— One grain drill; one broadcast seeder.

Jas. Little & Sons, Menasha, Wis.— One No. 5 four-knife feed cutter, power machine; one No. 4 feed cutter, power or hand; one No. 3 two-knife, novel feature on changing gear.

J. S. Rowell, Sons & Co., Beaver Dam, Wis.— One seeder.

M. M. Anderson, Eldorado Mills — One Deering twine binder.

E. H. Bornton, Fond du Lac — One washing machine.

J. W. Marsh, Fond du Lac — One seeder and cultivator, combined; one force feed grain drill; one hay carrier and elevator; one grappling hay fork; one steel stubble plow, iron beam; one turf and stubble plow, iron beam; one turf and stubble plow, wood beam; one chilled stubble plow, iron beam; one chilled stubble plow, wood beam; one straw, hay and cornstalk cutter; one grain and seed cleaner, for Birdsell Manufacturing Co., South Bend, Ind.; one clover thresher, huller and separator; one force-feed, broadcast seeder, for J. W. Stoddard & Co.; one grain drill; one self-operating sulky rake; one hand dump sulky rake.

D. M. Osborn & Co., Auburn, N. Y.— One harvester and self-binder; one reaper; one combined reaper and mower; one No. 5 mower; one No. 2 mower; one No. 1 mower, exhibited by C. H. Salzman, agent.

Nichols & Shephard — One self-guiding engine and vibrator separator.

Geo. Esterly & Son, Whitewater, Wis.— One improved harvester, with twine binder.

Russell & Co., Massilon, Ohio — One threshing machine; one portable engine; one pony saw-mill — all in operation, using their own power; sold on grounds. One H. M. Olin, Milwaukee; one reaper and mower combined; one single one-wheel reaper; one light mower, rear cut; one light mower, front cut.

J. & B. Mink, Fond du Lac — One iron harrow — very fine piece of work.

C. E. Hyatt, Indianapolis, Ind.— One combined cultivator.

P. P. Mast, Springfield, Ohio — One broadcast seeder; one spring toothed harrow; one grain drill; one spring tooth cultivator; one combined wood beam walking or riding corn plow; one iron beam plow; one plow attachment.

M. K. Dahl & Son, Rockford, Ill.— One prairie breaking plow; one sod breaking plow; one steel beam stubble plow; one wood beam stubble plow; one turf and stubble Scotch steel beam plow.

J. B. Ralston, for Emmerson, Talcot & Co., Rockford, Ill.— One Standard Economist reaper; one Standard Economist reaper,

No. 2; one Standard Economist mower; one rotary corn planter; one side corn planter; one six-shovel corn cultivator; one four-shovel corn cultivator; one hand planter and pumpkin seed attachment.

G. I. Susan, Fond du Lac — One spring tooth seeder and sulky plow.

J. J. Courtney, Minneapolis Harvester Works — One harvester and twine binder.

Fuller & Johnson, Madison, Wis., by W. A. Throop — One harvester and twine binder; one single mower; one sweep rake reaper; one Barlow's corn planter.

Thomas Davis, Oshkosh — One sulky cultivator.

T. A. Knapp, Fond du Lac — One harrow.

K. W. Skinner Scandia Co., Rockford, Ill. — Four stirring plows; one breaking plow; one sulky plow.

De Groat, Giddings & Lewis, of the Novelty Iron Works, Fond du Lac, exhibits Gowen's patent head block and set works for saw mills — a very accurate working machine.

C. J. L. Meyers, Fond du Lac — One heavy steam pump (weight nine hundred pounds); one thirty-horse power stationary engine.

Aultman, Wheeler & Co. — One geared mill; one geared mill; one geared mill; one grinder No. 1; one grinder No. 2; one grinder No. 3; nine pumps; one hay cutter; one corn sheller.

Edson & Son, Fond du Lac — One root cutter for stock.

Jas. E. Baker, for Buffalo Pitts Agricultural Works, Buffalo, N. Y. — One traction engine; one noticeable feature in the construction is, that while under heavy pressure of steam it does not throw off water from the stack.

W. V. Matteson, Milwaukee — Gleaner and Binder Works of Norristown, Pa. — One Hubbard gleaner and binder; a very ingenious machine, drawn by one horse, taking the grain from the swath or gavel and binding it very rapidly. Something entirely new; an advancement in the right direction; also, one Perry Royce reaper, manufactured by Tuttle, Wykoff & Olin, of Perry, N. Y.; one Williams Center cut mower, by Williams Harvester Co., Cedar Rapids, Iowa; one band cutter, ingeniously constructed for cutting and drawing the wire from the bundles.

J. P. Phillips, for John Dodds, of Dayton, Ohio — Six sulky rakes of different styles; two hay carriers with Walker's improved carrier; a very excellent device for latching and unlatching the same; two hay forks; one Walker's carrier; one double harpoon fork; one bundle hay carrier.

Birdsell Manufacturing Co., Mount Calvary — One clover thresher and huller.

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

Weber Smithkoffer, Mount Calvary — One stone extractor; one stump puller.

Beadle & Kelly, Troy, N. Y.— Two horse corn planters; one sulky hay rake.

D. A. Van Brunt, Horicon, Wis.— One seed sower; one cultivator.

Madison Plow Co., by J. Lamont — One sod plow; one chilled iron plow; variety chilled plows; one turf stubble plow; seven varieties stubble plows.

J. A. Field & Co., St. Louis, Mo.— One corn mill, with sifter; one corn mill, without sifter.

Furst & Bradley, Chicago, Ill.— One Garden City stubble plow; one Garden City stubble and sod plow; one Garden City chilled plow; one sulky plow, patent Fox attachment; one corn cultivator; one combined cultivator; one hand-lever rake; one adjustable harrow; one Friedman harrow.

A. E. Stearns, Waupun, Wis.— Steam washing machine.

J. I. Case, Racine, Wis.— One sixteen-inch center-draft stubble plow; one fourteen-inch Clipper sulky plow; one sixteen-inch, breaker attachment; five chilled iron plows; one ten-inch wood beam; one twelve-inch wood beam; one No. 22, twelve-inch wood beam; one No. 24, twelve-inch wood beam; one No. 44, center-draft, steel arch and wood beam; one No. 64, center-draft, steel beam; one No. 64, with Scotch coulter plow; one No. 12, steel beam; one No. 84, "G" sod and stubble, wood beam; one No. 84, sod and stubble, steel; one fourteen-inch timber plow; one sixteen-inch Ex. breaker; one No. 21 spring-tooth harrow; one walking cultivator; four shovel corn cultivators; one No.

34½, iron beam stubble plow; one No. 74, center-draft, steel beam plow; one No. 94 "S," wood beam Clipper plow; one No. 34, stubble plow; splendid display in the above line.

Appleton Manufacturing Co.— One seeder; one cultivator; three plows; one lever feed cutter.

Novelty Co.— One shuttle worker; one transplanter; one Gutic roller; one strawberry runner cutter; one ax-handle.

Briggs & Enoch — One shovel plow; variety of plows; one breaking plow; one cultivator; one sulky plow; one corn planter; one corn planter, No. 2.

W. B. Barber, Fond du Lac — One crank wrench.

W. Painter, Albion, Ill.— One plow.

A. Inglis & Sons, Horicon, Wis.— One windmill.

M. C. Gouchie, Milwaukee — One hay-fork and carrier.

J. W. McDermaid, Rockford, Ill.— Three animal powers.

Madison Manufacturing Co.— One Plantation sugar cane mill; No. 2 sugar cane mill; one Climax sugar cane mill; one farm furnace and boiler; one evaporating pan.

Warrior Mower Co., Little Falls, N. Y.— One Randal harrow.

A. Bailey — Car wheels on hack.

J. W. Austin, Fond du Lac, for Austin & Lewis, Chicago, Ill.— One feed water heater, lime extractor and condensor combined. Very meritorious. J. W. Austin, inventor. The above machine was in operation at the fair.

DEPARTMENT I.— MANUFACTURES.

By H. D. HITT, Superintendent.

Gentlemen: Having been appointed superintendent of the department of manufactures for 1881, it becomes my duty, and it is with pleasure I hand you a brief report of the success attending this branch of the fair. The exhibition in this department was unusually large and fine, and was remarked by many visitors as being the best display ever exhibited in the state. While nearly every article on exhibition in this department had more or less merit, there were some of modern invention that were especially worthy of commendation.

The exhibition of carriages was unusually large, but the department too crowded to show them to advantage. The committee found it difficult to do justice under the premium list. I respectfully recommend a revision of said list.

A double carriage, exhibited by Parsons & Goodfellow, of Oshkosh, attracted much attention for superior workmanship.

A double wagon, manufactured by Lenz & Ehlers, of Fond du Lac; the painting in particular deserves special notice.

Prentiss, of Sheboygan, was on hand as usual with a fine line of carriages.

A fine display of hardware and stoves by Messrs. Hughes & Otis, Hartman & Peters, Wilky & Dana, and John Reinig, of Fond du Lac.

The Fond du Lac Trunk Factory exhibited some very fine articles in their line.

Fine boots and shoes by Venne & Scholl, and C. F. Youmans.

Leard, of Oshkosh, brought in a fine display of dry goods and clothing; also, Sullivan & Merriman, of Fond du Lac, a large and elegant assortment of woolen goods.

The dairy utensils by E. H. Jones, and the large and tasty display of drugs and spices by J. C. Huber, of Fond du Lac, were special attractions.

The Webster Manufacturing Company, of Menasha, had a very tasty representation in pyramidal form, showing their hubs, spokes, wagon-hounds, sled-runners, plow-beams and handles, etc.

Of many other articles I would like to make special mention, except for making this report too lengthy, but I cannot close without complimenting Master Chegwin, of Fond du Lac, a lad of nine or ten years, on his beautiful pyramid, constructed of nuts of different varieties.

DEPARTMENT V.—HORSES.

By E. W. PALMER, Chairman of Committee.

FOND DU LAC, October 3, 1881.

To the Officers of the State Agricultural Society:

As chairman of the committee on examination of horses, I would say that the general exhibit was most excellent; superior

in many respects to any show of horses that I ever saw at previous fairs. In several instances the competition was so close that there was but little, if any choice between first and second horses, and also, often in the whole number in competition.

In several instances where your committee made special recommend, the animal so noted was the best in that particular show, and only failed of receiving first prize for want of sufficient proof of pure breeding, though actually finely bred; especially in class 4, No. 160, stallion two years old, under three, being the most perfect horse of his age and breed that I ever saw; also the sweepstakes in this class surpassed any show of its kind that I ever saw in quality and beauty. In class 3 Mr. Johnson's horse, though getting no premium, is not second in quality to any horse shown, the competition being about equal. In the class of roadsters the show was splendid and competition very close, and a dozen prizes would have been carried away had the offer been of that number.

The show in the horse department was one grand success, and the parties who have contributed so nobly, though many have received no prizes, may well feel proud of the efforts they have made to make the fair and show what it has been over fair ground mud and rain.

STATE

AGRICULTURAL AND HORTICULTURAL

CONVENTION,

Held at Madison, February 6th to 10th, 1882, under the auspices of the State Agricultural and State Horticultural Societies.

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:

Members of the Wisconsin State Agricultural and Horticultural Societies:

GENTLEMEN — As at the beginning of a new year the man of affairs sets himself to work to find out just where he stands financially, and books are balanced, and the year's work summed up, and a pecuniary observation taken, and an account of one's worldly stock and store, so on the occasion of this annual meeting of our societies we are gathered to look over the records of the past year, to note whatever of failure or success, of progress or retrogression has fallen to our lot, and to plan as wisely as we may, instructed by experience, in regard to the future of the farmers and other representatives of the great brotherhood of workers. I am glad to see so many, and especially glad to see before me those who have been identified with our agricultural and mechanical interests from the beginning, and who from first to last have been pioneers and fast friends in all improvements and progress in the line of industrial callings and pursuits. And when I think of the profit accruing to each one of us in our coming together at

these annual gatherings — of the mutual helpfulness, the larger and more intelligent purpose, the better equipment, resulting from conference, discussion, comparison of views, and the submission of our several experiences, these reunions seem to increase greatly in importance and usefulness, and it would be of advantage to our farmers generally, would lead on in the way of improvement, would help to better methods and a more intelligent conception of their high calling, were they oftener to come together, in district or neighborhood meetings, or to associate themselves in societies and clubs for the comparison of views on agricultural topics. The age in which we live is an age of association. In every other branch of industry, in every other calling, and in every other business and profession, there are associations whose object, aim and purpose are to improve and to advance their knowledge, their well being and their true interests.

Then why should not that great interest which underlies all others, the agricultural interest, have its associations also? Can any good reason be given against it? I certainly know of none. I can conceive of no reason against it, while there are many to favor it. The most obvious reason of all is, that agricultural meetings are great schools for improvement in practical agriculture and for mutual advice, counsel and co-operation. It has been well said, that from the hour that Adam was driven out of Eden and the ground cursed for his sake, the primal work of man has been in process of performance, not so much, perhaps, by any mere strength of arm or breadth of shoulder, or sturdiness of bone and muscle, although these have had their place and acted well their part, as because of the progress and power of enlightened thought, mind, mental development, culture, expansion, effort, which lie back of the grandest of material victories, of the proudest triumphs of civilization. I take great pleasure in calling the attention of my agricultural brethren throughout the state to the prosperity that has been achieved for our high calling. Never before has it filled so large a place in the public esteem, or held so exalted a position. It has an honorable place among the industries of the land, and its influence is commanding, and this because they who have adopted it and who are laboring in it in a

wise and progressive way, have set the mark of dignity upon it, and compelled for it the respect of men. It is within the memory of some of us that the cultivation of the soil, the care of flocks and herds, the growing of corn and the reaping of harvests, was thought to be a low and vulgar calling; and the hand that had grown hard and rough in the felling of the forests, the holding of the plow, and in mowing and reaping, was one hardly to be clasped, save in a shrinking, loathing sort of way.

It was forgotten that the first man was a farmer by divine appointment, and that in the divine economy farming takes rank above all other employments or forms of labor. As some one has said, "it underlies, like a bed-rock, every other occupation, and is the basis and support of all other industries; it is the back-bone of commerce, and of every material enterprise, and because of it, art thrives, and civilization progresses, and liberty becomes the watch-word and glory of the people." All this is coming to be appreciated, and the old verdict in regard to farming is being set aside. And this more for the reason that with farmers themselves there is a better appreciation of the nobility of their calling; showing itself in the employment of measures for the redemption of a degraded pursuit. Science, and the knowledge that comes from experience, have helped to lift agriculture into its present commanding position. The agricultural school, the agricultural society, the agricultural paper, and a hundred co-operating agencies, have aided in elevating the character of farming, because they have helped to place the farmer on higher grounds, and made a wiser, a stronger and a more complete man of him. They have furnished him with better methods, multiplied his facilities, given him better tools to work with, and relieved him from unremitting and slavish toil by placing the burden of drudgery and wearying labor upon the back of machinery; thus giving him time to rest, time to think, time to read, time for social converse, and time for culture in the refinements and amenities of life. But when we call to mind the many and great improvements that have been made in our high calling, and the largely superior advantages we enjoy as compared with those of our predecessors, we will do well to remember that there is room and need for

other and greater improvements, and that wisdom is by no means exhausted in us, or in the progress we have achieved. For after all, so far as the many are concerned, only a small part of the science of farming is known, and large numbers of the cultivators of the soil are slow to apply new truths, or to make use of new and wisely adopted methods and means. They hold fast to their old methods and practices, and flounder on in the old sloughs, and, in spite of all the light shed on their way, make little or no progress.

The cause of all this is to be found in the fact, no doubt, that large numbers engage in the pursuit or business of farming who have neither taste nor fitness for it. Possibly they have tried everything else and failed, and have taken to farming as a last resort. Now, natural adaptation is as much required in the case of the farmer as in the case of a lawyer or a doctor, or a minister, that is, if he would succeed, and I am not certain but that it is more essential in the making of a successful farmer than in the making of either of the others. In any event his calling is of divine appointment, and so of right may take rank among the highest and the best, and he who degrades it in his own estimation, or who has no reverent recognition of its sacredness, only degrades himself, by showing that he has not sense enough to appreciate its worth and importance. You will understand from what I have already said that I regard agriculture as the leading industry of the state. It would be easy enough to show that it is, if the facts were questioned, and the statement by no means underrates the importance of our mining, lumbering, mechanical and other industries. Besides there can be no reason for doing this. They are not rival industries, and consequently between them there can be no conflict. Each is dependent upon the other, and it would be most unnatural for them to come into conflict with each other. They are alike to be fostered and protected. Legislation that is unfriendly to one is unfriendly to all, and that which helps one helps all. Agriculture is the foremost industry within our borders, and therefore is justly entitled to corresponding care and encouragement from the state.

It has seemed strange to many that this society is without rec-

ognition in the recent message of the governor. I am far from believing that the slight was intentional, and therefore do not refer to it for the purpose of unfriendly criticism, or of censure, but rather to offer the charitable suggestion that in the multiplicity of other subjects before the governor, this society and its claims were overlooked. However this may be, it deserves and should receive the most generous aid from the state.

If in any way crippled or hindered, if burdens be placed upon it — if it be discriminated against, every other industry and interest of the commonwealth must suffer. Any harmful blow that falls upon agriculture, smites with equal force manufactures and commerce. It is only when these are regarded as one and indivisible, and are set side by side in harmonious relations, the first in importance at the head, that a people can rise to the highest attainable point of independence, wealth and power. The strength and prosperity of a nation largely depends upon the prosperity of its small land holders. It is to be said to our advantage, that there are only a few large farms in Wisconsin. The average size of our farms is not much if any over one hundred and sixty acres, and it will be found generally to be the case, I think, that nearly every man owns in fee the farm he works. The result is, better farming as a general thing, and the fostering of a spirit of independence and self-reliance; and then the man who is conscious that he is the uncontrolled owner of his acres, feels a greater interest, not only in his farm, but in all social and political matters. Habits of attention, observation and frugality are encouraged. He not only looks sharp after his crops and stock, but equally so to roads and schools, the taxes, and the expenditure of public money. Most of the labor, with our modern improved farm implements, is performed by himself, and all under his personal supervision. The result of all this is to be found in a growing prosperity, in improved stock, in good roads and schools, and in the increase in wealth and power of the state.

Here let me say, that inasmuch as the society of which we are members is not only the parent of all our minor agricultural societies, but the leading, the chief representative of the vast agricultural interests of our state, so the state, in its care for its most

important industry, should adopt the most liberal policy with reference to it; especially by securing to this representative a more ample and permanent endowment. It can scarcely be doubted that the increasing interest in agriculture which everywhere manifests itself, the quickened mental activities of our farmers as shown in their eager pursuit of agricultural knowledge, the increasing demand for the annual transactions of our society, the growing inclination to employ in agriculture money, business, energy and active enterprise, which are so successfully employed in other departments of business, are largely due to labors and the quickening influences of this society. Other industries have been helped and stimulated by it as well, especially those most intimately related to agriculture. It has largely aided in many ways the improvement in agricultural machinery, and the introduction of new implements, which have so almost entirely revolutionized the farming of the west, reducing to the lowest minimum ever attained the proportion of manual labor employed in its operations. Thus has it powerfully aided in making farming reputable and attractive, in giving it high rank among industrial callings, and in interesting men of culture and wealth in its behalf. Through its instrumentality, the knowledge it has furnished, the examples it has presented, the reforms it has advocated, the healthful competition to which it has incited, our farmers have been brought to see that their business means something more than mere delving in the soil, something more than unintelligent and slip-shod ways. For, like other occupations, competition in the production, and in the supply of the markets of the world, requires a thorough command of the subject matter, in the same relative degree that a knowledge of mechanical engineering is essential to the success of the ship builder.

To be a farmer means a machinist, to understand the construction, management and care of farm machinery; a carpenter, to repair implements, and manufacture many fixtures of the farm; a bookkeeper, to keep an accurate account of the out-go and income, experiment, profit and loss; a merchant, to know how and when to buy, and when to sell or dispose of the products of his labor; a banker, to discover where drainage and fertilization will

prove a better investment for surplus profits than government four per cents., or railroad stock. If in these ways and to this extent the agricultural society has helped to promote the agricultural interests of the state, then surely we may confidently rely upon a more liberal appropriation in aid of its work, thus increasing its power and usefulness. Evidently it is entitled to greater prominence in our legislation than has heretofore been given it, as compared with other interests, asking and receiving special aid and protection. There seems to be a sad lack of system (in fact there does not appear to be any system) in making up the agricultural statistics of our state. Legislation requiring a concise and uniform style of making up these statistical reports would be of great benefit to the farmer and to business men also. I would therefore recommend, as a wise measure looking to the increased efficiency and usefulness of the state agricultural society, that there be a legislative provision to this effect. That all appropriations to county and local agricultural societies be coupled with the requirement that the secretaries of all county and local societies make a report to the secretary of the state agricultural society, such reports to embrace all matters of interest in connection with the last annual exhibition, the condition of the crops in their respective counties and districts, the kinds of farming that predominate, viz.: grain growing, grazing, dairying, or what not, with a few figures worked in to show the ratio of increase or decrease of products within a given time; each secretary to arrange his reports as he may deem proper, giving any information of interest connected with the proceedings of his society during the past year, or copies of any paper or address read before it; the object of the report being to secure general information regarding the agricultural interests within the state; also that these county and district societies shall make an annual exhibition of the products of their respective counties and districts at the state fair, each county and district competing as a county or district with all the others; also that they be represented by one or more delegates in the agricultural convention convening at Madison in February of each year. It is very desirable that every county and district in the state should be represented in said

convention, and that their several reports be published in the annual transactions of our society. The importance of these requirements can scarcely be over-estimated. They would help to impart system to what is now loose and irregular, to unify effort, and to bind up all our local interests in one common bundle. And then it is to be considered that while the state agricultural society, from first to last, has been instrumental in accomplishing great good in the way of disseminating valuable information on agricultural subjects, and awakening a very deep interest in all that relates to farming pursuits, its power for good, for a larger and better work, would be greatly enhanced, and its influence proportionately widened and strengthened, were these requirements adopted. In a word, it would be made far more efficient in promoting the vast interests committed to its charge.

What is needed and what the changes recommended would help to make it is, that the state agricultural society should be, far more than now, central and supreme in its lawful realm, and that all county and district societies be constituted its auxiliaries, owing it allegiance and doing it service. Thus would we concentrate all of influence and power, and join hands in a brotherly way, in an institution having for its grand object the fostering and upbuilding of the noblest industry in the world.

DISCUSSION.

Mr. John S. Dore, Madison — In the very carefully prepared paper we have listened to, the wide range of topics connected with farmers' work so thoughtfully presented, there seems perhaps little opportunity to present anything at variance with the ideas advanced. Statistics, however, is a topic in the paper that we can profitably consider.

First, the suggestion that the secretaries of the agricultural societies receiving an appropriation from the state shall furnish, with their reports, some specific information in regard to the prosperity of this industry and its operation in their localities, is all right, but the obstacle in many instances is, persons are chosen to the position of secretary because of their convenience in some village to attend to the business wants of the society, as gen-

erally understood, and without any *special* reference to their *qualifications* or fitness for that position. They are without any interest in the work proper of an agricultural society. They are persons ofttimes who have not the time, who have not the means, who are not prepared to give that attention to this subject that would enable them to make a report of any value to the state, or a fair representation of the agricultural interests of their locality.

It would seem to me, sir, that it were much better if we could have a different system and a stronger one, that should reach out to every township, and include in the work of the assessors something more specific and definite than that required at the present time; that the officers that are elected in the several towns of this state, and are paid for their services from the public treasury, and have a certain duty to perform, and are looked after to see that they perform it, include in their work something of these statistics, and we might get something valuable. This voluntary work and spasmodic effort on the part of those who are willing to and can do this work, would be all right, but it is not sufficient to give any reliable data that would be of practical and substantial advantage to the citizens of this state or the citizens of any other state that would wish to know the progress here.

The subject of statistics is a very large one and a very important one. No other one thing, in my judgment, presented in the paper is worthy of greater consideration, from the fact that nothing, absolutely nothing, has been accomplished, so far, in this state in that direction.

The reports made out by the assessors are regarded as mere forms of law, something that don't amount to anything; hence the necessity of a little more attention being given to this at the very fountain head, and that seems to me to be in the several towns of the state. In regard to the interest that public men take in our work, and particularly our state officers, I feel encouraged. My own observation has been that we have been steadily growing in the respect of people; not, perhaps, faster than we have grown in self-respect for ourselves, for our society and for our occupation. No man and no woman who is ashamed of his or her occupation will ever reflect any honor upon that occupation, or command the

respect of anybody else. This evening, in conversation with the governor upon another matter, voluntarily, without the subject having been mentioned to him by any of the gentlemen present, he suggested this great interest of sugar, and sugar-cane growing in this state, and he said: "Anything that I can do I will do to help on this industry." He volunteered this remark, which shows that he has been thinking in the line of our work, and that we have developed an interest that is strong enough to command the respect and thoughtful attention of the governor of this state.

Mr. Kellogg — The value of the suggestion in regard to district and county exhibitions cannot be estimated. I would further suggest that at your winter meeting you offer premiums for vegetables and grains, so that the farmers might compete for certain premiums that could be very justly and appropriately exhibited at these annual winter meetings. If you wish for an example of what can be done in exhibition of fruit in winter, just look at our exhibition below, and this is a poor year for fruit. I suggest this as an additional matter of moment.

Professor Henry — I would like to speak just one word in the beginning of our meetings. Our congratulatory addresses here at the opening possibly may seem strange to some — that we should begin to flatter ourselves at the very opening of our meeting as to the position of the society in the state. It may seem strange to some, but I don't think that we or you, either of us, realize the benefit of this agricultural society to the state of Wisconsin. Let me illustrate: I was last winter standing in the office of the Newhall House, in Milwaukee, being there for the purpose of attending one of the Grange meetings, the State Grange being then in session, and I noticed a very pleasant-faced farmer and his wife walking back and forth, apparently enjoying themselves, and it happened during the meeting that we became acquainted. The farmer says to me: "I am somewhat in the dairy business now;" and he went on to give an account of what he was doing. He said: "Several years ago I got into such difficulty in my farming operations that I found something had to be done. I was growing wheat year after year. My farm was mortgaged; my crops were poorer and poorer each year, and it was a life and death struggle

with me. My wife and I worked as hard as ever two human beings did, and we could not lift one dollar of that mortgage. I saw in the papers that at the agricultural meeting at Madison Hiram Smith was to speak on dairying, and I remembered that in England I had something to do with the dairy business, but I did not know anything about dairying in America. I said to my wife: 'I am going up to Madison. I don't know what kind of a meeting they have up there, but I am going up there to see if I can learn anything to help me.'" He said: "I did not know at that time who Hiram Smith was, but I noticed his name was on the paper." He came up here, heard what was said about the dairying business; and, by the way, he told me that he borrowed money from one of his neighbors to pay his expenses here, for he had not money enough in his pocket at the time to do it; that he actually borrowed money to pay his expenses while here. He went home, gave up wheat-raising, got his land into grass as fast as possible, bought up heifer calves, at first made what butter he could from his own few cows, increasing his herd as rapidly as possible. He said, in a short time some of his neighbors, finding he got a much larger price for his butter than they did, came to him and asked him if they could bring their cream and have him churn it, and give them the price he got. He said: "Certainly, if you do as I wish you to as to the setting of the milk." Said he, "Now twenty of my neighbors bring their cream to my creamery, and my hired help do the churning." Said I: "Your wife don't work as hard as she did." He says: "No, we don't either of us really, for that part of it." Said I: "How about the mortgage?" Said he: "That is gone; that went some time ago." When we think of the burden that was lifted off that one man's heart, and how silently it was done — and only by chance I found it out — we must see the work that is going on.

I hope now, friends, as we go away from here that a more earnest effort will be made to get our neighbors here. I have been talking to neighbors, getting them to come, and I think efforts ought to be made to effect a larger meeting next year.

George A. Austin, Neillsville — I really hope that the idea of compelling the secretaries of the county agricultural societies to

report to the state agricultural society will not die here. I have faith enough to believe that the secretaries of our county agricultural societies have as much intelligence, on an average, as the average assessors in towns. If they have not, then it is the duty of the members of the agricultural societies to elect such men as have. I think I can see a large amount of good growing out of this. I know that I have been benefited more than ten times the expense that it has cost me to visit Madison to attend even one of these meetings. This is my second attendance at a convention. I do not care how much a man knows or what his advantages have been, no one individual can work out for himself what a large number of men can work out collectively. We bring our mite here; we compare notes, and the mass of information gathered here is a sum that cannot be valued. No man that is engaged in agriculture, horticulture, dairying, or any other of the agricultural or laboring interests, or even mechanical, can afford to stay away from these conventions, unless he is above-board and does not need any more proceeds from his farm. A man that is so wealthy that he does not need any more crops can afford to stay away, but a man that is dependent on any exertion for his living cannot. I hope that the mite that can be gathered from the county agricultural societies will be added to the quantity already here. I believe that by connecting the county agricultural societies, making them dependent upon and a part of the state agricultural society, will improve them and help this society. With that idea in view, I hope that this thing will not die here, that the suggestion of the president will be carried out, that there will be an effort made to have the tail attached to the legislative kite that grants subsidies, if you call it that, or appropriations to the county agricultural societies.

Mr. A. A. Arnold, Galesville — It is hard to make a speech after you hear a well written address that gives your exact sentiments, because it is so much easier to criticise when you find something to criticise. Of course then we can pitch in and fight and have a good time. Farmers are first-rate fault-finders, and we could do something first-rate if we had something in that paper to find fault with. As has been remarked, I do not find anything

of that kind. But there was one thought when I was hearing the address. Your president touched the point of co-operation and self-appreciation of what we are worth as farmers. This point of co-operation is something that I think that we, as farmers, would do well to look to. The condition of society depends upon public sentiment. Public sentiment wants toning up once in a while, and I apprehend that among farmers this public sentiment wants toning up, and if we are to have any advancement in our laws it will be the result of this toning up of this public sentiment; or, in other words, the crystallization of this public sentiment. Law is a rule of action, but it is only the result of the crystallizing of public sentiment. If we have the correct public sentiment and have it crystallized, it will show itself in the shape of law. Now we are constantly finding fault with our laws and our law-makers and the condition of things. We know many things are wrong, and I believe our legislators will in almost every instance follow the dictation of public sentiment if they once know what that is. No man sent to the legislature is so solicitous of anything as he is of seeking to satisfy those who sent him there. He wants to please his constituency. He wants to advocate those ideas that they believe in. Now if we can co-operate in this, find out what we want, what we are in favor of, then we may have the laws just as we want them. We represent more than one-half the property and more than one-half of the votes of the United States. We represent the leading industry, the basis of all other industries, as has been said, and if we have the proper amount of intelligence, which we should have, and tone up public sentiment, as we should, we can be the dictators of our laws, as we should be. Now if we do not have a correct appreciation of our industry, of our own personal importance, of the importance of everything that interests us, we may not expect others to have any more. I believe this is one of the great reasons why so many of our sons are unwilling to remain on the farm. Their mothers say to them from their childhood that it is a hard life; it is a life of drudgery. The fathers do but little better, and we need not expect that they will be contented to stay where they are taught from their infancy that it is an uncomfort-

able and a poor paying employment. Now this correct public sentiment can be started at infancy. We are all the time shaping it. We do not have to go to the state agricultural society in order to tone up public sentiment. We may influence it right at home. I do not believe in bigotry. I do not believe in the farmer thinking that he is the only honest man in the universe. I think we are just about as honest as other people, no more and no less. With some temptations we would be like other men. With less temptations some of us are none too honest. That is true. Now I feel interested in this thing, that we do make this correct public sentiment, and, as the president has said, it is improving, it is on the advance; and this is encouraging. But we have not done our whole duty, and we will not have done our whole duty until we use our influence in every position we may occupy in life. The truth is we are too independent. The life of a farmer encourages that disposition. We feel as though we did not want to follow anybody's lead; still we are led by the nose all the time. We feel that we do not want any man to dictate to us. We are the owners of the realty. We live there. We have supreme control. We dictate how everything on or about the farm shall be managed, and we feel our independence. It is no man's business how we run our business, provided we keep off the town. Therefore we are unwilling to co-operate, unwilling to organize, unwilling to do things that other people are doing, which are the sequence of our civilization. Combinations are necessary in order to produce great results in our civilization; it is a necessary sequence of our civilization. That being so, we must keep up with the times and do the very same things that other men are doing, so far as we may want to be successful.

Gen. George E. Bryant — Perhaps there is no person present that knows any more about these crop statistics than I do, because I have been secretary of the state agricultural society for some years, and I have had these questions asked me. I believe that I have received on an average ten letters a week, five hundred and twenty letters in a year, as secretary of the state agricultural society, from different commercial houses throughout this broad land and Europe, from statisticians of different colleges and differ-

ent institutions of learning in different parts of the country, asking for statistics in relation to certain things that are grown in Wisconsin. I cannot tell them. I am secretary of the state agricultural society and supposed to know all about it. I have no way in the world of knowing except by going to the secretary of state's report, which I get a year after it is made up from the reports of the supervisors of the year before. Now the state of Ohio pays $10,000 every year to get up their statistics, and they are sent in to the secretary of their state agricultural society. The state of Illinois takes a different course. The board of agriculture there took hold of it and said, "If you will pay us for a clerk, we will run it ourselves." The state of Illinois gave the state agricultural society a clerk. He does nothing else only answer those letters, and has correspondents in every town in the state, and finds out how many acres of wheat are planted, how many acres of hops, how many acres of flax, how about the cattle and everything else, and has a regular set of books, and they know exactly. They know a great deal quicker than the merchants do how their statistics stand. Now we do not know anything about it here. In Illinois they do it themselves without any payment from the state except the payment of the clerk, but the state of Ohio pays $10,000 a year to get those statistics and put them in the hands of farmers so that they will know how to sell. A man writes to me and wants to know about the hog crop. I look back at the assessors' reports made a year ago last spring. Those letters are going all over the land everywhere. I had a letter from a man the other day who said he was very much interested in finding out how many acres of flax there were planted in the state of Wisconsin, because they are about starting a new and great industry which will use up all the straw of the flax, which has always been thrown away, and they wanted to know how much they could get in Wisconsin; some new paper invention they were going to use it for. I looked back at the secretary of state's report, and I found that in 1880 there were so many acres of flax raised, and there were so many acres planted in 1881, and when I want to find out how much it comes to, I have got to wait till next September before I find out. So

we are just a year and a half behind in all things. We are a year and a half behind on the report, and then it is half a year after the report gets in before we have got it. I do not know how to get at it, but it seems to me there ought to be some way so that the farmers of Wisconsin could be put on a level with the farmers of Indiana, Ohio and Illinois. Mr. Chamberlain told me in Washington the other day that their crop statistics saved the farmers of the state of Ohio, simply from what they got there, millions of dollars, because they knew just how many bushels they had and they knew how much to ask for it. All the information we get in our great commercial center, Milwaukee, is what the railroads send us. They send out to a town to know how the wheat is around there, and the depot master takes a horse and rides through the country and picks off five or six heads and sends it to Milwaukee, and that is the estimate on which their estimate is made. We ought to have a man who would compare it with last year and the year before and publish it every week. They publish theirs every week on little slips of paper; I get them from Indiana and Ohio and Illinois. One clerk does the work, and from that they print the slips and send them broadcast to farmers. We are a great ways behind them. Whether there is any way to get at it is for the farmers of Wisconsin to say.

Mr. J. M. Smith — Are our statistics reliable when we get them from our own state?

Gen. Bryant — My friend, the captain, who is a good soldier, intimates that assessors are not always the brightest men in the land.

Mr. Smith — I asked the question particularly because in looking over the statistics from my own part of the county where I have lived, I recollect the acreage and number of bushels of potatoes were given, and I could count up fields within a mile of my house that had both more acres and more bushels in than were given in the whole town.

Mr. Fratt — Was your assessor a fair average of the class?

Mr. Smith — He was a fair average of the assessors of the county, and I do not know but a fair average of the assessors of the other towns.

Mr. George A. Austin — At the risk of being tedious, I wish to make one suggestion drawn out by Mr. Arnold. He says the farmers represent half the wealth and half the votes. I think we pay nine-tenths of the taxes. Which is most important for the agricultural interests of this state, the diffusion of this knowledge of the actual statistics of the crops, grown and growing, grain in sight and on the ground, or the manufacture and distribution of fish? Look over the statistics and see what they give us for agricultural purposes and what they appropriate to the fish commission. I do not want to tread on anybody's toes, and I do not want to delve in politics at all, but I do think that in justice and fairness to the people of the state engaged in agricultural pursuits, their interest is as much as those engaged in fishery, and we will ask them to give us for this purpose the same amount they give to the fish commission. I suggest that the committee which waits upon the legislature to ask for a bill in this direction draw the comparison and ask no more than they give to the fish commission.

ENSILAGE AND OTHER EXPERIMENTS ON THE EXPERIMENTAL FARM, NEAR MADISON.

By W. A. HENRY, Professor of Agriculture at the State University, Madison.

Mr. President and Ladies and Gentlemen:

My subject is not particularly the subject for consideration today, as I propose to take up something more general, but at the same time it will be introductory to the more proper topic of the day. While cane-growing has been the main experiment upon the farm the present season, we have, of course, conducted other experiments, and I propose to speak to you for a moment, if I may, of my own work. I hope you will exonerate me from all egotism, if I seem to be urging a cause which seems to have me for the central light. I do not wish to occupy any such position, excepting as I hope to be of advantage from my position. Having been elected by the board of regents to the position of professor of agriculture in the state university, and in charge of the experimental farm, I find devolving upon me a certain routine

of duty. I must teach in the university a certain amount; I must have control of the farm; I must attend farmers' conventions. Now I find myself thrown upon the farming community in one position and another, and I am forced to be with you whether I wish to or not. I believe that I can safely say that I have come into your state with all the energy that I could possibly command, and that I have thrown that energy into the work. I found upon coming to the state university that we had no agricultural department, unless you can call a farm an agricultural department; we had no building, we had no room even in the building, we had no museum, we had no appropriations, excepting for the farm; I had no place that I could take a man and say, here is my office, here is the place I write letters from; not a thing that I could call my department, and yet I had to head my letters "Agricultural Department." I, however, have gone down on the experimental farm, and have taken charge of the farm. I told the regents that I believed I could run the farm without a superintendent, and I am running the farm, and to-day my hired men are doing the work that I gave them directions to do this morning. I have, in connection with my other work, sole charge of the farm. When I came to my department I found no correspondence, nothing that connected the farmers with the agricultural department. Now letters come, from three to ten a day, from farmers, in regard to various topics, and this feature of my department is growing very rapidly. Farmers are asking questions regarding fertilizers, the introduction of new seeds, the question of stock and the sorghum industry. I find my department growing in that direction. The regents have promised me as much of one building as I desire; they have also called to my aid a chemist and a botanist, so that the department, which previous to my coming was represented by Professor Daniells in his double capacity of chemist and professor of agriculture, is now represented by myself with two assistants, or will be shortly. You see, then, that in the short space of a single year our department has made great strides. Again, in the direction of the farm, the regents have allowed a certain amount of money to be spent upon the farm. Finding that more was needed, if we wished to

conduct any experiments in the Amber cane industry, the state legislature generously gave us $4,000 last winter. With that $4,000 the chemist, of whom I have spoken, was employed, machinery purchased, a small building erected, and we have conducted experiments. Of those experiments, Mr. Swenson, who will address you, had almost complete control. He is a machinist by trade and a chemist by education. This combination seemed to fit him for this work, and last winter we arranged it between us to see if something could not be done. Some people thought that we were rather young to undertake it, and, as Mr. Swenson had never seen sugar cane growing, it did seem, possibly, like something of an undertaking for a young man who had never seen cane growing to attempt to make sugar. You will be surprised though to find how, with his mechanical knowledge, he rapidly reached positive results. In the first place he analyzed the juice which came from the cane, and could tell to a fraction how many pounds of sugar there were in that raw juice. He then could apply whatever chemicals he wished, and again analyze that juice and see whether the sugar was still there, for you know sugar is easily converted into glucose and the glucose into other products. He could boil that juice after defecation to any consistency of syrup desired, and again analyze it and see where the sugar was; he could stop at any stage of his process and find out. You see that with his chemical knowledge he had an advantage over any ordinary person. He soon had ripe cane, and as soon as the cane was ripe he began to make sugar. With our farmers, as they ordinarily manufacture syrup, sugar is sometimes made, but it is one of those curious will-o'-the-wisp products that we are never certain of. I find farmers that say, "Three years ago I made sugar, but last year I did not get any; can you tell me why?" Another will say, "This year I got sugar, and last year I didn't." Another will say, "Last year I found a little sugar in the bottom of the barrel, and this year there was a good deal more." Mr. Swenson in his work had no such uncertain factors. If there was sugar in the juice in a proper amount, he obtained a proper amount of sugar; and he was certain when he started what he was going to obtain. We raised on the

farm something like four acres of cane; we manufactured several barrels of syrup and about a thousand pounds of sugar, as near as we can estimate. Samples of this sugar will be found upon the tables. Our white sugar is all exhausted, as we sent sample packages all over the state. Of our brown sugar, as partially refined, we have a couple of barrels' full left; and of the raw sugar we have several hundred pounds. We have brought that sugar here for the purpose of having it distributed over the state, and if any of you wish to take any of it home, you can take it. We wish to distribute it. If any of you care for samples of syrup we can bring plenty more, as we have nearly a barrel of the grade represented in the large pail upon the table. I do not care about going further into sugar experiments, at present, because Mr. Swenson will take up that subject, and it is properly his subject. The making of sugar has to be left to an expert. If you go to the south you will find upon the plantations a sugar outfit costing about $40,000, and the southern people cannot make sugar profitable without an outlay of something like that amount. Their cane is somewhat superior to ours, their labor system is inferior to ours. But we cannot expect to make sugar on our farm any more than they can in the south. And in the south planters are saying, "We cannot carry $40,000 worth of machinery; we cannot afford, for two or three months' work, to have $40,000 lying idle nine months," and therefore they are adopting what we will have to adopt, a central system, where several plantations join.

The second experiment was upon ensilage. With this I had more to do, and of it I will speak somewhat at length. Ensilage has been practiced in our country now, I think, six years. Our experimental farm was the first one to adopt it, unless we except the state of New Jersey. (We are ahead of the states of New York and Michigan. Iowa is now considering the question of building a silo.) We built a silo on the farm at one side of our barn, which was thirty feet long, outside measurement, and fifteen feet wide; giving us twenty-seven feet in length, inside measurement, and twelve feet in width, and it is fifteen feet deep. It is made of stone laid in strong mortar, the walls being eighteen inches thick. Over this is a superstructure, quite a fair looking

low building, which protects the silo from the rain. All you have to do to imagine a silo is to think of a stone cellar twenty-seven feet long inside, fifteen feet deep and twelve feet wide, the walls being plastered with cement and made smooth; no doors or openings of any kind; the silo sunk about half way into the ground; there is about seven feet out and eight feet under ground. Into this silo we run corn fodder, cut by the ensilage cutter. Our corn fodder was brought from the field green, as fresh as we could get it, and run through the cutter, which cut it into bits from half to three-quarters of an inch in length. From there it was passed directly into the silo. It was trod down by at least one man, and sometimes several, in the silo, and packed as securely as we could; and when the silo was nearly full, finding that our corn fodder was running short, we ran in some clover, fresh from the field; upon the clover we placed plank, and upon the plank, stone. We placed on the silo ten tons of stone, giving us one hundred and twelve pounds of pressure to the square foot. Last year, in our convention, you will remember that the Hon. I. C. Sloan read a very interesting paper, in which he gave a number of quotations as to the yield of corn fodder per acre. It was estimated, he said, by competent parties in the east, that corn fodder would yield from twenty to seventy tons to the acre. A good many here thought that that was rather a large story. We try to do things on the farm somewhat systematically, and every load of ensilage that went into that silo was weighed before it went to the cutter. We had three kinds of corn planted. The first, if I remember right, went twenty-three thousand pounds to the acre; that was yellow dent corn, planted seventy-five grains to the rod, and the rows thirteen inches apart, in drills, and the field kept clean. The field would have raised about twenty-five or thirty bushels of shelled corn to the acre this season. On the next field, which last year gave eighty bushels of shelled corn to the acre, and this year would have given about fifty to fifty-five, or possibly sixty, the corn was planted in hills, three grains in a hill, two feet each way, and the ground carefully prepared, heavily manured, and everything as favorable as could be. I never saw better ground for corn than that. That was planted with white flint corn, three

grains in a hill, two feet each way. The yield of that was thirty-three thousand two hundred pounds to the acre. In the same way, a similar piece was planted with southern corn, a large white dent corn, the seed obtained from the Missouri agricultural college, a variety known as the Evans. This yielded, under the same conditions as the last, forty-two thousand eight hundred pounds to the acre. This corn was twelve feet in height, and so thick that no ears formed upon it. The stalks were leafy and green to the very ground, and when the leaves started to appear they were so high that I could just reach them. The stalks were leafy to the top. A single stalk was measured, in the presence of some gentlemen who were visiting the farm, and weighed five pounds. That went forty-two thousand eight hundred pounds. You see then that in the very start we must cut down those statements made by eastern gentlemen of seventy tons to the acre.

I received the report of the ensilage congress, held in New York city last week. In that congress gentlemen made statements that heretofore the thing has been entirely over-estimated. One man said that he obtained eleven tons and two hundred pounds of ensilage to the acre. The only man that made any such wild statements as were made last year was Mr. Mills. He has made apparently a good many wild statements, although he stands a good cross-examination. Mr. Mills claims he cuts seven hundred tons of ensilage from twelve acres. That is the only wild statement made in the convention this year, and I think that will have to be set down as a wild one yet. But even yet we have not reached the question. It is not so much how much corn fodder can we raise to an acre and put into the silo, but what is the value of the products of the silo? That is the question after all, and, I must confess to you, is yet unsolved. There are new difficulties arising constantly in our study of it. We have had four cows in a partial experiment for over forty days. We have just purchased two more for a second experiment, and we are feeding some calves upon the ensilage. The results cannot be published before spring, and I think it is perfectly useless for me to attempt to draw any conclusions from an experiment which has run no longer than some of these have.

It appears that one pound of good timothy hay is worth from four to seven of ensilage; that is what it appears at present. Some gentlemen in the ensilage congress in New York claimed that two pounds of ensilage was worth one pound of hay. Others put it one pound of hay worth from four to seven of ensilage; pretty nearly as we seem to be concluding from our experiment. But there is no need of talking about that; we cannot draw conclusions before we have experimented.

As to the expense of building a silo: our silo, which was built of stone that cost us $2.50 a cord, lime twenty cents a bushel, cement $2 a barrel, masons $3 a day, labor for the masons $1.75 a day, if we include drawing the stone and excavating the cellar, and the cost of the ensilage cutter, $81, was $413, if my memory serves me. The cost of drawing it from the field, weighing it, running it through the cutter and putting it into the silo, allowing for a break-down in one case of half a day, and a complete change of power, which took us nearly a day more, having to cover the silo up and again uncover it and finally cover it for good, was $1.68 a ton.

I am confident that next year we can put the ensilage into the silo for from seventy-five cents to a dollar, if not cheaper. The only caution that I would urge to any one who may think of building a silo is, in the first place, wait. I would not put up a silo yet. I would wait one year. The whole thing is an experiment. We are beginning to discuss the question if it is not possible to build wooden silos; silos with very thin walls; less expensive silos. And the question of how we had better cover them and weight them is not yet settled. The question of the best cutters is far from being settled. By a mistake in our cutter, we lost, I think, $40, by getting a cutter which did not suit us. I think we lost at least $40 in the hired help that was paid to manage it. To manage an ensilage cutter requires as much ability as it does to run a threshing machine, and there has got to be as many hired men around it, and you can imagine the difficulty there would be in getting a threshing machine on to your farm, and trying to run it with wholly inexperienced help. The circulars led us to infer that two horses and a tread power would

run our cutter very easily. We found that the two horses would sweat until the water ran down on to the tread power. We had to give it up, and change our pulleys and belting and get another power entirely. I do not think that there is anything yet that shows that ensilage is not a good thing, and profitable, at least on a dairy farm. Yet at the same time I cannot see that here in the west, where labor is high and land very cheap, the thing is at all settled. It would be nice to stand up here and try to get up an excitement about this, but it would only reflect discredit on me in after years, and I believe that we had better go cautiously. I hope that another year we may continue this sorghum experiment that we have begun. I do not think we can do much more in regard to sugar, but there is a great deal of work to be done in the improvement of our varieties. Think of France. At one time it took ninety cents per pound to produce sugar from beet juice. The juice of the beet contained only six per cent. of sugar. The French government, under Napoleon Bonaparte, who was as invincible in agriculture as he was in war, ran up the produce of the beet juice until it contained eleven per cent. of sugar. Southern cane is ahead of northern cane, but northern cane is yet a mongrel. We talk of Early Amber and all these things; we have nothing yet that is fixed in our varieties. We have no thoroughbreds, as we have in our cattle and horses. Our cane must be improved. We must have it done systematically, and our farmers cannot do it. To illustrate: Forty-three farmers told me that they would try to perform a simple experiment in Amber cane, in regard to the manures to be applied to it. Out of the forty-three I have one successfully performed experiment. Farmers have not time in this busy age to conduct experiments such as we have to. They have not time to stop and weigh every load that goes into their barns, as we would have to. I hope to continue the experiment with the ensilage, and there are a great many other experiments in regard to hay and other products that we shall also conduct. I have spoken of these things mainly for this reason, a number of you are here from a distance. Our experimental farm is nothing wonderful in its looks, but possibly there are some things that might interest you if you should go

there, and I extend to all of you a cordial invitation to visit our farm and see the silo and the vacuum pan where the sugar is produced. You will see the lay of the land, so that in after years, when you read of our experiments, you will have some idea of the conditions under which they were performed.

DISCUSSION.

Mr. Wood — If you take the number of pounds that go into the silo, how many pounds will come out? Have you any means by which you will know what the shrinkage will be? If one pound of hay would be equal to six or more pounds of ensilage, we would want to know how much green fodder it would take to make so much ensilage.

A member — Do the stock like ensilage?

Prof. Henry — Yes, I think that the stock are easier to convince of the good eating qualities of ensilage than a convention of farmers. I could convince one hundred cows that it tasted well quicker than I could a hundred men. In regard to Mr. Wood's question, it is difficult to tell, unless we take it out and weigh it over again. Of course that would be wasteful. We could build a small silo and weigh in, and then take it out and weigh over again and see what the loss is, or perhaps take a certain number of cubic feet and weigh that and compute. I hope to be able to give that statement definitely, but at present I cannot. To those who are not familiar with ensilage I may say that it is sour. The sugar in the corn stalk is turned into glucose, and the glucose is broken up in some cases to alcohol, and in other cases into acetic acid, the acid that makes vinegar, so that the ensilage is sour. Some of that chemical change results in carbonic acid gas, which gradually passes off. Ensilage will all burn up in time. A hod full of coal which weighs forty pounds will make two or three pounds of ashes. The difference between the weight of the ashes and the weight of the coal has passed off in water or its compounds, or in carbonic acid gas. There you have a rapid fire. In a silo there is the same fire that burns up the logs that rot in the woods, that burns everything that decays. How much of this change has gone on in the silo we can only tell by chemical

analysis and by weighing. Mr. Swenson has been at work on the ensilage, analyzing it, for nearly three weeks, and has reached some results.

S. L. Mason, Masonville — In visiting the silo I noticed that you had on the surface a layer of clover; I wish to know whether that clover could be put in right from the field without cutting, if it would be as profitable, and if it would keep as well and feed as well or be as nutritious as it would be to cut it.

Prof. Henry — At the New York ensilage congress one of the members exhibited a bundle of fodder taken from a silo, the fodder never having been cut, and in nice condition. The same thing is true of Mr. Gilbert's silo in Jefferson county in this state. He puts in corn fodder without cutting, and is perfectly satisfied financially with the result. We put in something like five tons of green clover, just as it came from the field. Having been cut in a wet time, I supposed that possibly it would rot, since it was at the top of the pile, and the last load was put in after having stood out all night, and the next morning was pitched into the silo and spread over the top. The water dropped from the clover as it was put in, there having been a heavy rain during the night. That was not run through the cutter, just pitched in and a plank laid on top. Some of it rotted, but if you had put in hay or anything else, that would be rotten the same way. The cattle preferred that to the ensilage corn.

Mr. B. F. Adams — Did I understand you to say that you had visited the premises of Mr. Gilbert?

Prof. Henry — No, but I saw his ensilage at the dairymen's fair at Oshkosh last winter.

Mr. Adams — Did any considerable number of those who attended that ensilage convention you spoke of approve of cheaper methods of building silos, above ground or with wood?

Prof. Henry — One gentleman in that convention said that ensilage would not keep if the silo was above ground. Our experience goes contrary to that. There are others that think wooden silos will do, and Mr. Mills is one of that number. The whole principle is to keep air from the ensilage. The ensilage will all rot if you cannot keep the air out.

Mr. Adams — I am acquainted with Mr. Gilbert. I understand he has been practicing storing fodder in silos for the last four years. He made a cheap one in his barn with thin partitions. I saw it announced in the Jefferson County Union that his fodder comes out as bright and in as satisfactory condition as that which has for years past been stored in an expensive silo.

Mr. Ford — I noticed in the report of the New York ensilage congress, referred to, a gentleman there had simply dug a pit in the ground and put in a wooden frame without anything further, and put his ensilage in there and covered it up and put earth on it. He reported that his ensilage was well preserved and it was a much cheaper process, and that they would come ultimately to building their pits right near their corn field, and bury their ensilage as they do their roots, and take it out as they wanted it. Do you think it could be preserved in that way?

Prof. Henry — We have a small silo upon the farm which is a small hole eight feet square in the ground; no boards against the sides of it; no protection of any kind. Into that we put all the clover we could get in, and tramped it in, and upon that we threw the earth we had dug from the hole. We filled the hole, eight feet square and eight feet deep, with clover till it was rounded out, and threw on six or eight inches of earth. In twenty-four hours the whole thing had settled until it was level; then some earth was thrown on and it settled again, and they threw on more earth, and so on, and it stood out without anything over it through the lively rains this fall, the whole thing being on a rather dry bank, and when we dug into it we found the best ensilage we had this season. There was not a board or a stick to protect it.

Mr. J. M. Smith — Will hogs eat ensilage preserved in earth, or clover preserved in earth?

Prof. Henry — The pigs on the farm have eaten it somewhat, and so have the chickens, but it is too diluted food for chickens, and we have not experimented enough with the pigs to know much about it. If clover can be raised that is better than corn fodder I think the ensilage would be that much better.

Mr. Arnold — What is the difference in weight between a ton of clover in the field and after it is dry?

Prof. Henry — In one of our experiments we found that three and a half tons of clover shrank to one, but I do not think that is at all fair. It was an experiment that was done in a small way.

Mr. Arnold — You might say four to one.

Prof. Henry — I think it is more than that.

Mr. Arnold — Then if dry fodder is as one to four, that would make it about even as compared with ensilage, only that one takes a little more room than the other.

Mr. Stickney — It was my privilege about three weeks ago to visit the silo of Mr. Mills that has been referred to. We did not find Mr. Mills at home, but received from his foreman a general statement of the matter that would be less colored with enthusiasm than what we might receive from Mr. Mills himself. We found at that silo one hundred and sixty head of cattle, his regular stock that he was carrying. This is the sixth year, I think, of working with his silo. Now, the proof of a man's faith is by his works largely, and the facts of the case are that there had been no other provision made for coarse forage upon that farm, except the sowing of twenty acres of drilled corn, for that one hundred and sixty head of cattle. The excessive drouth of last season had reduced that yield to such a point that they were short of forage, but they were planning that that one hundred and sixty head of cattle should have been carried through generously with twenty acres of ensilage. They were feeding their cattle very much too light. They were feeding nothing but this ensilage and about three or four quarts a day of ground wheat screenings, not over rich. We saw the food. They were placing it in for the cattle when we were there. The cattle looked in very fair condition, but not as fat and plump as they would with an abundant supply of coarse forage. We knew and they knew that they were pinched in that direction, but not to their material injury. It is evident that Mr. Mills believes in what he is doing, and believes that twenty acres of drilled corn will carry through, for coarse forage, about one hundred and sixty head of cattle. There is a means of comparison between that and dry fodder that any man can make for himself.

Another instance I have some knowledge of which I have not seen. A gentleman in Massachusetts, about thirty miles out of Boston, is making his second season's use of a silo with about forty head of stock. He carried those forty head of stock through from the first of December to the middle of April, last season, giving them a little more than half of their feed of ensilage, the other half of their coarse fodder of grain feed or of mill feed, from a product of six acres, and they had an abundance. They have from the product of six acres the full feed of forty milch cows through the winter, or of twenty cattle through the year. That will enable any one to judge a little of its feeding qualities. I feel very deeply interested in this thing, though not a farmer. I have very much faith in it, yet I approve most heartily of the suggestion of Prof. Henry, to go slowly and surely.

Mr. Hiram Smith — I would like to inquire if the gentleman gained any information in regard to the amount of grain fed per day to the forty head of cattle.

Mr. Stickney — Not of the forty. The one hundred and sixty were fed not to exceed four quarts a day of grain feed, a little better than our shorts, not as good as our mill feed. I should think it was equal to about half and half shorts and middlings, as it comes from our mills in the west. They fed no coarse forage of any kind but that.

Mr. C. Judson, Omro — I believe that this day was set apart for Amber cane, and this ensilage rather belongs to the other business. Therefore I think we had better go back to our Amber cane industry for the present. I would like to ask the cost of converting Amber cane into sugar.

Prof. Henry — I think that had better come later, after we have opened the discussion.

SUGAR AND SUGAR MAKING IN WISCONSIN.

By A. J. RUSSELL.

The production of pure sugar and syrup from northern grown cane has attracted considerable attention, from the Atlantic to the Pacific oceans, and from Canada to the Gulf of Mexico, and the reports of the many good results that have been obtained have reached foreign nations, followed by a demand for the Amber and Orange cane seed grown in the northern states, and over thirty thousand pounds have been exported to supply that demand, to enable them to try and produce like results on their own soil. Australia and New Zealand are not behind the rest of the world in desiring to produce their own sweets; and several parties residing there sent to me last year for the seed.

It is no longer a subject of doubt as to the profits to be derived from its culture and manufacture by some of the experienced sugar planters of the south and some of the most experienced sugar and syrup refiners of the north, and is not confined to the primitive style of operations heretofore existing, but large sugar houses and refineries have been established and put in operation, and others are in course of construction in Nova Scotia, Canada, New York, New Jersey, Pennsylvania, Minnesota, Iowa, Illinois, Missouri, California, and last but not least in Kansas, where they have five large works, costing from $30,000 to $60,000, and having a capacity of from one thousand to two thousand acres each per season. Most of the large works referred to have been fitted up with the best and latest improved mechanical appliances, and some of them are operated by practical sugar boilers and refiners of long experience with the tropical cane juices, and assisted by professional sugar chemists. One refining company of Philadelphia fitted up a complete sugar house in New Jersey, this past season, costing $60,000, and the result of their first season's work was two hundred thousand pounds of refining sugar, worth seven and eight cents per pound, and sold at that price. The seed of the cane was sold for sixty-five cents per bushel for feeding purposes. The state of New Jersey, to encourage the production of

sugar cane, pays to the farmers one dollar per ton premium for every ton of cane they raise that will produce crystallizable sugar, and to the manufacturer they pay one cent per pound for every pound of sugar they produce from native grown cane. And the result of the past season's work, with the liberal inducement offered by the state, has so greatly encouraged the producers and manufacturers, that they are making preparations to greatly extend their operations.

At the Mississippi Valley Cane-Growers' Association, held at St. Louis last month, most of the states were represented, and so important was the industry considered, that the Southern Sugar-Planters' Association of New Orleans, and the governors of several states, sent special representatives to that convention, to impart and gain what knowledge could be obtained from practical operators, fresh from the fields and sugar-houses; and I am proud of the fact that among that large assemblage of representatives from the sugar-planters of the south and from some of the largest sugar works of the north, operated by professional sugar refiners, there were none whose experiments and results obtained attracted more respectful attention than those of Professor Henry and Mr. Swenson, of the agricultural department of our university, who represented our state in this industry. While great advancement has been made, yet, with the assistance of our energetic professors of agriculture and of chemistry, if they are permitted to continue the work so well and ably begun, there is no doubt they will be able to still further enlighten us on the most important point, and that is, the best soils and fertilizers to be used to produce the largest yield of cane per acre and the richest quality of juice, and methods of planting and harvesting to obtain those results, and, if possible, propagate new varieties. Enough has already been learned of the nature of this sugar plant to show that in order to work successfully, the many valuable experiments that *have* been made *must* be *systematized* to make a financial success to the farmer, the auxiliary and the central works.

Pure and well-developed seed, and *no* other, should be planted to obtain good sugar-producing cane; a thorough preparation of

the ground and cultivation of the cane, keeping it free from all weeds, and the ground in a loose condition.

The methods of planting will differ according to the nature of the soil and the object to be obtained. If for sugar-making, which should be the *great* desideratum, it must be planted in rows, far enough apart to admit of plenty of sunlight to the lower portions of the stalk; but if syrup-making alone is the object, closer planting will serve the purpose.

In harvesting the cane for a sugar crop, the professors of agriculture and of chemistry have settled the point quite conclusively, that the maximum amount of crystallizable sugar is reached when the seed has obtained that hardening state that it cannot easily be cut in two with the thumb-nail; but to make a beautiful light-colored and finely-flavored commercial syrup, free from the objectionable sorghum twang, my own experience in large field operations, combined with others, is, that we can commence to harvest the cane when the seed is in the dough state, thereby giving us a longer grinding season, which is very desirable in this latitude.

The best soils and fertilizers to be used, the plant growth, treatment of the juice with lime, and its consequent action upon the sugar, will be better and more intelligently explained by the professors of agriculture and of chemistry, who are present, and have taken a deep interest in the study of this cane, and who have rendered so much valuable aid to this industry.

Having delivered the cane to the mill in good condition, it should be ground with as little delay as possible and reduced to semi-syrup, to produce the largest yield of sugar.

Owing to the great weight of the cane, it is not practicable to haul it more than three miles. It is also impracticable to establish sugar houses with sugar appliances at every four corners. This would seem to favor the erection of small steam or fire-trains, of sufficient capacity to work up in due season the cane grown by the neighboring farmers within a radius of three miles or less, and reduce the juice to semi-syrup, and stop there if sugar is the object; if not, continue the boiling to a commercial density. The reason they should stop at the semi-syrup point,

when sugar is the object, is because it has been demonstrated by practical sugar refiners, that have used the polariscope to ascertain, when and where the great amount of sugar that was originally contained in the juice had been destroyed, and it has been shown by these tests that the greatest destruction of sugar occurs in the last five minutes of boiling with the open fire or steam-train, but less with the steam-trains when the temperature is rapidly raised from two hundred and eighteen degrees to two hundred and thirty-four degrees Fahrenheit, or after it has been reduced to a semi-syrup state, which is the best condition to leave it in for the use of the vacuum-pan, where it can be finished to a sugar density at a temperature of one hundred and thirty to one hundred and forty degrees Fahrenheit,—not hot enough to destroy the sugar, but will permit of the formation of the crystals in the pan, when skillfully handled. True, there is some sugar made with the open trains, but when the juice is rich enough to produce from three to four pounds of sugar per gallon with the open-pan work, it will, when reduced in the vacuum-pan, produce from seven to nine and a half pounds of sugar per gallon.

If syrups alone are expected, then all that is needed is a fire or steam train, no matter *how small*, if intelligently operated, to produce a fine flavored commercial article of syrup.

At the Minneapolis convention last month, the committee appointed to report on samples of sugar and syrup on exhibition there, was composed of wholesale grocers of Minneapolis. They pronounced forty samples of the syrup to be a prime commercial article, and awarded the first premium to the sample that was made in our own state on a fire-pan. The sample of sugar that received the first premium was made by Prof. Henry and Mr. Swenson, from cane grown on our university farm, and it is well known that the finest flavored and highest priced molasses bought on the market are made from the open-kettle process; but to obtain sugar from Amber cane, or other sugar-producing plants, in paying quantities, the vacuum-pan must be used, for the reasons previously stated.

After more than fifty years' experience, the small southern sugar planters have decided that it is more profitable to them to make a

thin syrup, and ship to the refinery at New Orleans, and have it made into sugar there, than to undertake to make the sugar with their open kettle trains.

New Jersey, I am informed by the chief of the bureau of statistics of that state, will profit by the experience of the south, and work as fast as possible into the central factory system, which seems to be the only practical way of developing this business rapidly, and in such a manner as to make it profitable to the farmer, and the auxiliary syrup works.

We have the evidence of some of the most expert sugar refiners, well known professors of agriculture and of chemistry, who have experimented in this direction, and a host of manufacturers, well known wholesale dealers, and, most important of all, the testimony of the consumers, that sugar and fine flavored syrup can, and *has been* made from Amber and other northern grown canes; and it now only remains for us to put into practical operation the knowledge we have gained from past experience, in a business-like manner, to insure success.

And I would suggest to the farmers to give this crop the requisite amount of care and attention to produce good cane, and deliver it at the mill in his neighborhood at the proper time, in as good a condition as possible, and for the operator at the same mills to obtain instruction from a central works, and make the kind of semi-syrup they require, and deliver it at the central works to be made into sugar and refined syrup.

There will be two objects gained by doing so. First, a greater abundance of sugar, which should be the principal object to be attained; and second, the central works will have control of all the syrup, and will be better able to sell in large quantities to the jobbing trade at higher prices than could be obtained where every small operator and farmer, having a few barrels to sell, will offer it and sell it to the retail groceryman he trades with, for a less price than could be obtained at wholesale; and when the local trade is supplied, and a surplus stock left over to be disposed of, and they offer it for sale on the wholesale markets, it creates surprise that the jobbers will not touch it. They cannot handle it when their retail customers can obtain it at home at a less price

than its actual value in job lots, as compared with other syrups; and that is the only reason the jobbers have not bought first class Amber syrups, and paid as much for it as they have for New Orleans molasses. They could not touch it at those figures when it was sold by the barrel at home at a less price, and most of the syrups that were sent to Chicago for sale passed into the hands of the mixers at a ridiculously low figure, and was mixed by them with glucose and common New Orleans molasses and sold in the very towns in which it was manufactured as choice New Orleans molasses, and some of it was sold without mixing; and if jobbing prices have ruled lower than they should have done, the fault can only be attributed to the undeveloped system of marketing our products.

There are enough experienced growers in this state, located in sections that are well adapted to the growth of a cane that produces a juice that will polarize as high as the Louisiana cane juice, or about twelve per cent. in most seasons (some of it will polarize fourteen per cent. of crystallizable sugar), and there are enough experienced manufacturers to make a sufficient amount of semi syrup, to justify the erection of a central works at some eligible point for receiving and shipping the products. And business men in several localities have the matter under consideration, and there is very little doubt but that we will have a central works established in this state this coming season. To make a success of the business, there can be no half-way measures adopted, but everything pertaining to the business must be systematized, in the field, in the sugar house, and in marketing the products.

DISCUSSION.

S. L. Mason, Masonville — I would like to inquire what kind of seed you use; if there are varieties of the Early Amber, and, if so, what kind have you had the best success with? What would be the better kind for the people of northern Wisconsin to use, where the season is not quite as long as it is here, although we have been able to produce cane and get it to good maturity? It matured well there, and the seed is in condition to plant next

year, that is, well ripened. I wish to know what your views are in regard to the earliest and the best seed.

Mr. Russell — I have only used one kind of seed, and that is the Minnesota Early Amber. The practical experimenters at the conventions at St. Louis, and other conventions which I have attended, all seem to concur that the Early Amber is the proper seed to use for this climate. Great care should be taken in the selection of the seed, and nothing should be planted but the largest and the best. At these conventions that I have attended recently, they suggested taking the seed and sifting it so as to get out all of the smaller seed, and have the largest to use. A great many suggested the soaking of the seed, not until it sprouts, but until it is nearly bursting, and then plant it shallow; and if the season is going to be a wet one, plant from one-half to three-quarters of an inch deep, but if it is a dry season, they would plant, especially on clay soils, not to exceed an inch in depth. Seed prepared in that way will show itself in four or five days. There are others here, I know, that have experimented with this, and I would like to hear from them.

Mr. Eustace, of Fort Atkinson, was called upon and offered to answer any questions which might be propounded.

Mr. Arnold — I would like to know which is the better course to pursue, to sow the seed of the Early Amber acclimated, or to send somewhere else and get the same variety produced in a little different climate?

Mr. Eustace — I think it is a good plan to change the seed on different soils. The seed is apt to run out and deteriorate, if planted on the same soil, in a few years. The change from the south to the north is better than it is from north to south; that is what they all seem to say who have changed that way.

Mr. L. S. Wright, Janesville — Have you used the Early Amber?

Mr. Eustace — That is the only kind I have ever used since the Early Amber came out.

Mr. Hiram Smith — Do you plant seed from your own raising?

Mr. Eustace — Yes, sir.

Mr. Hiram Smith — For how many years in succession?

Mr. Eustace — Four or five.

Mr. Hiram Smith — Have you had good success?

Mr. Eustace — Yes, sir.

Mr. Hiram Smith — There is a little doubt about there being any more necessity for a change of Amber Cane seed than for wheat or corn.

Mr. Eustace — I have always taken great pains in selecting my own seed, to get it pure. I have never experimented, myself, by planting seed from the south side by side with seed that I raised myself. I have seen others that tried it.

Mr. Stickney — In selecting seeds, what characteristics are you governed by?

Mr. Eustace — In order to get good seed, you want to go through the fields about the time it is ripe, and take the largest heads; generally select the large stalks. Sometimes there will be stalks that will not be more than half matured, and these you want to discard.

Mr. J. M. Smith — Suppose the stalk was cut when the seed was in the dough and set in shocks the same as corn shocks, would the seed ripen so as to make it perfectly safe to plant?

Mr. Eustace — It would. As soon as the dough is made in the seed, it will grow.

Mr. J. M. Smith — I noticed, in my own growing, that some of the heads were much darker than others, even when they were nearly ripe, and the seed seemed to be heavier. Would you select those that were dark and heavy, if there was a difference?

Mr. Eustace — I don't know anything about that. Every seed has a hull, and, when the seed is wholly ripe, it projects from the hull, and, as you thresh the seed, it hulls. Seed that is not matured will not hull quite so readily.

Prof. Henry — There is a question I wish to bring up here for discussion; it is of especial importance when we consider the sugar side of this question. You who are familiar with the cane, will recollect that toward the head there are side branches; instead of being one straight stalk from root to top, there will be branches reaching out of various lengths. Now I wish to ask if any one knows of Early Amber which is entirely free from side

shoots? Mr. Swenson has found that those side shoots cause quite a part of the sugar to be converted into glucose, and that is very deleterious in the manufacture of sugar. I think that one of the things that we ought to attain, if we intend to make sugar, is a stalk which is simple from root to top, and if we could get any such seed upon our experimental farm next year, I should consider it a great advantage, and I mention it that some of you may be able to write us.

Mr. J. M. Smith — I have had a great deal of experience in planting small seed, for some years, and it has been suggested, at some of the conventions, to soak the seed. In many seasons that might answer a good purpose, but in very many seasons it might result injuriously. If you should soak seed nearly to the starting point and plant it, and, after it is planted, you should have a cold storm, it would almost certainly rot the seed; it would go no further, but rot just where it was put into the ground; the cold air would kill it. On the other hand, if you should have a very dry spell, if the ground was damp enough when it was planted, it would sprout itself; and then, if it should get dry and hot, the seed would lay there and go no further; it would probably not rot, but would simply stay there; and, if the dry spell continued, it would die. But if we were prophets enough to know when the weather would be just right to soak the seed, it would help it; it would get it started perhaps a week or ten days earlier. But a person planting seed in that way is running a good deal of risk. After a good many years' experience — and pretty large experience — I never risk it unless I am forced to.

Mr. Wood — I don't claim to have had any large experience in this matter, but have had some, and have paid some attention to the literature of the sugar business, and so far as I have read, it has seemed to be desirable, in the manufacture, to have the cane well matured. It has been said here, that for sugar the seed should be hard, while for syrup it might do to have it softer. If we assume that the same laws prevail with sorghum as with corn, we know that seeds brought from the south are earlier, when they are first produced, than the same variety raised here on our own soil. For instance, the Dent corn will become earlier by

being raised in Wisconsin. Now, if that is true, it would seem that earliness would also be desirable with a view of sugar making, and that our northern grown seed, if it was earlier, would be preferable on account of its good ripe seed; while if we wished to confine ourselves to syrup making, it would do as well to send south for seed, and get the same variety and work it a little earlier. It would seem to me, if that statement is correct, about having it ripe for sugar, that it would have an important bearing on this question of procuring seed. You would want to consider what you wanted to do with it, whether it was for syrup or sugar. When I have cut my sorghum, I have always found stalks that seemed to be peculiarly well ripened and free from suckers, and comely looking plants, and those heads I have cut off and laid by themselves, so that when I was returning through the field, I could pick up a dozen or two heads that pleased me as I went through, for seed, and hang them up in a dry place, and keep them for seed. The ripest and best seed I would thresh out first; I would not thresh out all at once, but thresh out as I do my planting. I then plant it, and of course I plant it too thick. When we begin to hoe it, there is always a great choice in plants; there may be a dozen plants, and as a matter of course, I would not do as the Irishman did, who, when picking his potatoes, pulled out the big plants to give the little ones a chance, but I would pull up the little ones. That is a good sifting place in pulling out the plants; and a weak plant is not as good as a strong one.

Mr. Russell — Parties in Missouri made an experiment with seed that was grown in Kansas, planted side by side with seed grown in Minnesota the year previous. That grown in Minnesota matured a week or ten days earlier than that of the southern seed. But the earliest cane that has been matured has been our volunteer cane. I have seen several patches of this volunteer cane that matured ten days before the spring planting did, and it is a question of considerable importance, and I think an experiment should be made in the direction of this fall planting, in order to get a week or ten days more work into the grinding season. I know of parties who have made the experiment of

planting in the fall, two consecutive seasons, and both seasons produced like results; they matured in advance of that that was planted in the spring, and produced a richer juice.

Mr. Frazier — Is it not a fact that seed that has been grown in our latitude for a number of years, while it matures earlier grows weaker, and is more liable to lodge? That has been my experience; that is why I should favor getting seed from a southern latitude in order to have a stronger cane.

Prof. Henry — It is well enough to get acquainted with each other at these conventions, and since we of Wisconsin feel pretty proud of our Amber cane during the past season, I would like to say to the audience that the gentleman who has just spoken (Mr. Frazier) is the gentleman who was fortunate enough to have made the syrup, this season, which took the first prize at the Minneapolis convention.

L. A. Henry, Mazomanie — In speaking of the value of cane, are there not two considerations involved; that is, quality and quantity? I have had some three years' experience with Amber cane, and about seventeen in raising other kinds of cane. My experience with Amber cane is, that I get, on the average, a little better quality of syrup than I did with the Early Sorghum, but the quantity is not more than two-thirds of that we used to get from what we called the Early Sorghum. Now, I have raised as much as two hundred and twenty gallons to the acre of Early Sorghum; and my experience the last three years, with the Amber, is about one hundred gallons per acre; the quality, perhaps, is a little better on an average than the old Sorghum. And if it is sugar you want, the crops that we used to manufacture some ten or fifteen years ago had more sugar in than any sorghum I ever made up. I have made up cane some twelve or fifteen years ago, when pretty much all of the barrel we put syrup in, perhaps five-sixths of it, would be a kind of mush sugar.

Now a word as to seed. I have never but once had the same results from planting seed dry that I have by steeping it, and that was three years ago, I think; then I fell short of planting a piece with steeped cane seed, which I have made a practice of for ten or twelve years. I got some dry seed and planted it. A shower

of rain came immediately after we had done planting, and in three days the cane was up, and I could not see the difference. I found it an advantage to steep seed. I have planted cane seed where it has been four or five weeks before it has come up; that was eighteen or twenty years ago. The weeds would come up so that we would have to get down to find out which was the plant and which was the weed. If the seed is steeped, it will come up in from three to seven days; it gives the plants a chance ahead. You can begin to cultivate in two weeks from the time you plant it, by steeping the seed. I believe that the seed needs changing perhaps as often as once in three years. I find that, after I have planted it two or three years, deterioration takes place; you do not get as good results; you do not get so much syrup, and the results are not so good in any way.

Mr. McIntyre — To get the matter before this convention in shape, I would introduce the following resolution and move its adoption: "*Resolved*, That in the opinion of this convention, the Amber cane is the most profitable variety to cultivate; and that great care should be taken in saving the earliest and best matured seed for planting."

Mr. Decker — I second the motion; but, as I have heard nothing of anything but Early Amber, I will tell you of the result of a small experiment of mine with two kinds. I had one acre that was planted half and half with Early Amber and Early Orange. The Early Orange was nearly two weeks later in maturing than the Early Amber.

Prof. Henry — I move to amend the resolution by adding: "Plant only that which threshes from the head most easily."

Mr. Decker — While at present it appears that the Early Amber is the best to raise, there are things tending to show the probability of other varieties coming up in the future, that will mature early enough, and give better results than even the Early Amber. I planted one acre, half of Early Amber, and half Early Orange, both seeds being grown in Missouri the year before. The Early Orange was two weeks later in maturing, yet it matured early enough and made very fine syrup. I had eighty gallons of the Early Orange, and sixty-five of the Early Amber; both being

treated alike. Yet I thought, taking one thing with another, it was not as safe to plant the Early Orange, although we got better results. The Early Orange gave the best results, but it is not certain, I think, for every year.

Mr. Wood — There is one point that strikes me as being of considerable importance, with respect to what Prof. Henry has told us, that those side shoots that come out near the head are a great detriment to the cane in the manufacture of the sugar. Now, the improvement of the plants of all kinds is only accomplished by the selection of the fittest; selection of those plants which come nearest to our ideal of what we want. I move to amend the resolution by adding, that the seeds should be saved from these single heads. I think that would be quite important in sugar making at least.

Mr. Wm. Toole, Sauk County — I think we might safely adopt that resolution, provided we say "for sugar;" but if we are going to adopt the resolution for sugar and syrup both, I think it probable that experience, in a short time, may show that other varieties are better for syrup; while I do not think we shall change from Early Amber for sugar.

Mr. Grant — I have planted seed grown in Minnesota, and seed grown in Missouri, side by side, and find that the cane from the southern grown seed is much stronger at a time when we need its strength the most; it comes up so much stronger that it contends with the pigeon grass, and we can get in and work it quicker than we can the cane grown from our own seed. I found also, but a few days later, it was a great deal more juicy; I laid that to the size of the stalk; and it stood, in the field, almost a foot higher than the Minnesota grown seed. I think we ought to bring this matter of seed down to a sameness. If we mix our syrups, we will spoil our market; and I suggest that experiments, on other seeds except Early Amber, should be left to the Professor of Agriculture, and when he finds something which will be better, for us, to adopt it, and recommend its adoption to our growers. What we want is to make money out of this; to produce goods that will have a certain grade in the market. If I sow half Early Orange and half Amber, and twenty or thirty growers do the same,

how are we going to keep the proceeds separate? If one is better than the other, and we have a better barrel to offer a man, he will not look at the other. Two years ago I had twelve hundred gallons, and went to Chicago and proposed to sell it to one of those mixers. He said: "If you had as many barrels as you have gallons, I would talk to you, provided it is all one grade." We know what we have got in the Amber, and a few experiments will show what we have in the other. Let this be done by our state government, and then we can adopt it. I would like to have the manufacturers and growers come to some stated point on this seed question. If you save your own seed, save it as you do your seed corn. You are not going to take a nubbin of corn and lay it away for seed; neither will a man take seeds from stalks that produce a big head. The way I thresh my seed, I take an empty barrel, and whip it over that, and don't whip it very hard, either. To thresh the seed to sell, I have known some to run it through a threshing machine or a broom corn separator. I would like some one to put a motion in shape, that we adopt the Early Amber cane seed, and advise that half of our crop be raised from southern grown seed and half from home grown. In regard to our Early Orange, I will say this: we all find that the first of September is a little earlier than we can commence operations on the Early Amber; and sometimes we have got caught about the fifteenth with frost. Now, if we have a later maturing kind, how will we be fixed then?

Mr. Russell — It seems to me this question of seeds is one of the most important points in this industry, either for sugar or for syrup, and I do not think it is judicious to jump at conclusions. If you will read the proceedings of all the conventions that have been held throughout the country heretofore, you will see that a new beginner has nothing to go by; he has no guide. None of the conventions have got right down to business and given an expression of opinion from the majority of the practical growers in the convention. Now, what we want is to have this seed question thoroughly ventilated, get the best possible light on the subject we possibly can; and I think what the majority would do under the circumstances and would indorse at this convention, would be perfectly safe for a new beginner to follow.

Mr. G. W. Dibble — I have not had a great deal of experience in raising cane. Some three years ago last spring I sent to Mr. Hodge, of St. Louis, for seed, both the Amber and the Orange. I was disappointed somewhat in the Orange because it was poor seed. There did not near all of it come up; but the Amber seed I planted with a hoe, about an inch in depth; and part of my piece I planted with seed I had raised the year previous; that I planted with a horse planter. The result was that the seed from St. Louis, planted with a hoe, was about four days earlier than the other. It was a stronger stalk. It stood the winds better, and it was more juicy. Now in regard to cane suckering near the head. My experience is, that it is owing a great deal to the season. This season our cane suckered very little. Last season, a great deal. The Early Orange was somewhat later than the Amber, perhaps about two weeks. The seed that I received from Mr. Hodge was a stronger cane and a larger cane and suckers less at the root than the Amber. I think it is a cane that will produce more syrup on the same amount of ground. But in manufacturing it this fall — we hadn't a great deal of it on account of its not coming up — when we came to make it, there was such a strong smell came from it like the old sorghum, that we thought but little of it. We never once thought that it was throwing off that rankness, and we took but little pains with it. We put in a good deal of lime. After the syrup became cool, we were convinced it was a better tasting and sweeter syrup than the Amber.

The resolution and amendments were then re-offered in the following form: "*Resolved*, That in the opinion of this convention, Amber cane is the most profitable variety to cultivate; and that great care should be taken in saving the earliest and best matured seed for planting, planting only that which threshes off most easily."

Mr. Wm. Frazier, Enterprise — I would like to vote for this resolution if there was one amendment made, consistent with this gentleman's remarks, that we recommend the seed be not raised here more than two years; that we get it from a southern latitude at least as often as once in two years.

Mr. McIntyre — I hardly consider that to be an objectionable feature in the resolution. It is almost impossible to frame a resolution that would embody everything. We might pass another resolution at some other time. It seems to me that the resolution covers the ground it was intended to cover; and the resolution was introduced for the purpose of getting an expression of this association on the kind of cane to cultivate in this latitude. And it seems that we are all agreed that, with the present lights we have, and the experiments that have been conducted, the Amber cane is the cane to cultivate at present. If, after experiments have gone further, and new light has been thrown upon the matter, we consider some other variety is more profitable to cultivate next year, we can introduce a resolution that something else be cultivated. It seems to me that this resolution is what we want at present.

The resolution was then put to vote and adopted.

EXPERIMENTS IN SUGAR AND SYRUP MAKING AT THE EXPERIMENTAL FARM.

BY MAGNUS SWENSON.

How can we make our own sugar? is a question of national importance, and therefore of universal interest. The pockets of the American people are drained annually to the extent of one hundred and twenty millions of dollars to pay for foreign sugars. How to keep this large and yearly increasing sum at home has been for years a much discussed problem.

It is, therefore, at the present time, doubly interesting and important from the fact that all who have investigated the subject in an intelligent manner are unanimous in their opinion that the problem is solved. I fully appreciate the difficulties with which this industry has for years been struggling, and that there are still some to be overcome is at once admitted. Undoubtedly many improvements will be made in future investigations, for we cannot expect an industry of this kind to be perfected in a couple of years. Some of the methods suggested will undoubtedly be

modified more or less when applied in practice. The beet sugar industry of Europe, which has assumed such immense proportions, is the outgrowth of years of laborious toil and investigations. I think I am perfectly safe in saying that had not some of the governments of Europe brought it to its perfection by instituting investigations which are still continued, it would never have lived to become one of the chief industries of Europe. Again I am safe in saying, that the beet sugar industry during its infancy never had such bright prospects as the Amber cane industry has with us to-day.

I will now try to make clear the reasons for the failures of the past, and also as far as possible show how they may be avoided in the future. The only method employed for years by most of the syrup-makers, and is still employed by most of them, consists in merely boiling the juice down to a syrup, the vegetable matter being removed from the surface as scum.

Before speaking of the results of such a treatment let us for a few moments turn our attention to the composition of cane juice. Cane juice contains beside cane, sugar and glucose, quite a percentage of free acid. Now, it is the acid when allowed to remain in the juice during the boiling down, which is the great destroyer of cane sugar. To prove this to you I will place a small quantity of cane sugar dissolved in pure water in this glass vessel. You will observe that when it is boiled with a small portion of this blue solution it does not at all change its appearance. It remains perfectly clear and blue. To show the effect of a small quantity of acid, I will drop this glass rod into this bottle of hydrochloric acid, and merely rinsing the small quantity of acid which adheres to it into this same solution of cane sugar. I will boil it for a few minutes. Now by adding this blue solution you will see that it is at once decomposed. To show you that this change is not due directly to the acid, I will add a little to this pure water by boiling, and adding this blue solution, you will see that there is no change. Therefore, since there is nothing present but cane sugar, acid and water, which I have shown you cannot produce this change, therefore it must be due to some new substance. This is formed by the action of the acid on the cane sugar and is what is commonly known as glucose.

This glucose will not crystallize, that is, it will not separate out into hard, distinct grains, and moreover is much less sweet than cane sugar, and moreover each part of glucose will keep another equal part of cane sugar from separating from the syrup, so that a gallon of syrup which contains say four and a half pounds of cane sugar and four and a half pounds of glucose, is practically useless as a source of cane sugar; and again, after cane sugar has once been changed into glucose, there is at present no possible way known to change it back again to cane sugar; hence for every pound of cane sugar destroyed two pounds are practically lost as far as the making of sugar is concerned. It is therefore obvious from what has been said so far, that in order to make sugar the effect of this acid must be destroyed in some way. This may be done by neutralizing the acid with lime; this is the process known as defecation, and is probably the most important process in sugar making. Here is some blue litmus paper. If that is put into some acid solution it will be turned red; if that juice contains a free acid it will be reddened. (Solution tested.) That proves that there is a free acid in that juice. Now if I should boil that juice down to a syrup without taking that acid out, it would have the same effect precisely as when I boiled this pure cane sugar in the test tube: that is, it would be destroyed. Glucose is a sugar which is only about one-third as sweet as cane sugar, and it will not crystallize as the cane sugar will. It will dry up and form masses of wet, waxy-looking material. Moreover, one part of glucose in the solution will keep one part of cane sugar from separating out. So that, supposing you have a gallon of syrup, which ought to have contained, if no cane sugar had been destroyed, about eight pounds of cane sugar, by boiling it with this acid half of it would be destroyed, or you would only have about four pounds of cane sugar and four pounds of glucose. The four pounds of glucose would not only not crystallize itself, but would also keep the cane sugar from doing so; so that in that case you would not be able to get a single particle of cane sugar out as sugar, so that the effect of changing cane sugar into glucose is doubly injurious; first, the cane sugar is itself destroyed; and second, the cane sugar which remains is prevented from crystallizing. As you have seen, cane

sugar may be very easily changed into glucose, but chemical science does not now know of any way to change it back again into cane sugar; so that if it is changed into glucose it can never be, under the present conditions, changed back into cane sugar. I might tell you the chemical difference between them, but I do not think it would be of any interest. Now, as you have seen, this juice contains an acid, on account of its turning this litmus paper red. Now here is some milk of lime. You see that if I dip this in here it will change it back again to blue. That is the reverse of acid; that is, it is alkaline. Now if I add some of this lime to the cane juice the lime will combine with the acid and form a substance which is almost insoluble to the juice, and its action is neutral with litmus paper; that is, it will neither change blue litmus paper red, nor red litmus paper blue; so that if I add just the right quantity, just enough to neutralize the acid, then it will have no effect at all on litmus paper. Another thing which lime does when it is added to a juice of this kind is to coagulate the vegetable matter. You have noticed in boiling eggs that when the white becomes heated to a certain point it becomes solid. That is precisely the effect that lime has on the vegetable matter in the juice; it changes it into a solid; so that when you get used to this you can judge very closely as to when you have lime enough in by looking at your solution to see whether the little flakes of this vegetable matter separate out as solid flakes. Now I will begin to add this lime to the solution. It ought to be added in small quantities, because if you get too much it will have a bad effect on the syrup, which I will speak of soon. To see if it is still acid, I will put a piece of blue litmus paper in. If it is reddened it wants more lime; if it is not reddened we have enough lime. This juice is very acid on account of being exposed all winter, a great deal of the sugar has been changed into acetic acid, and it will take a great deal more lime than ordinary cane-juice would. When the paper is turned a light purple, there is sufficient of the lime. This is just about the point. You see it is turned a faint purple. There is a little too much lime, if anything. In making syrup it ought not to be limed quite as much as that, but in making sugar it ought to be limed until a piece of red litmus paper is

tainted a faint purple, making it slightly alkaline. You will notice the flakes of vegetable matter are easily seen. They form just as soon as the acid is neutralized. If this was fresh juice that would be green and it would show better. I will now heat this to the boiling point as quickly as possible, and you will find that it will clear itself in a very short time. It will leave the clear juice in the middle and part of the scum on the top and part on the bottom. You can siphon off the clear juice and boil it down, and you will not have any of this vegetable taste. The "sorghum taste" is produced by the presence of that acid, although it is the popular opinion among makers that it is due to the green vegetable matter in the juice. That is not the case. It is due to this acid; and just as soon as you take out that free acid by neutralizing it with lime, you do not have that sorghum taste. Lime has no effect whatever on cane sugar, and it will not change it, but it at once attacks whatever glucose there may be and turns it dark; so that when you add lime your syrup becomes dark at once from the decomposition of the glucose. This is not at all due to the presence of cane sugar. Lime does not destroy or affect cane sugar in any way. When your syrups become dark by the addition of lime, it is due to the glucose which is in the juice, and consequently lime should never be added in excess, because it will give you a bitter and a dark looking syrup; but if you can just add enough to neutralize the acid, then neither the glucose nor the cane sugar will be affected, and at the same time you will get rid of this objectionable sorghum taste. A good many use sulphurous acid. An excess of lime is first added to neutralize the acid, and the lime is again neutralized by adding sulphurous acid to the juice. It is supposed by some, that sulphurous acid does not affect cane sugar. I found by a series of experiments that it affects it to a great degree, and for that reason I would not recommend sulphurous acid to be used when sugar is the product which is desired; but for syrup, if you can add it very judiciously and not get too much in, it will heighten the color and make a very much lighter colored syrup, and, even if a little cane sugar is destroyed, it will not affect the quality of the syrup any. It is probably best to

add the sulphurous acid, or "sulphur fume," as it is called, to the juice before you add lime at all, and then add lime until it becomes almost neutral, that is, leaving it still slightly acid. The acid which is in the cane is stronger than this, and the lime which you add to the juice will first combine with the vegetable acid in the cane juice, and if there is still some lime left it will combine with the sulphurous acid, so that the free acid which is left in the syrup, if this is added, will be sulphurous acid, which, however, will give the syrup rather a bad flavor, unless it is nearly all taken out by lime. The quantity of lime to be added to the juice will depend a good deal on the quality of the juice. Very little sulphurous acid was used in my experiments, and I believe its use quite unnecessary. By adding lime until nearly all the acid was neutralized, a very fine syrup was produced. The best way to defecate for syrup, when sulphurous acid is not used, is to add lime until the juice is slightly alkaline, and then add fresh juice until a faint acid reaction is produced. The juice may be treated with lime when cold, but I prefer to have it slightly heated. By defecating in this way you will produce a syrup free from sorghum taste and of good color.

DISCUSSION.

Prof. Henry — We all know that hot tea or coffee will dissolve sugar much quicker than cold. If the workman is careless and throws in a whole batch of the milk of lime, it settles at the bottom, and it will begin to burn up part of the glucose and make part of the juice very black at the bottom, and there will be acid left in the juice above, while, when it is being heated, there is a constant rotation of the liquid which tends to carry the lime all through it.

Mr. Swenson — In my defecator this would have been all clear by this time. Five minutes after I defecated I could draw it off just as clear as water, and after that you would have to skim it but a little. You see this is clearing off quite nicely. That would make a syrup, but it would be a glucose syrup. It would be very much of the consistency of soft soap, stringy and tough. While this is settling I will speak of some of the other causes

which tend to hurt the cane juice. I am speaking now of making sugar and not syrup. Sugar cane should not be cut and piled up for any length of time. Just as soon as the cane is cut it begins to deteriorate. The acids in the stalk will at once attack the cane sugar and produce the same effect on the cane sugar that it does in the juice when you boil it, only in a very much slower way; fermentation also begins, so that, if you intend to make sugar from your cane, you should haul it from the field to the mill and grind it up as quickly as possible, without piling it up. Another thing, cane should not be stripped and left in the field without the leaves on. The reason for that is this: just as soon as you tear the leaves off, the little buds which you have probably noticed under the leaves will begin to shoot, to form new leaves. These new leaves, or at least a great part of them, are produced at the expense of the sugar in the cane, consequently it is a loss of sugar. Again, after pressing out your juice, you should never allow it to remain in that condition before defecating it. That is one of the greatest causes of the destruction of cane sugar, because just as soon as you press the juice out it begins to ferment. You are not able to see this because it is very slow, and it takes place through the whole solution. Although it is very slow, it has a very great effect on the juice. A short time on a hot summer day is sufficent to produce quite a loss of sugar in the juice, if it is allowed to stand out before being defecated. Consequently the cane should be hauled from the field almost immediately after being cut, and the juice should be pressed out and defecated as soon as possible after leaving the mill. This does not make very much difference when you make nothing but syrup, because syrup containing half sugar and half glucose is a very good, sweet syrup, and in fact it is better than the syrup which contains more cane sugar, because you do not want the syrup to grain. It is rather an objection to have syrup crystallize; so that that does not make very much difference. You can cut cane and leave it for two or three weeks, or even three or four, and still the syrup from it will be good.

Now you will notice that all the vegetable matter in this solu-

tion has gone to the bottom. The solution is perfectly clear in the middle from here to here, almost free from particles of vegetable matter, while the layers below and above contain all the vegetable matter that was in the juice. Now this juice can be poured off or siphoned off. You can draw it off with a stop cock in your defecator and into your pan and boil it down, and you will have to do very little skimming, because it is already free from scum; so that the defecation has three advantages: first, it neutralizes the acid and prevents the sorghum taste in the syrup; second, it prevents the destruction of cane sugar; third, it saves a great deal of trouble by taking this vegetable matter out at once and not during the whole process of making syrup, so that you will not have to attend to it much if it is once defecated well.

In regard to the experiments conducted upon the farm during the last season, the first thing which I studied was the development of the cane. The question will naturally arise, when shall we cut our cane? I analyzed some on the 10th of August. It was just headed out. I found there was only three per cent. of cane sugar and four and one-half per cent. of glucose in the juice; that is, it was more glucose than cane sugar. Ten days afterwards, on August 20th, the juice contained eight-twentieths per cent. of cane sugar and five-tenths of glucose. There is a gain of five per cent. of cane sugar in ten days. On September 6th I found nine and one fourth per cent. of cane sugar in the juice and four-twentieths of glucose. Without reading further from the report, the cane sugar in the juice begins with about two per cent. and gradually rises until it reaches as high as twelve and fourteen and even sixteen per cent., while the glucose begins at five or six per cent. and decreases until it is about two and a half and even as low as one per cent. I found that at the time when the seed was just beginning to get hard the juice was the richest in cane sugar, and consequently that is the time to cut your cane. After this period had passed the cane was about uniform; consequently it will not hurt your cane to leave it standing in the field for even a month after the seed has hardened. The juice will not change at all, so that it will give rather a long working season. A light frost does not seem to injure it. I tried the effect of leaving the cane cut.

The cane was cut and hauled into the barn and left on the floor. The freshly cut cane contained ten per cent. of cane sugar and three and twenty-five one-hundredths of glucose. After lying two weeks the cane contained eight and twenty-five one-hundredths of cane sugar and six per cent. of glucose, showing a loss of about two per cent. of cane sugar and a gain of about three per cent. of glucose. After four weeks it contained seven and four-tenths per cent. of cane sugar and three and four-tenths of glucose, showing a further loss of about one per cent. of cane sugar, and a loss of about three per cent. of glucose. After six weeks it contained eight and one-fourth per cent. of cane sugar and three and three-fourths of glucose. The cane sugar increased again. This was not due to anything in the cane which changed to cane sugar, but to the evaporation of the water in the stalk, so that the juice became more concentrated and consequently contained a larger per cent. of cane sugar, and at the same time part of the glucose was removed by fermentation.

Another point which I wish to make is that cane sugar is not fermentable, that is, cane sugar itself will not ferment, but in order to ferment it must be changed into glucose, and it is changed into glucose largely by the acid which is in the cane and which is developed by the fermentation of the glucose, which first changes into alcohol and then into acetic acid. The acetic acid will change cane sugar into glucose and that will ferment, and consequently you get more and more acid and less glucose and also less cane sugar. This experiment shows that the cane will not deteriorate very fast when it is kept under shelter, so that the cane after being kept six weeks was a good cane for the making of syrup. I also tried the effect of leaving it out in the field. During the time it was lying in the field it was raining almost continuously. The cane was cut September 20th, and left in the field until November 2d. At the time it was cut it contained ten and one-half per cent. of cane sugar and about five per cent. of glucose. On November 2d, after being left in the field exposed to all kinds of weather, it contained thirteen and eight-tenths per cent. of glucose, and there was not a trace of cane sugar left in that cane. That would not have made a marketable syrup because there was nothing there

but glucose. Every bit of cane sugar was destroyed by lying in the field from September 20th until November 2d. I tried it with both stripped and unstripped cane. The experiment of leaving cane in the barn was also tried both ways. Half of it was stripped and topped and the other half left with the leaves and tops on, and there was no perceptible difference.

The experimental plots were each about a fifth of an acre, and the sugars which you see in the other room were made from two plots of that size. I will give the yields per acre.

The total weight of the cane on plot A was at the rate of thirty thousand and forty-eight pounds to the acre. The total weight of the juice in the cane would be twenty-five thousand one hundred and eighty-seven pounds, or about eighty-five per cent. of the stripped stalks is juice. The weight of the juice expressed was seventeen thousand four hundred and twenty pounds, about fifty-eight per cent.; and right here you may see the great wastefulness of this method of extracting juice, which left over one-third of the total quantity of sugar in the cane in the begasse, so that in the juice expressed we only got about two-thirds of the total quantity. There is no difference in the quality of the two juices. I ran it through the mill twice and tried both kinds. I cut a great number of stalks, and found by analysis how much sugar there was in the stalks, and then by knowing the total weight of the stalks on the whole plot, I found that the total weight of the cane sugar in the field as the cane stood was two thousand three hundred and thirty-seven pounds to the acre. The total weight of the cane sugar in the juice expressed was one thousand six hundred and twelve, and seven hundred and fifteen pounds were left in the begasse and consequently wasted. The weight of the cane sugar separated was nine hundred and twenty-three pounds per acre. That is what I actually separated as cane sugar. This was obtained by two separate crystallizations. First I boiled the syrup down until it was thick enough, and in about a week it was separated and the molasses boiled again in a vacuum pan and the second crop of crystals obtained. This second crop weighed about half as much as the first crop, and the total weight was nine hundred and twenty-three pounds. That was considerably less than

half of the sugar that was grown in the field. I considered that quite a high yield. The sugar cane of Louisiana only gives about one thousand three hundred pounds to the acre; that is considered a good yield, as I was told in St. Louis some time ago. We lose about one-third of the whole by the mill and then we lose another lot by the molasses. You cannot extract the whole of it by a three-roller mill. I think by employing a five-roller mill, or what they call a supplemental mill, as high as seventy per cent. may easily be obtained. That is by passing it through another set of rollers. That is the system that they are now adopting in the south altogether. This same plot gave twenty-seven and one-half bushels of seed, and the weight of one bushel of seed was fifty-three pounds. The other plot gave me twenty-three thousand five hundred and fifty pounds of stalks. The other one, you remember, was about thirty thousand pounds; but the juice contained ten and one half per cent. of cane sugar in this case, while in the other case the juice contained only nine and one-quarter per cent., and consequently I found that I got nine hundred and ninety-seven and one half pounds of sugar per acre from that plot, while from the other one I only got nine hundred and twenty-three, although the yield of cane was much greater in the former case, where I only got nine hundred and twenty-three pounds, but that was due to the poorer quality of the juice. The plots were side by side. I took special care to select fair specimens. Prof. Henry and I have sent to parties all over the state and they have sent cane to me for analyses. They have sent me a description of the soil and when it was cut, etc., and I found by those analyses that a sandy soil, as they call it (you probably know what is meant by a sandy soil better than I do), produced more cane sugar than a heavy clay soil, and the poorest juices are those that are grown on clay soil. One sample was raised in a barn yard, and I believe that was the poorest one I had. Another set of experiments was with different kinds of cane. I tried the Early Amber, the Early Orange and the Honduras. Neither of the others was as good as the Early Amber for sugar, but for syrup I think they are superior on account of giving a larger quantity. One great trouble is that the Hondu-

ras would never ripen in this latitude, and you would always have to send south for seed. The weight of stripped stalks of the Honduras was forty-two thousand three hundred and thirty pounds to the acre, while that of the Early Amber was twenty-three thousand five hundred and twenty, and of the Early Orange thirty-one thousand, showing a large amount in excess for the Honduras of stripped cane; but the percentage of cane sugar in the Early Amber was ten and sixty-three one-hundredths, in the Honduras seven, and in the Early Orange ten and fifty one-hundredths. The glucose in the Early Amber was two and one-half and in the Early Orange five. That is the reason why it was such a poor cane for cane sugar, because it contained so much glucose that the sugar would not crystallize, although it contained as much cane sugar as the Early Amber. It was ripe when cut, but the season was wet and the land was rather clayey. Besides the sugar the yield of the first plot was one hundred and three gallons of molasses and of the second plot eighty-seven gallons. The reason why this gave less molasses than the other was that the juice was richer in cane sugar. The yield of sugar is about six pounds to the gallon of syrup. I have made experiments with stalks affected with "rust," as it is called, and find that the cane sugar was very much less in stalks of that kind than in those that were not attacked by this rust, and moreover it made a red-colored syrup, and the effect of the rust was deleterious to the syrup and sugar both. The use of clay is for the purpose of clarifying. The clay will get into these particles of vegetable matter, and, being heavy, will carry them down to the bottom and clarify the juice in that way. I should not use salt at all. The lime we have in Wisconsin is about half lime and half magnesia. You could not get rid of the magnesia by slacking it and running off the water. You would get rid of the lime and have magnesia left. The magnesia is less soluble in water than lime. I have never tried pure lime. I do not know whether it would be better or not. They claim that magnesia is a better material for defecating than lime is. How that is I do not know. Just as soon as I possibly can I shall try the experiment, if these experiments are continued. I would not use salt

because it would dissolve in the syrup and give the syrup a salty taste.

Henry Lindlay, Mazomanie — I have used salt for twelve and perhaps fifteen years, and my opinion is that it makes a better syrup. I have noticed from the very outset that it made the green scum rise at once so that we could skim it off.

Mr. Swenson — I should not think it would be well to use it, although I have not tried it. It would all remain in the syrup, and I should think it would give the syrup a salty taste.

Mr. Lindlay — I brought a sample with me. When I tried it I thought it made the green scum rise quicker and I have used it ever since, some twelve years.

Mr. Swenson — I think you would find lime much more efficient for removing the scum.

Mr. Lindlay — I know that in the market where sorghum is being sold, that mine has the preference as to the absence of the sorghum taste, and I have always attributed that to my using salt.

Mr. Swenson — The salt cannot neutralize the acid in the juice because it is incapable of combining with any more acid than it has already combined with. I do not think it will have any effect in removing the sorghum taste for that reason. The sorghum taste is due to the presence of an acid in the juice. It is certain that the acid in the juice cannot be removed by salt. Nor would the settling of clay take out any of the sorghum taste, if it is pure clay. If it contains carbonate of lime, it will. The acid that is used is sulphurous, not sulphuric acid. To make the milk of lime it is best to take fresh lime and slack it with hot water. Make the lime into a common whitewash; it does not make much difference how much water you put into the lime. I would put on more than enough to cover it.

Mr. Dore — I have had no experience in the manufacture of syrup, but I read somewhere that salt was better than lime to use, and last fall, in visiting a friend who was manufacturing Amber cane syrup, I told him what I had read. I have since had information from him that he got a better quality of syrup than he had ever made before, and that he continued to work up his product in

that way. I would like to ask Mr. Lindlay if he finds any salty taste in the syrup.

Mr. Lindlay — No. As soon as I run the sap from the tank I scatter about a handful in fifty or seventy-five gallons of sap, and I have never discovered any taste only in one or two instances where I have found that the cane has been frozen when I have worked it up, and had a very rank, strong smell to it, in fact seemed to be almost spoiled, and I have used additional salt after that and it has made a fair syrup. With that exception I have not discovered a salt taste. I have not made a batch without salt for many years, and that has been my experience with salt.

Mr. Swenson — Salt can never have the effect on the juice that lime has, because it cannot neutralize the acid.

Mr. Lindlay — We began to manufacture this cane between 1860 and 1870. During the first years we manufactured it, if you took the syrup in your mouth and swallowed it, it would leave a stinging, pungent taste. I supposed it was acid that produced that effect on your throat and tongue. Since I have used salt I have never discovered any such thing.

Mr. Swenson — It may have an effect on the vegetable matter by neutralizing some kind of a taste in that. I have never tried it.

Mr. Lindlay — My impression is that it raises double the amount of scum, very near from the outset, and that scum being skimmed off as soon as it rises, that or something else makes the difference between that stinging, pungent taste we used to have and the taste of the sorghum that we have now.

Mr. Swenson — The salt is still in your syrup as salt. There is nothing in the syrup that can decompose the salt, and you will find it in your syrup. The salt is still present as salt; whether it neutralizes some taste or other I do not know.

Mr. Henry — I do not think Mr. Swenson ought to have any more salt questions put to him. Let us drop the salt question. He can experiment with it next summer.

Mr. Swenson — An excess of lime will give a bitter taste to the syrup. A bitter taste may also be produced if it is scorched by steam, but if they have used lime the probabilities are that it is due to the excess of lime that they have added; but it is very

easy to scorch by steam in an open pan. I have heard that it will become bitter if a large quantity is run into a tank to cool after being boiled in an open pan. It is apt to become dark and rather bad in flavor if you leave it in a large tank.

Prof. Henry — I am very anxious while we have Mr. Swenson with us that we get this subject of defecation by lime clearly understood. I have letters from over two hundred syrup boilers in the state of Wisconsin. They report over four hundred thousand gallons of syrup made by them. I estimate the product at something like seven hundred thousand gallons in our state the present year. I find that not over five per cent. of our syrup manufacturers use lime defecation, and probably not over one per cent. of the remainder use any defecation. Now the use of lime is not difficult. We have in our midst a gentleman who at a sorghum convention last spring put the inquiry, "How shall I learn lime defecation?" and I am told that that gentleman was told "It is no use to use lime." He was discouraged from the use of it. Possibly I may be wrong in that. At any rate, he left the convention with the idea that good syrup could be made without the use of lime. Being of an inquiring mind, he corresponded with a number of our syrup manufacturers. He went home and learned to use lime in defecation with no one to instruct him except by letter or by newspaper or book accounts. He made a study of it. The syrup made by him is upon our tables for exhibition. The same syrup took the first premium at the exhibition at Minneapolis, was pronounced the best syrup there. That gentleman is Mr. Frazier, and I think we ought to hear from him.

Mr. Frazier — I had no expectation of being called on for remarks and I am a poor hand at talking without any preparation. I presume the professor wants to hear from me in regard to defecation. What he related that had reference to me at the last spring's convention is substantially correct. I had been in the business from 1865 to 1873, and always used two pans. I used a Cook pan, or a Madison pan, which is really a Cook evaporator, and a pan that I called my defecator, that I partially boiled my syrup in. I always succeeded in making a very light-colored syrup, but certain individuals would object to it that it had a

sorghum taste. I was not satisfied with the arrangement because the syrup did not suit the palate of all syrup eaters. A great many liked the syrup to eat and a great many did not. I went out of the business in 1872 and commenced again a year ago last fall. I bought the mill late in the fall and manufactured about nineteen thousand gallons on shares with my neighbors. It sold so readily that I was unable to fill an order for half a barrel on the day I finished. But I was not satisfied with the arrangement. I wanted to make a syrup that would suit the palate of all. I believed that it could be done; I had read that it could, and that the remedy was to defecate with lime, but I could not find anybody in our county that had been defecating with lime. I talked with old cane-growers. They said that the only way to defecate was with heat and a proper pan. They did not believe in chemicals. I attended an association last spring and met with nothing but discouragement there. I went home almost discouraged, but determined not to give up. I corresponded with Hedges, with Swarris and with Kenney, and they all advised using lime and claimed for it a grand success. I made it a thorough study, studied it day and night. There was nothing else interesting to me, not even the Guiteau trial, especially in regard to defecating and making a pure syrup that would be eaten by all who eat syrup. From all I read from these men, who seemed to be leading syrup-makers, I was convinced that it could be done before I commenced. But I had supposed that such things were apt to be a little exaggerated, and I was a little fearful all the time that it might not work so well as I anticipated, but I found when I commenced the business that it did work exactly as these men said it would in every respect. I did not make a failure in any one batch. My syrup is sold at the highest price to the merchants. They could buy sorghum in our county for thirty to forty cents and they have offered me forty-two, and some of them did not like it because I would not sell to them. I feel so well convinced of the benefits of lime that I, like the Hon. Seth Kenney, of Minnesota, will say that I will never make another gallon of syrup without the use of lime or its equivalent. It is generally conceded that lime is the cheapest alkali that can be used for the

purpose of neutralizing the acid in cane. It does neutralize it. You will find men in every neighborhood that say that sorghum makes good cake, but they do not like to eat it as a syrup. I do not know of a man, woman or child among my customers that will eat syrup at all but what likes my defecated syrup. I have sold it to more than fifty customers and there has not been one complaint made in regard to the price or the quality of the syrup. My manner of defecating is a little different from what is recommended by Kenney, Swarris and others. Kenney's plan is to defecate in batches, say about one hundred gallons each. He raises it almost to a boil in a plain pan, checks his fire, skims off the green scum, and then starts up his fire and boils until the green scum is pretty much all off. That is his recommendation. I thought a better plan, and I am thoroughly convinced it is, would be to make the pans with three apartments. I did so, making the pan a little longer than the evaporator. The evaporator is fifteen feet long and the pan seventeen. You run the juice into the first apartment next to the smoke stack. The next apartment is a little smaller. In those two apartments the juice is heated. In the first apartment it needs skimming only very rarely. In the next apartment it is raised as near to a boil as I can make it without boiling, and as soon as it passes from the second apartment into the balance of the pan, which is finished the same as the Cook evaporator, it is kept boiling rapidly until it runs to the front end of that pan over the fire, where it is run out and settled. Here is a point in settling that ought not to be overlooked. I have two settling pans that will hold one hundred gallons each. As soon as one is filled I am ready to start into my evaporator by drawing through tubes from the top of the tank. It will be settled very soon after it is filled, so that you can commence to draw off the clear liquid, and while drawing off that the other tank is filling, but in the bottoms of these tanks I have two or three gallons of settlings that are very tart, so that when I left a barrel over the second day it became so sour it fermented and boiled over. I get that out. I shall always, until I find something better, and I never expect to, advocate the use of lime as a defecator.

Mr. Russell — This topic of defecation seems to be the topic under discussion, and it is one of the most important ones on this subject of syrup and sugar making. It is conceded by all the largest and most successful sugar manufacturers and refiners, that they cannot get along without the use of lime. Mr. Decker, who is here, has had a great deal of experience in lime defecation. He took the premium on syrup at the Fond du Lac convention last year and is well skilled in the handling of lime. I would like to hear from him.

Mr. Decker — I do not claim anything more for the plan of defecation I use any more than to make a clear, good syrup. I do not claim to be an expert by any means. The plan of defecating I have adopted is to run into my tank directly from the mill, as fast as it is ground, an amount not to exceed probably one hundred and twenty-five gallons of juice. I commence heating that juice with a steam coil in the bottom of the tank. When I commence heating it I commence using lime. My lime is simply whitewash strained so that it is clear, without any coarse particles. I commence to try the juice with litmus paper to determine when I have lime enough. I do not put the lime in all at once, but continue until the test of the litmus paper shows a little acid — not alkali. Then I heat it up to about one hundred and eighty degrees to form a blanket of scum on the top of the defecator, taking great care never to boil it over, for if you boil it one minute the violent agitation dissolves all the scum and it goes back into the juice, and you can never entirely remove it. It will go into the syrup. I heat it to one hundred and eighty or one hundred and ninety degrees. Then after I form my blanket of scum, without boiling it over except to roll the scum, I let it stand probably five minutes. Then I have in the bottom of the defecator two holes, one connected with a pipe that runs into my large evaporator, the other passing into a waste pipe that goes out-doors. When I want to draw off the juice I have a round tin tube, perforated very finely with holes, which prevents the scum from coming out. On the end of the pipe connected with the evaporator I have a bag made with cheese cloth that is slipped onto the outlet of the pipe, and any particles of sediment are caught by the bag.

After it has run into the evaporator I use the sulphurous acid to test the action of the lime. Then we test by the litmus paper to find when we have used enough acid. Then I boil it down as quickly as possible. That is my plan of defecating, in as few words as I can give it.

Mr. Russell — The largest manufacturer in the state, as far as my experience goes, Mr. O. S. Powell, of River Falls, is with us, and I think his experience in defecating would be interesting to us.

Mr. Powell — I have been operating with this lime defecation for the last two years, but a point came up this year that is a little discouraging to me in one sense and very encouraging to you who are doing nothing in the way of lime or any kind of defecation. I received an order from a party in Chicago along toward the middle of the season for a few barrels of sample syrup made in a given form. They specified what they wanted it like and I made it as near as I could what they wanted it, and shipped it to them with instructions that if it suited them they were to let me know immediately. It has taken a great while this season for anything to go by railroad, and it was three weeks from the time the syrup was placed at the depot in River Falls before it was delivered to that house in Chicago, and in less than twenty-four hours after they received it, they sent me an order for a car-load made just like it without any lime defecation. Now I only speak of this, not advocating anything, only to say that we do not all want to go in one direction and we had better go slow. We do not want to drop the good old ways in which we have been treading and met with success, and try a new experiment, because in that some of us may meet with loss. I notified these parties that unless they notified me soon, I should make up my stock so that it would be marketable in our country, and that would be by giving it the very best defecation that I could. In doing that I think it is well to bring your juice to just as perfect a condition as possible before heating it, and before you add any lime. My way is to run the juice over a fine screen the first thing after it leaves the mill. It runs down on to a fine screen, possibly six feet long by three wide, set into a box with copper handles that you can take hold of to move it when it

gets full. From that it runs into a large barrel or cask partially filled with straw, and I find that that takes out a certain portion of rubbish that passes through the screen, sand and such stuff. From that I run it to my defecator. After it has passed through the defecating pan, I have been using two settling pans, as Mr. Frazier has. That is the plan of Mr. Kenney. I know that because I have had one of Mr. Kenney's brothers assisting me for two years. This year I found five pailfuls, and I believe ten, of settlings, where there was not one last year. If any one can explain the reason of that I would like to know, for I would like to get rid of that rubbish. It would be entirely unfit to go into any defecating pan. It was like thick mush. I suppose it was owing to the peculiarity of the cane in our locality. It seemed to come out badly. It all went to pieces in grinding it, owing to the extreme wet weather or something of that sort. I think we should be very cautious about using too much lime. A man of experience can tell just how much to use, but those who have had little experience had better use a little less lime than too much. After you have got too much it is difficult to get it back, and get it just where you want it, unless you use this sulphurous acid, which was used in my house last year, and I became thoroughly disgusted with it and do not want to use it further.

Mr. Russell — I would state in reference to our friend Powell's experience, he was engaged in defecating syrup to be sent to Chicago to meet the wants of the bakers. We have improved a great deal and made a great deal of advancement in this business, but we have a great deal more to improve. There are three kinds of syrup that we must aim for, and you must determine in the outset what kind you propose to work for, whether for sugar, commercial syrup or bakers' syrup. For commercial syrup it is indispensable to use lime. For bakers' syrup, if you use lime and neutralize all the free acid that is contained in the juice, it becomes alkaline and will not bake as well, according to their theory, as the New Orleans molasses will. What gives this Louisiana molasses so much precedence over our sorghum as at present made with the free use of lime, is because they have so much of that free acid in it. Their test is, in using the carbonate of

soda, it puffs up very light and flaky. If they take sorghum, where all the free acid is neutralized, it becomes flat. That is the only reason why New Orleans molasses has the preference over sorghum with the large bakers. In regard to making this bakers' syrup, which is a very important part of the industry, I think our professor might give us some enlightenment. After neutralizing the acid with lime, is there any ingredient we can add to it afterwards, without destroying the sugar, that will replace the natural acid that was destroyed?

Mr. Swenson — I should think it would be just as well for the bakers to have a sweet, defecated syrup, and at the time they wanted to use it, to add tartaric acid to the syrup, which would produce the same effect as the acid in the syrup itself. If you added tartaric acid it would have precisely the same effect as if the acid had been left in the cane without defecating it. Milk of lime is used in the southern manufactories. I think they leave the New Orleans molasses standing quite a while before shipping it, and it usually ferments a little. That fermentation develops acid. They always defecate and take out the acid when they make sugar, and then when the sugar or molasses ferments a little it gives rise to acetic acid, which has the same effect as the acid in the juice without defecation. They do not have that acid in the sugar when it is boiled down, so that their sugar is not destroyed by it.

Mr. Powell — There is one point I would like to speak of, and that is the mode of boiling. I believe you can effectually destroy your syrup by being too long in evaporating it. If your steam is low, and you are operating with steam, you had better rest than put in a batch boiled with low steam. I was not prepared to work with steam this season. Another point: I was using the same thermometer that I was last season, and I do not know that we swung off a batch in the fall of 1880 at less than two hundred and thirty, and this season, in swinging off, we commenced at two hundred and twenty-five, and I discovered after a short time, that it was all going to mush sugar — solid in my tanks, so that I would be unable to draw it off, and I commenced swinging off at two hundred and eighteen and two hun-

dred and twenty and running it into those tanks, in order to bring it down to a density that I could handle it in cold weather or any time, and whether the thermometer has changed, or the difference was in the defecation, I cannot tell. I think it was in the mode of defecating. I claim that boiling is a portion of the defecating. Unless you boil right you will not have good defecation.

Mr. Toole — I think the most of our farmers know the value of good, old-fashioned sorghum that has not been defecated with lime or otherwise, as a cooking syrup, and many of us believe it is better than New Orleans molasses. Yet we learn by experience that it is liable to undergo a change, and what suits us toward the fall, after it has been manufactured, may not by any means suit us the next summer. I have brought a couple of samples here, and noticing the difference between the two quite surprised me, as I learned it but a few days ago, because they were both taken, at different times, from the same barrel. A year ago some of the syrup was manufactured without any lime, or so little that it was not worth mentioning, a very good cooking syrup, and my brother wished to use some, and he put it in two or three gallon jugs, and has used it from the jug, while ours was kept in the original barrel. Ours began to settle. We thought we were going to have sugar, but it jellified; it fermented. It seemed as if there was alcohol mixed in it. That standing in the barrel now is quite a dark color and shows some flakes mixed in it. If there is any change in it, it would take a chemical analysis to show it. Another barrel of a different manufacture that was kept in the same place that ours was, jellified in the same manner. It might be suggested that the barrel was sour, yet the syrup flaked in a new barrel.

Mr. Swenson — Syrup which has been boiled down without defecation contains a large amount of glucose. This glucose is very easily started into fermentation, and the fermentation changes the sugar into alcohol, and, if it is carried on still further, this alcohol will be changed into acetic acid, at least if it is exposed to the atmosphere to some extent. Probably that accounts for it. The particles that separated out were probably crystallized glucose. I have had several samples of syrup sent me by makers

who thought they had a good deal of sugar in their syrup, but, as a matter of fact, the particles which they saw all through their syrup was nothing but glucose which had separated out in white, putty-like masses, and there was no cane sugar at all. That is probably the explanation of it.

Mr. Frazier — I left out one or two points, the most important, I think, in my manner of defecating, and that is, I defecate cold and draw off from the top. That allows it to settle, and, in a tank that holds one hundred and fifty gallons, I usually defecate it full, and put the lime in when it is three or four inches from the top, and stir it thoroughly and test it with litmus paper. In the bottoms of those tanks of one hundred and fifty gallons I would get out from three to five gallons of a fine mush, a sediment. That is saved from going into the pan by this manner of defecation. Another point I should have mentioned. It should be borne in mind, in making a fine article of syrup, to boil it just as rapidly as it can be boiled. Mr. Swarris, of Iowa, one of the most successful men in the business, finishes right over the fire. I would finish rapidly. Just keep it booming; that is the way to do it.

Prof. Henry here offered the following resolution, which was voted upon and carried: "*Resolved*, That in the opinion of this society a lime defacation should always be made in the manufacture of syrup."

Mr. Toole — I do not want to oppose the resolution, by any means, but it was called to our attention that the bakers wished a cooking syrup. I doubt if we will ever educate them up to the chemical view of the matter. In our own family we would like some of the syrup for cooking purposes without lime defecation, perhaps, and our object is to learn the best manner of keeping the syrup so that it will not change, and can be forwarded to them as they wish it to be.

Mr. Russell — I would state the importance of having some action taken in this convention in regard to these different points. There are many people who propose to commence the business for the first time this season, both in the manufacture and cultivation of cane. What they want to know is, not what we want at home, nor what we want to supply the local demand, which is not large

enough to justify men in making the expenditure of thousands of dollars for mechanical appliances, but what they want to know is the best method of treatment to produce a commercial article that will sell in the commercial centers when brought in contact with the best products of the country; and that is the reason these resolutions are passed, for the purpose of having it go forth, to disseminate that amount of knowledge, as having the indorsement of a majority of the practical operators here who have had experience in marketing goods at the trade centers, beyond all local influences, and where they have come in contact with the best products of the country.

Mr. Frazier then offered the following resolution: "WHEREAS, The Amber cane deteriorates in this latitude, therefore, *Resolved*, That we recommend growers to procure seed from a more southern latitude as often as once in two years."

Mr. Toole — I want to ask how we should proceed intelligently in regard to making selections for improving the quality of the cane. I would like to ask if we can do anything in the way of improving what we have.

Mr. Russell — It seems to me the most practicable way to do that would be to request our professor of agriculture to make experiments in that direction. I try to propagate new varieties that will produce a larger proportion of crystallizable sugar and a larger yield of cane per acre. I think he can do it more intelligently, and that that will be of more benefit to the greatest number than any other way we can adopt. Still, the matter is open for discussion.

Mr. Frazier — I think the resolution passed this morning was a very appropriate one, in regard to selecting the best matured heads and saving the largest and best developed seeds. I have written to a very careful farmer in central Illinois to raise for me twenty bushels of cane seed, and that there should not be any broom-corn or any other kind of sorghum or millet raised within half a mile of it, and that I would furnish him the seed to start on and furnish him the seed once in two years, and he would furnish me the seed to grow here, and I think we can all find some one in the southern latitude that we can depend on to raise seed for us.

Mr. Swenson — I think a great deal can be done in trying to get the best varieties of cane and in trying to produce new varieties. We can learn a good lesson from Europe in regard to their beets. When they first started their beet-root sugar factories, the beets contained on an average only about eight per cent. of cane sugar. I have seen lately that they have succeeded in France in raising beets that contain as high as sixteen per cent. of cane sugar. This has been done by years of investigations and propagating different kinds. How it was done I do not know, but I think that we could proceed in some similar manner and increase largely the value of the sorghum cane.

The resolution of Mr. Frazier was then put to a vote and carried.

Mr. Russell — Mr. Frazier's resolution simply covers what was admitted to be true at the Minneapolis and St. Louis conventions, where men have experimented with this cane side by side year after year, and in every case they pronounce that it deteriorates after being used in the same latitude two or three years, and therefore they rotate and get seed from Missouri and Kansas and plant it one year to acclimate it in Minnesota, and that class of seed has produced the richest cane-juice we have at the present day.

Mr. Lindlay — I am satisfied to change every once in two or three years. I have found seed to deteriorate in that time, and every time I have made a change, even to get the seed at Jefferson, the yield was nearly double.

Mr. L. O. Dill — I see in a Minnesota report that by getting seed from St. Louis it grows from twelve to fourteen feet high the first year, the second year ten to twelve, and the third year eight to ten. I wrote to Mr. Miller to know where I could send to get southern seed. If any gentleman knows where we can get the pure southern seed, I wish to have his address. There are a great many going into it in Waushara county where I live. I have advised them to get the pure Amber cane, and they wanted me to send and get a couple of hundred pounds. I have received a card from Mr. Miller.

The following resolution was then offered: "WHEREAS, Investigations into sorghum canes of great value have been conducted at

Washington by the agricultural department, be it *resolved*, That this convention earnestly urge our commissioner of agriculture to continue the experiments conducted by Dr. Collier with sorghum canes. *Resolved*, That a copy of these resolutions be forwarded to the commissioner of agriculture and to each of our senators and representatives in congress." The resolution was adopted.

The following resolution was then offered by Mr. J. Schoemaker: "*Resolved*, That planting should be done as early as possible in the spring."

Mr. McIntyre — I do not really understand what is meant by as early as possible in the spring. If it means as soon as the ground is thawed out, I should be opposed to the resolution, but if it means as early as the ground is in a suitable condition, then I should be in favor of the resolution.

Mr. Schoemaker — If your ground is plowed, get on to it as early in the spring as you can and put your seed in. It has been my experience in manufacturing for some time, that early planted seed or self-sowed seed produces much larger than late-planted. That is one fault with our farmers in Wisconsin. They seem to think they can plant their sorghum seed after they have done everything else. They sow their wheat and plant their corn, and I don't know but some of them hoe it, before they plant their sorghum seed, and the result is about one-half, and sometimes not half, of a crop; whereas, if you plant just as early as you can get on the ground, you need not cover it, because if you cover it to any extent, where it is planted early, it is apt to rot and not come up; but if it is just laid on the top of the ground when the ground is moist, it will germinate and come right along; and another advantage is, where we plant early, the sorghum seed comes up before the grass seed, and it is so much easier to hoe it, and it will come up before that because the grass seed does not come up before the ground is quite warm, and the sorghum seed will come sooner; therefore it is so much easier to hoe it; whereas, if you wait and plant late, the grass seed will come up before the sorghum, and you will want better eyes than I have got to tell the difference, and it makes a great deal of trouble to hoe it. Therefore I say plant as early as you can get on the ground.

Mr. Dill — I wish to refer to my experience last spring. The plant was about an inch and a half high and the frost cut it so it turned black and lopped right down. It sprung up again and grew more vigorously, if anything, than seed that was planted before, so that it had not come up when the frost struck. It is a very small rooted stalk in the start, and that which came up after the frost cut it down was ahead of the other all the way through the season. So I think there is no danger from frost. I advise not to soak the seed but to plant very early.

Mr. H. C. Davis, Jackson County — A short time since I wrote to a man who had sorghum, some self-sowed and some he planted. The self-sowed plant was just a month ahead of the other and made better syrup. I think the matter of self-sowing is well worth our professor's attention.

Mr. Frazier — I would amend the resolution to plant in the fall instead of the spring.

The resolution relating to early planting was then adopted.

Mr. Russell — From experiments made on a small scale and with volunteer cane, the volunteer cane that has laid in the ground all winter generally matures earlier than spring planted, and produces a richer juice. I think it would be well for somebody to make some small experiments in fall-planting.

Mr. O. J. Arnold, Mt. Ida — I believe we were promised this forenooon to have the *modus operandi* of making sugar explained to us. I would like to have the process of changing molasses into sugar explained.

Mr. Swenson — It is only necessary to defecate the juice, as I did here, evaporate it down to about twenty degrees B., till it gets to that density in the open pan, and then I transfer it to a vacuum pan, at a temperature not exceeding probably two hundred and sixteen or two hundred and eighteen. It is boiled down probably about one-half and then transferred to the vacuum pan, and boiled down at a temperature of one hundred and forty or one hundred and fifty F., till it is about forty-three B. It was then run into a barrel, and in the course of a week it would become semi-solid from the formation of sugar crystals, and it was

then transferred to a centrifugal machine, where the syrup was drawn away from it and the sugar was left in the centrifugal.

Mr. Lindlay — I believed up to a year or two ago that we should plant our cane after we planted our corn, but instead of that, if we plant almost as soon as we can get the ground ready for it in the spring, I believe it will facilitate it, and that it should be done without steeping. That is my opinion.

Mr. Dill — I wish to state my experience in planting. It is only two years, and what I have advised my neighbors,— to plant three feet apart and give a chance to cultivate both ways, and plant ten to twelve seed in a hill. Cover it about a quarter of an inch deep. Plant with a hoe, and put the seed on the moist ground and cover it with moist ground. I have tried planting eighteen inches apart in drills, and I find by planting in hills I get larger stalks and I get a better yield of juice than I did in planting thicker. In my section of country, which is pretty well north, August seems to be the month that the sugar cane grows most, and the more sun can get in the faster it grows, and I think the sweeter the juice is. I have been manufacturing for the last two years. I have kept the name of every man that brought cane to me, and the number of gallons of juice that his cane made, and made a report for two years to the department at Washington. My advice to my neighbors has been to plant three feet apart and twelve seeds in a hill, and then after it gets up, thin it out and leave six or seven stalks in a hill. If you leave more, more suckers come. The seed that I used I got from Washington, claimed to be the Early Amber. It grew on an average, a year ago, about twelve feet and a half high, and from about three-quarters to seven-eighths of an inch in thickness. My experience in manufacturing with small cane is that you do not get but little juice. Give me as large cane as I can grow and I will get more juice. My main point in cultivating it is to keep it perfectly clean when it is small. After it gets thirty inches high I calculate it will take care of itself, but cultivate it well while it is small and tender, and in preparing the ground. If I manure the ground, I want to do it in the fall. I hoe it first, and after it gets large

enough I use a two-horse cultivator. I manure it in the fall with barn-yard manure. I spread it as I draw it, and then I get it just as I want it.

The following resolution was then offered: "*Resolved*, That the best manner to plant cane is in rows three feet apart each way, with the rows running north and south, covering one-half inch deep."

Mr. C. R. Rounds, Crawford — I would say planting four feet apart each way if you choose, as planting three feet apart is too close for using a two-horse cultivator. Plant four feet apart and you can use your cultivator. I have tried planting various ways, and my experience is that you get the greatest yield by planting in drills eighteen inches apart one way and four feet the other, and plant from two to three kernels in a hill; or, if you have more than that, thin it out to two or three; and in planting four feet each way, from four to six stalks in a hill. I find that I get more molasses with less labor with that mode of planting. I cultivate with a two-horse cultivator.

Mr. Frazier — I would say in reply to the gentleman, that I planted twenty acres of cane last year, and most of it I planted three feet each way, and the balance three feet one way and three feet ten inches the other, and I did all my cultivating with a two-horse cultivator. It makes it a little difficult work, but it can be done at even three feet.

Mr. D. McDonald, Verona — I think that I have planted part of mine a little different from anything that I have heard yet. I tried various ways of planting as an experiment. I tried planting three feet ten inches one way and divide that the other way, as near as might be, and planted with a horse planter. It did very well. I also tried this way: I took a two-horse corn cultivator and took off the front shovels and set the hind shovels three feet and a half apart and went over the ground and marked it. It left a groove that was very loose and mellow. I then took a drill and dropped it from five to eight inches apart usually. Sometimes, through mistake or stopping, the same ground would be gone over twice, so that it would be a little too thick, but where it was planted with a drill we could pick it out much easier

when we went over it with a hoe than where it was planted with a hoe. From that ground I had a much better yield of cane than off any of my other plantings. The rows were planted north and south.

Mr. S. D. Clark, Plover — I think different soils need planting in different ways. I have planted on both heavy and light soil. On the heavy soil I have the best results from going both ways, but on light sandy soil by running once.

Mr. O. S. Powell, River Falls — There is a point that all farmers ought to realize, that we cannot cultivate any crop alike on all kinds of soil. Any one who has been raised a farmer will understand that what will answer on light sandy soil will not do so well on heavy clay soil. I am satisfied that it is not well to plant too thick or have too many hills to the acre in this country where land is so cheap. In Germany it might be well to study economy in regard to the number of acres. From my observation we want to let the sun fall on the ground when the cane is ripening. If it is a dense mass of leaves so that the sun cannot get in, you are not going to have the best kind of cane. From my observation there are more failures in the raising of cane than in the manufacture of the cane, or in the defecation or boiling or anything else. Now I will venture the assertion that one-half of the cane that is brought to the mill is not worth the hauling; it had better be fed to the stock on the farm. That is my experience, and I have no doubt it is the experience of every one else. As has been said, it is a great deal better to plant half an acre and attend to it well than to plant an acre and attend to it poorly, for the reason that you throw away all your labor in raising and manufacturing.

Mr. Dill — Every manufacturer that manufactures syrup knows that one man will plant a quarter of an acre and attend to it properly, and another will plant half an acre and not half attend to it, and after it is drawn to the mill he will complain that he does not get as much again syrup as the man that planted only a quarter of an acre. In my section of the country, where they mark off the ground and plant in the check, if there happens to come a shower it will wash so that they cannot see where the marker has

been and it will cover it too deep. I would not put it in the check but on one side of it, and that the south corner of it, where the sun will have a chance to strike it. The sun has no chance to keep it warm on the north corner of the check. I have tried that. I found that that which was planted on the south corner of the check came up the quickest and was the best. Others have planted in the check and it was a great while coming up, and some of it never came up.

Mr. Grant — I do not believe there is one farmer in ten that will plant his cane before his corn. The main question seems to be how they can raise an acre, or half an acre, or enough to supply the family, the easiest. My plan is to leave what he wants on one side of his corn-field, and then he will certainly plant it when he plants his corn. It has got to be hoed anyway or he will have very poor cane, unless he raises it on clover sod or very nice clean land. When he cultivates his corn he cultivates it one way, and he must hoe it the other. It does not interfere with his corn crop, and it is there and he has got to attend to it, consequently he will have cane that will make sugar; otherwise he will not.

J. A. Taylor, Sun Prairie — I have raised cane for the last four years, putting it on the side of the corn and marking it. My boy drags the corn and drags the cane with the rest. Then when he is planting the corn I plant the cane. When he is working out the corn I work out the cane. I will guarantee that every rod will give me a surplus, and the cheapest sweetening we can get. When you plant put in enough, and if there is too much pull it out, and the old man can do that and let the boy do the hard work.

Mr. Schoemaker — I had a small piece of land on which I thought I would try an experiment. It was marked out three feet and ten inches one way, north and south. I planted one row with cane seed, about eighteen or twenty inches apart, in drills. Then I planted the next row with Early Ohio potatoes. I planted half an acre in that way. From that half acre I harvested forty bushels of good potatoes, and I got, I think it was, sixty-three gallons of good syrup. I do not think I got a single gallon less than if I had planted every row with cane. The cane was about seven

feet apart and the sun shone through it nicely. I had large, heavy, well-matured cane, and it produced well. But I would advocate planting four feet apart, in the hill, on account of cultivating. I think that is the best way. Give it plenty of room and do not get too many seed in a hill.

Mr. Frazier — I move to amend the resolution so as to read "from three to four feet apart." It is evident that different soils require a different manner of cultivating the crops on them. On some soils it would be too close, no doubt, to have it three feet each way.

Mr. Dill — I wish to say in regard to close planting, that I have a socrometer, with which I test every man's juice before I put it on the book, and it tells just how sweet it is. Where it has plenty of sun and is three to four feet apart, the juice is considerable sweeter than where it is planted close and thick.

The resolution, as amended, was then adopted.

WEDNESDAY EVENING.

THE METHOD OF MANUFACTURING CANE SUGAR FROM SORGHUM.

DISCUSSION.

Mr. Swenson — It is rather a surprise to me to be called upon to speak to you on this subject. I hope the subject will be discussed and that we shall hear from some of the practical sugar-makers here. I will give a brief sketch of the way I produced my sugar, and will give the best methods of making sugar, as far as I know, from the sorghum cane. The time of cutting is the first thing to be taken into consideration. The cane should be cut just as the seed begins to harden. I think this is the proper time to cut it. From this time on the juice will not change to any perceptible extent, unless the season happens to be an extremely bad one or some storm should happen to lodge your cane. If your cane is lodged, it will deteriorate very fast. I found that some of my cane that was lodged by a storm last fall lost three to four per cent. of cane sugar in a week and a half, but if the

cane is in good condition it will remain good for a couple of months. If, however, the cane is cut and remains in the field, the cane sugar will be changed into glucose very quickly, and it is something which should never be done. If the cane must be cut it should be hauled and placed under shelter, but it should never be allowed to be exposed to the open air and rain. I think for making syrup the cane may be well cut and put under shelter for two or three, or even four weeks, without any particular harm. The next thing then is the grinding of the cane. I think that more attention should be paid to getting a good mill. You probably do not realize how much you lose by a defective mill as well as I do, as I have weighed all the juice that I got from my mill, and also the stalks that went into the mill, and I also know how much juice the stalks contained, and consequently I could tell how much juice I lost in the begasse. By the mill which I used I got on the average about sixty per cent. I crowded the mill pretty hard. I loaded it down probably a little more than is usually done. I find that the average mill throughout the country does not yield probably over forty-five to fifty per cent. of the juice. The stalks contain, on an average, about eighty-five per cent. of juice. Consequently you lost very nearly half of your syrup in that operation.

You will see that if a mill will produce even ten per cent. more than another it will pay for itself in a very short time. After the juice is pressed out from the cane no time should be lost in defecating it, or, if you do not defecate it, no time should be lost in boiling it down. After the juice is pressed out, the process should be hurried as much as possible. If the juice is pressed out and allowed to stand, especially on a warm day, it will ferment very quickly, and you will lose sugar by it. The glucose will ferment into alcohol, and so rapidly that you would hardly believe it, because you do not see anything, but it takes place through the whole mass of the juice, and consequently a little here and a little there will add up to a considerable share of the sugar that is in it. This fermentation is arrested by heating to the boiling point. Just as soon as the juice is heated to the boiling point the fermentation is arrested, and even long before that,

so that it is best to heat the juice as soon as possible after it has come from the mill, and defecate it. After defecation it should be allowed to settle for some little time. After the juice is defecated there is no particular danger. I think it can safely be left ten hours without any damage at all. But the evaporation itself should not be prolonged any longer than necessary, for the reason that heat itself produces a change in the cane sugar, changing it into this inverted sugar known commonly as glucose. The evaporating then should be done as quickly as possible after it has once begun. You all know, of course, that when you first begin to boil the juice, the boiling point of that juice does not differ very much from that of boiling water, or two hundred and twelve degrees or two hundred and thirteen degrees Fahrenheit. As, however, it gets more dense, the boiling point will reach two hundred and thirty or two hundred and thirty-two. Now when the boiling point gets up as high as that, the sugar is destroyed quite rapidly, changing into inverted sugar. To make sugar, it is essential to boil your syrup in a vacuum pan after it has been reduced to about twenty-five degrees Baume in an open pan. It can be reduced to this point in an open pan without any danger of destroying much of it, although, of course, it would be preferable to do all your boiling in a vacuum pan, but it is hardly necessary. The same syrup which will boil at a temperature of two hundred and thirty in an open pan will boil readily at a temperature of one hundred and fifty degrees Fahrenheit in a vacuum pan, a difference of about eighty degrees, and you will see quite a difference, and you can boil it there just as thick as you want it; you can boil it down to a thick candy. I boiled it down so that when I let it out it came out just like a mush sugar, and I could run it into my centrifugal and separate it frequently, but I preferred to let it stand a while because the crystals would get larger and more numerous. The separation of the sugar is done with a centrifugal machine, which is a circular drum with perforations, sieve-like on the outside, and the mush sugar is put inside of that and then it is revolved at about one thousand two hundred revolutions a minute, and the syrup is thrown out through those little perforations and the sugar is left inside. In

that way you can take a centrifugal thirty inches in diameter and a foot high and you can separate about one hundred pounds to a charge. You can run out a charge in five or ten minutes, sometimes less, depending a good deal on the sugar. I will invite you to come up to the university to-morrow morning and we will show you how it is done.

Mr. Frazier — It seems to me that we, as citizens of Wisconsin, ought to be proud of the fine exhibit of sugar that has been made on the university farm in Wisconsin. I think it has not been excelled at any place in the west, perhaps not in the United States, made from the northern cane. I have seen samples from various other works, but none that I have examined will come up in quality with the second grade sugar as manufactured here. It seems to me that some resolutions ought to pass this association requesting the legislature to make still further appropriations, that this work may be more thoroughly investigated.

Mr. Russell — The subject of making sugar and making it at a profit has been investigated quite thoroughly, and the result of the investigation by those who have been making it is the investment of thousands of dollars in fitting up in the proper manner to make sugar. As I stated this morning, it is past the age of experiment; actual facts and figures have been determined; sugar has been produced, and the cost has been such that it has shown that sugar can be made at a profit from this Amber cane, and speaking from my own experience, I know that it can be made at a profit. The year 1879 was the first I engaged in this business. I never manufactured a gallon of syrup before in my life or ever saw one made, but my partner at that time decided that we would fit up in the most elaborate manner, procure the best mechanical appliances that could be found, and employ one of the best sugar refiners there was in the country, and he has that name. Our operations were confined to Crystal Lake, Illinois. We produced over forty-five thousand pounds of sugar. General Le Duc and Major McDowell came out there on a visit. The General examined that sugar and went down stairs where the centrifugal was in operation, and it was a pretty hard matter to get him away from that centrifugal. It was simply the culmination of his dream

that this country would in a few years produce its own sugar. And I am glad to state to-night that some of the most experienced men, I do not mean in the sorghum trade at all, but men that have had years of experience in the southern and Cuban improvements, have pronounced it a perfect success.

The result of Prof. Scovill's experiments at Champaign, Illinois, has been such that the business men of that town have organized a stock company having fifty thousand dollars capital stock, and they propose to put in one thousand acres of Amber cane there this year. They will also include in their manufacture glucose from the Amber cane seed. Whether they are going to use that to adulterate the Amber cane or the Amber cane to adulterate the glucose, is the question, but it is perfectly conclusive from his experiments there that sugar can be manufactured at a profit there in Illinois, and also that there is a large profit to be made by manufacturing glucose, and I presume that he will use the glucose in this manner: it is customary in getting out sugar, in the first place, to take out the first crop of crystals of the Louisiana cane sugar, and the syrup is shipped north and sold to sugar refiners. They take it and reduce it again in their vacuum pan and take out what they call the second crop of crystals; that is called "seconds." Then they have what they call the thirds, and sometimes what they call the fourths, if it is a very strong juice. That is a very fine grain, and they use that to make the very highest grades of sugar also. Now I say what we have done at one time, and if there is any gentleman here who has gone through the experience that I have and produced sugar one season, he feels pretty well satisfied that he can do it again with like appliances. Now since that time I have had no sugar appliances to work with. I have used a small open steam train, and the result of it was, it is no use trying to make sugar, and make it a financial success, with the open steam train or the open fire train. You can make some, but it will be a very small proportion. We have only to go to the south and gain experience from them. In my visit to the south last summer I was told by one of the smaller manufacturers that it did not pay to make sugar there with an open pan; that it cost him seven cents a pound

there, and that that did not pay expenses, the wear and tear of machinery, taxes, etc. He had gone out of the business altogether and gone into the rice business. Other parties I talked with told me it was more profitable to them to make a thin syrup and ship it to the New Orleans sugar refining companies. There they make it into sugar at so much per pound and nothing for the syrup.

The next question is, while we do not have the sugar appliances can we produce a commercial article of syrup that will compete with the best products of the country at our trade centers, where we must look for an outlet for our surplus stock? If we are going into this business extensively, we must look to that outlet and cater to that outlet. It is not a question of whether we can make a syrup that suits our taste, but whether we can make a syrup that we can take to Chicago and sell on the market, where it is out of all local influences and is bought and sold on its intrinsic merits. We can take a small fire train or small steam train and produce a commercial article of syrup that is finer in flavor and will bring a higher price in the market than any sorghum syrup that has been sold on the Chicago market, and the best of what I can say to you is to refer you to Major McDowell and General Le Duc, the former commissioner of agriculture at Washington, and Prof. Collyer. They had sugar that we made there at Crystal Lake. General Le Duc ordered some five or six hundred pounds for the agricultural department, and he ordered one barrel of it for President Hayes. President Hayes always had a large sugar bowl on his table filled with that sugar, and it was curious to note how all the foreign legations, when they would be there at any time, would have their attention drawn to that sugar, and they would get around it and talk about the northern sugar made from the northern cane. What we have done we can do again with the same appliances and under the same conditions, and, in proof of that, there are these large works being fitted up by capitalists associated with scientists and experts in the business.

Prof. Henry — There is one thing I wish to say. Our farmers must not think they can make sugar any more than they can make patent process flour. It is all right for the farmer to raise wheat,

but the farmer has no right to think that he can put up and run the mill on his own farm which will grind the flour. The manufacture of sugar is one of our most complicated industries, if you take it from beginning to end. A southern plantation requires $30,000 or $40,000 investment, and down there they are giving up trying to have a manufactory on each plantation and are talking of taking up the central system. No farmer should think that he can set a mill on a stump and with a potash kettle go to making sugar; it cannot be done; give it up. But do not give up the idea that we are going to make sugar. It is a business like the flax business or a number of industries that could be named. It requires capital. But why Wisconsin is standing back in the way it is, is a puzzle to me. New Jersey has gone ahead and won victory; it turned out two hundred thousand pounds of sugar or over the first year it started. Illinois at one place has $50,000 put up ready to start into the business. In Madison one or two men have shown some slight energy, but the rest of the citizens of Madison have all dropped off. I do not know what we are expecting here in Wisconsin. We will soon be buying our sugar from Minnesota and Iowa and Michigan and shipping it into our state, when we can go right into those states and take the premiums right away from them for quality and character. What we are lacking now is money. We lack capitalists. We have got men that know how to raise the cane. We have got the seed generally distributed, and men are getting so that they can tell the growing cane as it comes out of the ground from pigeon grass, which is quite an advance. Capitalists will go in and put in money, in different parts of our southern counties, to find out where there is copper ore. They are sinking thousands of dollars in copper mines in Sauk county where there is not a trace of copper to be found. They will invest in patent rights. They will take up almost any sort of a hobby that is presented, paying dearly for their pleasure; but here is an industry that needs capital to back it, and for some reason or other our capitalists have all stood back. Our farmers cannot go any further. There is just one direction now for us now to push, and that is toward a better quality of syrup, and it can be reached. We can make marketable syrup, but we have

not done it yet. Almost every farmer in the state is straining to make a syrup that will look like honey. What would you think of our dairymen in Sheboygan county, where they every now and then send off a whole train-load of cheese, what would you think of those farmers getting around the cheese and looking at the color of it and wondering if that cheese was nicely colored, and never thinking how that cheese tasted? Color is a very good thing in the cheese, but the trier gives you something besides color as you examine the trial cut. Flavor is the first thing. I have been at conventions where the farmers brought in their specimens, and the farmer who had the lightest colored syrup was the man. I have had the syrup which we made on the farm go into the legislature, and one member said to me, "We can make better syrup than that in our county." Said I, "Have you tasted it?" "No; it is too dark." "Well," I said, "New Orleans is pretty black; maple syrup is not very light." "Well, we make lighter than that." Now shall we go on that way? To be sure, there are grades of syrup of light color, the same as there is cheese of a certain color, but what we want is uniformity. We have got to work toward that, and defecation, it seems to me, is the only thing that is going to place us on a common level. Syrups may be defecated, and no matter where they come from they will be of a uniform color. What we need now is to manufacture syrup so that a Chicago firm can order fifty thousand barrels of syrup from Wisconsin, and when they job it out it will all be of a certain consistency and color and character, just the same as cheese is sold in London while it is crossing the ocean, because they know, when they order prime cheese or first quality cheese, just what that cheese is going to be, and there is not an iota of doubt about it. If we are going to manufacture syrup, our business will not be hawking a few barrels around the streets and peddling it out of the tail-end of a wagon. It has got to be something above that; it has got to be something of the same character that our dairy business has got to be. Our dairymen meet in conventions and represent millions of dollars. There were $45,000,000 represented in the Dairymen's Convention in Sheboygan a few days ago. Think of that. Our Amber

cane industry ought not to be a whit behind it in ten years. But these dairymen have worked. They have offered as high as fifty dollars in single tests. We have not offered a premium yet. We have not done anything in that direction. Now we must organize. We must adopt certain measures. When men say we must defecate, as they do in the resolution to-day, let us defecate; let us, at least, learn defecation, so that when a Chicago firm says, "Will you make ten thousand gallons of defecated syrup for us and deliver it at a certain date?" you can say, "Yes, and there is a sample of what we can do." If they do not want it defecated, very good. We must be able to turn it out defecated or undefecated. Let us get it so that we can ship one hundred thousand barrels of syrup to Chicago and they will feel confident that they are getting Wisconsin syrup that will stand in the market as Wisconsin cheese does, something with a character to it.

Mr. Austin — I am inclined to think that this industry has ceased to be an experiment and has become an institution of the country. It seems to me the same law governs the question of how to make it profitably that governs everything. Our wool does not have to go begging for purchasers, because it is made in quantities sufficient to call purchasers to it. It is so with our wheat and all other products, and I think when we have this in sufficient quantity and a commercial commodity, there will be no question about buyers coming for it; in other words, when there is sufficient for sale in the state of Wisconsin, money will be hunting it up; but so long as it is in small quantities, those small quantities have to go hunting for purchasers. If manufacturers would so regulate their manufactures as to manufacture for the wholesale merchant or refiner, I do not think this question would have to be asked again: "Why don't capitalists invest in machinery to manufacture it in sufficient quantities to put it before the people?" Before people can be expected to invest large amounts of money in refining, we must have an article to refine. My solution of the difficulty is for us to manufacture sufficient quantities to justify capitalists in investing money in machinery to refine it. If we do that, capital will be hunting for it.

Mr. Toole — I feel anxious in regard to one point. We have

told at various times that this and that were matters that should be experimented on, and that we might receive information at a future time from Prof. Henry or Prof. Swenson. We have passed quite heartily a resolution that the experiments in Washington should be continued. It seems to me that from all I can learn that we are as far advanced in Wisconsin as they are in Washington where they have experimented for years, and it is quite important that we should get light at home, and as soon as possible, and I hope that those who are drawing up resolutions will look after those that touch our own interests even more than the ones that have been passed.

Mr. A. A. Arnold then offered the following resolution: "WHEREAS, It is evidenced by the samples of sugar and syrup on exhibition that have been manufactured on the university farm, and also by the familiarity of Profs. Henry and Swenson with the subject, and the information given in this convention by them, that we, the farmers of the state of Wisconsin, are under obligations to them, therefore, *Resolved*, That, in token of our appreciation of the same, we tender to these gentlemen our most earnest thanks."

The resolution was put to vote and adopted.

Prof. Henry — I do not know whether Mr. Swenson is in the room or not, but I wish to say this; you may think, possibly, that in getting the salary which the appropriation allows him he is getting a big thing. When I tell you that Mr. Swenson has had an offer of something like $4,000 from a glucose factory to go into that business, but has remained working with you in Wisconsin at a salary of $1,200, and a possibility of being thrown out of employment at any time that the appropriations may cease, you will see that Mr. Swenson is at least trying to work along the line of consistency and is trying to stand by the farmers of this state in this work.

An invitation was then extended to the members of the convention to visit the university and farm.

Mr. C. R. Rounds — I would like to say that, judging the future by the past, I think we have great cause for encouragement. Twenty-two or three years ago, when this business was very

young, an article came out in the American Agriculturist in regard to making sorghum. The machinery was very primitive then, as you all know. The suggestion was that, before introducing the cane into the mill, they take a mallet and break the joints. It was suggested that we could procure more juice in consequence. I don't know as I have had very much experience — about twenty years, and I never made very large quantities; two thousand five hundred gallons is about the extent,— but I have found from that experience that the people of Wisconsin have encouragement enough, from what has been done in the last twenty years, that they can make an article of sorghum that will be marketable anywhere under the sun.

Mr. A. J. Decker offered the following resolution: "*Resolved*, That a committee be appointed to formulate a memorial to the legislature asking them to appropriate a sufficient sum to continue the experiments of making sugar at the experimental farm, and to pay for printing the proceedings of this convention for liberal distribution among the farmers."

The resolution was adopted, and the chair nominated as the committee, Messrs. George A. Austin, A. A. Arnold and O. S. Powell.

Mr. Arnold offered the following resolution: "*Resolved*, That in consideration of the manifest benefits arising from the appropriation made last year by the legislature for the purpose of conducting experiments on ensilage and in the raising of cane and manufacture of sugar from the same, we hereby petition the legislature to make an appropriation of $3,000 for the continuance of these experiments under direction of Prof. Henry as heretofore."

Mr. Arnold — Four thousand dollars was appropriated last winter, of which amount something over $1,000 remains. Prof. Henry informs us that he thinks he can conduct his experiments for another year for $3,000, and I think we can get $3,000, and we ought not to ask for any more than we need and will be likely to get.

Mr. Harris — You may be sure that the legislature will not grant any more than we ask. We had better ask for $5,000.

Mr. Arnold — It will not look well for us farmers to ask for more than we need.

Mr. Russell — As long as Prof. Henry seems to think that he can get along with $3,000, and make all the experiments that are needed on the farm, we had better let it rest there until he reports that it will take more money to carry on these experiments.

The resolution was then adopted.

Mr. Russell — We will pass to a very important subject, the value of the cane seed for feeding purposes. There are gentlemen here who have had considerable experience in feeding it to all kinds of stock. If Mr. Oak Hill is here I would like to hear from him in relation to that. He has had some experience in feeding it, and also in grinding it and having it made into flour, and using it as a substitute for buckwheat cakes.

Mr. Hill — I came up here to listen, and not to be heard, but the subject of the value of the seed for feed has not been introduced in this meeting before. There was threshed upon my farm this last fall three hundred and eleven bushels of this seed. I have been feeding that seed, and have taken particular pains to mark the character of the seed as I fed it. In the first place, when I gathered my sheep from the pastures and fields this fall, I divided them into three flocks. I had a flock of lambs that were weaker than the others that I put in one bin. I took for these lambs what seed I could take in one hand and shut it, for each lamb. I fed it for five weeks, or thereabouts. I came down one night, and there was no seed there, and I took over half a bushel of oats and corn, and put it in the trough where I had been feeding the sorghum seed. They put their noses into that trough, and looked up to me as if to say "What is this?" They did not know what it was, or acted as if they did not. They had eaten oats before, in the fall, but they had been eating that seed, and I stood there and watched them for four or five minutes, and I made up my mind that the lambs knew better what they wanted than I did, and I went back to the granary and got some sorghum seed, and took a handful of that sorghum seed and fed it to them as usual, and they crowded and pushed each other until the last seed was gone in the trough. Then I tried another flock of lambs

and yearlings of thirty-five in the same way, and with the same success. Hardly one of them would touch corn or oats. I turned my older flock in there and they ate up the corn, and I turned them back and got some sorghum seed for the second flock, and they ate every kernel of it and stood at the trough till it was gone, and wanted more. I have also ground it with oats and fed it to the cow I milked till the 10th of November and sent the milk to the factory. She was quite thin and I dried her off. She would all go to milk and I could not keep flesh on her by high feed. I dried her milk and fattened her, and I have fed from four to five head each year on my farm for the last twenty-five years, and I never fed anything that I got that rapid increase of flesh that I got upon that cow from feeding her sorghum seed, and not a single feed have I fed to that cow but what she ate clean. I fed a pailful night and morning, of oats and sorghum seed ground together, and not one single feed has she gone by without feeding, up to the time I killed her. She weighed seven hundred and thirty pounds when I dressed her. I had fifty-six pounds of tried tallow from the inside. She was very thin when I commenced feeding her. The boys laughed at me because I had a notion of feeding her, but I thought I would try it, and I met with good success, and I think it is one of the most valuable seeds for feeding that I ever fed. I have ninety-six sheep and I have fed my entire flock on sorghum seed, and I have never had my flock look finer or do better than they have the present winter. In regard to using it for cakes: I take the seed from the granary and clean it in a mill as I would wheat, and then take it to the mill. I have given it to everybody that would use it, and every one pronounced it to be very nice. There were a couple of men there from Ohio and they ate it and would never have thought but what it was buckwheat. We like it, and all the neighbors like it. We get some ground and put it in bags, and it takes pretty well at seventy-five cents a bag, a discount of fifty cents from what buckwheat is at the present time. I have been in the business nine years, and I have made in that time twenty-three thousand gallons of sorghum syrup. I have never been able to keep a barrel over, so that I had any on hand at the end of

the year. My syrup is all gone now, and buyers have come for it and I had no supply. I have sold in Whitewater and in Watertown and in Fort Atkinson. We have sold the seed for fifty cents a bushel, and could sell more. The yield was about twenty-eight and one-half bushels to the acre, as near as we could get at it. I threshed it with an ordinary threshing machine of ten horse power. I believe that raising the seed for feed is one of the great industries of this state, to say nothing about the cane. There are men in my neighborhood that are going into it who say that they shall raise it for the seed and make what they can out of the syrup.

Prof. Henry — I think what we have heard is really the most valuable thing that our convention has developed, the value of the cane-seed. In a letter from Mr. Bishop, commissioner of industries in New Jersey, he says that cane seed is bought readily from the farmers there at sixty-five cents a bushel for feeding purposes. In our experiments upon the farm we obtained seed at the rate of thirty-two bushels to the acre, the seed weighing fifty-two pounds and eight ounces or fifty-three pounds to the bushel. We did not thresh our seed as clean as it should be, there being quite a number of hulls left. The seed will go about sixty pounds to the bushel when properly threshed. Is Amber cane going to pay? is a question that has troubled some people. Look at it. One thousand pounds of the raw sugar you see here made from one acre, eighty-seven gallons of syrup of the quality you see drained from that sugar, and thirty-two bushels of seed from one acre, and let the farmers stand up here that raise oats at the rate of thirty-five bushels to the acre and say they doubt that cane is going to pay.

Mr. Ford — Has this seed been tested for fattening cattle? Do you know whether it is equally good for fattening hogs, and how it compares in fattening value with corn?

Prof. Henry — The wet weather has thrown us out badly this year on all our calculations, but, if our seed is not too musty, we shall probably grind it this week (we have thirty or forty bushels of seed saved), and shall feed it experimentally. In chemical analysis, the starch is about sixty-three per cent., while corn has

sixty-seven per cent. The albuminoids stand at about seven per cent., while corn is about ten per cent. Of course the albuminous part of the corn is the most valuable part; that is the part that makes the lean meat, the muscle of animals. The starch keeps up the heat of the body. There is in the cane-seed, however, something that we have forgotten yet to put in. In the hull of the cane-seed is tannic acid, and in such quantities that chemists are beginning to inquire if we cannot get tannin enough out of it to tan all our leather.

Mr. Arnold — I would inquire if there is phosphorus in that. There is in the hull of the wheat kernel.

Prof. Henry — I should think there would be.

Mr. Arnold — That is the beneficial part that is taken out of white flour. It strikes me that we might get phosphorus enough to make all our matches.

Mr. Hill — I think a bushel of sorghum is equal to one bushel of shelled corn for feeding.

Mr. Frazier — That is in accordance with my experience. I had two lots of hogs last fall. To one I fed cane seed unthreshed, and to the other corn. The hogs I fed cane seed gained faster than those I fed corn. However, I was feeding all corn, dry. There was a good deal of seed left in the field where the cane was topped, and I turned my cattle in there. In three weeks they had gained fully fifty per cent. on their milk — the milch cows did. It is supposed by some that if stock are allowed to run to it, it is dangerous. Suppose it is? So is any other grain. But I think there is not any more danger of their hurting themselves than there is with oats or corn.

Mr. Kellogg — Some years ago, at Lake Mills, cattle broke into a sugar cane field, and killed themselves eating something, whether it was the seeds, or stalks, or both. A neighbor of mine sowed about half an acre of sorghum this spring, and the seed he thought failed, and he run the drill over it the second time, and both sowings came up. It was too thick to cultivate, and he let it stand for fodder. It grew to the height of four or five feet, perhaps six. I noticed he did not cut it until after the ground had frozen up, and I asked him one day what he would take for it. He said he

would cut it with the reaper for so much. I told him I would take it. Says I, "I can use it for mulch, if I don't do anything else with it." My men drew it home. I should think there was about four tons of it. I stuck it in a narrow rick about six or seven feet wide right adjoining my barn. My wife knew that these cattle had died from the effects of eating it at Lake Mills. She said, "You will kill your cattle." I told her I would go slow. I took out a little fork-ful at a time, and kept trying it and feeding it, and horses and all that I fed the cane to ate it greedily, leaves, stalk, seed and all, and I was sorry when it was gone. I am going to sow some next season, for feed.

Mr. Dill — I have had a little experience in feeding cane seed. In my section of country I do not know of a single farmer that has gathered a single bushel more than he has gathered for seed, but let it lay right on the ground. I gathered mine and threshed it. I ground it to feed. I fed it to sheep, hogs, hens, and then I fed to my horses, and I had rather have it by fifteen cents a bushel, than oats to feed to horses. I feed it to my horses now in preference to oats. I think they do better on it. Their hair seems to lay smoother, and they look slicker than they do on oats. I have offered to give ten cents a bushel more for cane seed than for oats, for all they would draw to my place. I would give them ten cents more for cane seed than oats were bringing, if they would gather it and bring it out, and I would thresh it out. The threshing is a very small item. It threshes out very nice and very fast.

Mr. Hill — When I was fattening my hogs, I had fed them two baskets of corn, just husked; the ground was frozen, and the idea struck me — I had a pile of it that was drawn up and thrown into a bin, and I went and took a fork and took as much as I could carry on the fork, and threw it over, just one side of where the corn was, and every hog left the corn and went at that sorghum seed, and they ate every bit of that seed, and went to their nests and left that corn in the ear. Sorghum is also the best feed for fowls I ever fed. The only trouble is that if you feed it to them too early they get so fat they won't lay.

The following resolution was then offered: "*Resolved*, That it is the sense of this association that cane growing in Wisconsin is a

greater source of actual profit for the farmer than any other cultivated crop, considering expense, capital and labor."

Mr. Arnold — I move to amend that by adding "we guess."

Mr. Frazier — I shall not vote for the amendment. There is no guess work about it. I feel positive that the resolution ought to pass, so far as my experience goes.

Mr. Arnold — After having tried this two or three years, to then pass a resolution that it is the most profitable business that the farmers of Wisconsin can engage in, is assuming that we know as much about it as we do about the raising of tobacco, wheat, stock, hogs and everything you can name on the farm, and that it excels them all. I offer the amendment in good faith.

Mr. B. S. Hoxie — It seems to me the resolution should say, "in the opinion of the convention." We do not want to go too fast in recommending a thing and then have to take it back.

Mr. Arnold — If we say "we believe," the resolution will be in accordance with the previous resolution asking the legislature to appropriate $3,000 for experiments, but if we decide that this is the most successful business that a man can follow as at present developed, we do not need any appropriation.

Mr. J. C. Ford — I must confess that I am not posted on this. I am here to learn, and I presume nine-tenths of us are here for that purpose. It seems to me that there is a little conceit in assuming that all the agricultural knowledge in this state is gathered in this convention. We may be misleading people by taking the experimental farm as the basis of what might be carried out by every man in the state. I do not think there are men enough here to say that this business is more valuable than the tobacco business has been this last year, or than raising full-blooded Short-horn cattle to send to the Chicago market, or a dozen other industries that I might name. If I was going to express my judgment about it, I would move that this is one of the most profitable industries that can be engaged in. It seems to me that the facts which have been brought here and which will be published abroad, will be sufficient to enlighten people about going into the business, and to induce enough of them to go into this business; but for this body to set itself up as an infallible

pope and declare that this is the true doctrine, it seems to me is assuming more than we ought to, and may mislead people. It might be a positive means of loss. I think what Mr. Arnold says has a great deal of sense in connection with the action taken in asking the legislature to grant us money to make experiments.

Mr. W. J. McIntyre, Whitewater — It seems to me that the points that have been spoken about by the gentlemen who have objected to this resolution are well taken. I have raised sorghum a little, not to any great extent. Like others, I am here to learn, and I do not want to place myself on record, with the light I have got so far, as saying that this is the most profitable industry that we can engage in. I move as a substitute that we believe it will be a greater industry than any other cultivated crop.

Mr. Arnold — I withdraw my amendment and second the substitute.

Mr. Russell — I would be very careful about indorsing any resolutions of that kind, as parties outside who are contemplating engaging in business of this kind, reading the proceedings of this convention, might be misled. As the resolution in its original language might convey an impression that might not be perfectly correct, it would be better to modify the statement, perhaps, as Mr. McIntyre has suggested. It will go out as a point that is settled by this convention, that this is to be one of the greatest industries of the country. It is simply the promise of it from the experience and knowledge of it that we have obtained here to-day, and the results that have been obtained from various sources.

Mr. McIntyre offered the following as a substitute: "*Resolved*, That in the opinion of this association we believe that cane growing in this state will be one of the best paying industries, considering the amount of capital and labor employed."

Mr. Dore — I do not like the wording of that resolution. In passing it we would be assuming that we not only knew all about cane growing, but every kind of farming, and that we set up ourselves as being superior to any other body of farmers in the state. We ought to be very careful that we do not mislead peo-

ple. In the northern part of the state there are a large number of persons who are raising cranberries, and it would not be advisable perhaps for them to raise cane instead of cranberries; and so with other branches.

Mr. Harris — To get the sense of the house, I move to lay the resolution on the table.

Mr. Ford — It seems to me there is a middle ground between that of the resolution and that of the amendment that we can adopt, and that is by affirming positively, as the opinion of this convention, that this business is one of the most profitable, considering the amount of capital required, that can be entered upon. There we are not dogmatizing, and we are not taking ground that may not be, when we have had further experience, tenable.

The following resolution was here offered: "*Resolved*, That it is the sense of this convention that the growing of Amber cane in Wisconsin promises in the near future to be one of the most profitable industries, considering the amount of capital and labor invested."

The former resolution and the motion to lay on the table having been withdrawn, the above resolution was adopted.

Mr. Russell — There is one other subject, and that is in relation to burning the begasse for fuel.

Mr. Eustace — I have seen considerable begasse burnt for evaporating purposes the last season in the state of Kansas. There they have nothing else to use for that purpose except coal, and that is too expensive. In order to burn it profitably it should be drawn out in the field or yard and dried. One day's sun and air there will dry it sufficiently to burn well. They burn it just as it comes from the mill, do not cut it up at all. They do not have to chop it up. The mills do not leave it more than five or six inches long. When they get it very dry they put it up in ricks to use on rainy days. We use it mostly under boilers, for steam boilers. They lower the grates a little to make more space.

THOUGHTS ON DAIRY FARMING IN SOUTHERN WISCONSIN.

BY J. LUCHSINGER.

Many farmers of Southern Wisconsin have for a number of years back found the production of grain alone unprofitable, and in many sections almost impossible. The changed conditions in climate, deterioration of the soil, and last and greatest the competition of the new great wheat fields of the far northwest, where lands are very cheap and organized labor on a large scale reduces the cost of production to the lowest figure, have all combined to render the production of small grain alone a discouraging task, if not a ruinous failure.

Making a virtue of necessity, great numbers have long since commenced to diversify their products, carrying on what is termed mixed farming, with general good results financially.

Others, by no means few in number, have turned their attention to dairying, and those who have had the courage to persist in spite of the discouragements and failures, incident to this branch of farming as well as to others, have been liberally rewarded, beyond expectation.

Aside from the direct pecuniary benefit in dairying, there are other gains that are not often made account of because not so directly apparent. First is the improvement of the soil and the farm generally; the poor, harassed, exhausted land, after the numberless plowings and replowings, again has a chance to recruit its wasted strength; the ruinous, destructive gullies in the hillsides caused by the washing away of the soil can be gradually and surely closed and bound together with the firm, protective sod. Very many farms in the hilly portions of Wisconsin, which in a very few years would have been abandoned as worthless on account of the destructive washing away of the soil, have been by dairy farming brought to a productive and profitable condition. Lands that under the reign of grain growing were rapidly becoming worthless, and whose owners were on the verge of financial ruin, have been reclaimed, and the good, substantial improvements

that are made (and the advance in price of lands) show that genuine prosperity has followed in the wake of dairy farming, and that the owners from being habitual borrowers have become well to do, having money to pay as they go, and some to lay aside for a rainy day; — for the farmer in a hilly country the *cow path* has (strange as it may seem, but none the less true) become the highway to prosperity.

Another most valuable if not so apparent benefit derived from the practice of dairy farming, is the good effect which the proper conduct of the business has upon the formation of the character of the youth, the sons and daughters of those engaged in it. The habits so absolutely necessary in a dairy, of steady every-day application, of promptness, and of doing everything at the proper time and in the best manner, do not fail to make a good and indelible impression on the sons; so, that in their future, whatever business or profession they may engage in, the chances that they will succeed are greatly in their favor, for they have unconsciously and firmly acquired the qualities so indipensable to success, whether they become farmers, or merchants, preachers or politicians. For the girls, a dairy farm offers many opportunities for healthy, remunerative and not unpleasant labor; while on a grain farm, by the prevailing sentiment of the community, they are prohibited from engaging in most of the work of the farm, and are compelled to seek employment away from home as domestics, or at best, in what is considered the more genteel employment of school ma'am.

Although, in most instances, dairy farming is a steady, sure way out of debt, and into prosperity, for the farmer of average intelligence who has the courage and endurance to adopt it as the principal part of his business, yet it is by no means a pleasant, leisurely or sudden road to wealth. There are many disagreeable matters connected with the keeping and care of cows; many things will be often found to interfere with one's ease and convenience, and to most men (and women too) the opportunities for the exercise of patience and self-denial are urgently frequent in the exercise of the regular duties of a dairy farm; aside from these, there are frequent episodes, and at inconvenient times, to try one's patience and call for the exercise of skill and judgment.

On a dairy farm there are no idle days; let the weather or season be what it will, each day brings its regular duties which *must* be performed, and which cannot be put off with the common thought and remark that to-morrow, or next day, or next week, will do just as well, which in most cases means that it will be forgotten and not done at all. Persons who have a confirmed habit of postponing things until next time should never commence dairying; unless they determine to turn over a new leaf and rid themselves of the pernicious habit, they will find it a non-paying business, as much, if not more so, than any other branch of farming or other business they have ever been engaged in. This class of people are almost invariably found changing their mode of farming or business from one thing to another, never continuing long at anything, losing at every move, and wondering why it don't pay them as well as others; blaming luck, or circumstances, or anything, anybody, but their shiftless selves. Those lacking promptness and energy will fail more wofully in the business of dairying than in any other, for the opportunities for loss because of neglect occur daily and hourly, as do the chances for success and gain where the business is conducted in a proper manner. Shiftless, procrastinating men have a sphere somewhere where their peculiar qualities may lead them to success. But one thing is positively sure, that sphere is not dairy farming.

A paper on Needless Losses of Dairy Farming was read by Hon. Hiram Smith.

After the reading of the paper, Mr. Smith said:

The lessening of the grade, and the introduction of steel rails upon our railroads, have reduced the rates of freights in Wisconsin more than the "Potter law." The purchase of Illinois corn and Iowa bran given to milch cows will increase the margin of profits more than the addition of two cents per pound upon the product made. It has been frequently asked how much I could afford to pay for bran, or could I afford to buy bran at the prices asked? I will give the very sensible answer given by the president of our dairyman's association, Mr. Beech. When asked how

much he could afford to pay for bran, he answered he could afford to pay what it sold for, and this has been my experience.

I have endeavored to spin no theories, but the remarks I have made have been the result of the accumulation of knowledge obtained from actual experiment. I have tried both ways, and this is the result of my experience. If I have made any statements that can be further explained, I would be very glad to do so. I hold that every statement made in such a meeting as this should be sharply criticised and closely examined, or even ridiculed if you will, for ridicule is a powerful weapon, and should not be ignored. Everything that can be ridiculed ought to be ridiculed. You cannnot ridicule a reality, a raindrop or a sunbeam; it is only shams and pretenses that are susceptible of being ridiculed.

B. F. Hoxie — I suppose, in order that this paper may not mislead any one, we must take it all the way through that Mr. Smith means, in this "dairy farming," the *dairy* farm, because it is known that in a large portion of the state where farmers practice rotation of crops they do not consider fall feeding any damage to the farm, the clover field or the meadow, because that has to be turned under, and some might go out with that misapprehension; so that that part of the paper is all nonsense to talk to some Wisconsin farmers.

Mr. Ames — In regard to what Mr. Smith says about the location of this state as a dairy state for cheese and butter, I agree with him, because we can raise everything we need to feed our dairy upon. I have been east three times in five years, to Herkimer county, where my folks are dairying, and I told them this, and I think it will agree with what he says, that they have a powerful competitor in Wisconsin in dairying. And they admitted the fact, because if they can buy our grain and corn and our mill stuffs, and transport it from here in its bulky condition to Herkimer county or any part of New York, and feed it to their cows, we certainly can condense it into milk, cheese and butter, and the simple difference in the transportation of those articles will pay us most nobly. Therefore I agree with him that dairying in Wisconsin can never be overdone because we have the facilities

for it. I have acquaintances in northern Illinois who were formerly dairymen in the state of New York, and consequently they came there with all the knowledge so far as the old styles are concerned, and they have gone into the new styles, and are shipping their cheese to St. Louis, and they find a good market there summer and winter, but they devote almost their whole attention to winter dairying. I am not a dairyman, I am in the sheep business; but I think dairying can be profitably carried on in this state. Mr. Hoxie's idea in regard to pasturing, of course was confined more particularly to grazing sections. People ask me if my sheep do not destroy my pastures; I tell them it is no consequence to me if they do, they keep them clean; it prepares them for turning under. His idea in regard to pasturing meadows is what I have always heard and read; that to pasture meadow lands where they are exclusively for that purpose is wrong; I think so myself. But in regard to our dry land here, I do not think it would have that bad effect.

Mr. Hoxie — There is another question: if it is cheaper to feed the cows seven months on the cut feed than it is five months, why let them graze at all?

Mr. Hiram Smith — I stated, as you recollect, that it took a less amount to keep a cow seven months in the winter time than it did to pasture her five months in the summer, and took less land. It takes enough less to pay the excess of labor. My idea is that by an increase of ten cows on a two hundred acre farm over the old system of pasturing meadows and letting them run without ground feed, the proceeds of the ten cows will pay for all the extra hired help and a great deal more; it will almost pay the entire help. Labor can be hired to much better advantage by the year than by seasons of eight months. I hear a great deal about the trouble of men that only hire through the summer, how scarce labor is; I hear it every day where I travel; they cannot find any hired men. I do not pity them; they ought not to find them; they do not use them right. They hire a man six or eight months during the busiest part of the year, and in cold weather they dry up the cows and turn off the hired man. He cannot live there,

and he must go where he can procure work. He goes into the forest, or into the cities and gets into the shop. He feels no particular gratitude towards, and does not go back to that man in the spring, and work for him another six months; he is doing better perhaps where he is. But if he had been hired for a year, and given steady occupation, there would be no trouble anywhere in our section of country. There is no trouble in procuring all the hired help you want. I keep four hired men in the winter and five in the summer. I have not spent two hours' time in hunting for hired help in eight years. It is the way they are used that makes labor seem so scarce, because you cannot get hired help on the system of farming you are engaged in. The great trouble is in the fundamental principles that are pursued.

Mr. Ford — Have you tried ensilage as food for your cows?

Mr. Hiram Smith — I have not tried it. I have been examining that subject closely for a year or two. I visited Whitman & Burel's silo a year ago, and saw their cows that had been wintered mainly upon that product, and I know of no dairyman in Wisconsin but what would be ashamed to look at such cows. I became satisfied that it was a damage to those cows. Perhaps he had not discovered the right amount of feed to add to his ensilage, but the cows were in bad condition. I should not consider that wintering cows in that way was worth a dollar to me. I would rather pay the expense of wintering cows, and have them come out in the spring as they should, than to have them wintered for nothing as his were wintered. It may have been in the mixture of feed he had. I have had no experience in ensilage. I have been very anxious and somewhat active in making the experiment on the experimental farm here, for I consider it just as essential to prove that it is defective as it might be to prove that it is a success, but I look upon it with a little suspicion. I would advise you to wait another year before spending much money in ensilage. It is very coarse feed, and requires a good deal of oil-meal and bran; without that you cannot have good results.

Mr. Gurnee — I understand Mr. Smith to recommend winter dairying.

Mr. Hiram Smith — I do.

Mr. Gurnee — Would you recommend that for cheese making as well as for butter making, or is it better adapted to butter making? We are starting a cheese factory in our neighborhood, and if it is going to be advisable to run it in winter instead of summer, it is a fact that ought to be looked into. I would like to have some information on that subject.

Mr. Hiram Smith — In the present condition of the market and the way other people are engaged in it, if I was going to make only full cream cheese, I would make it in the summer. If I wanted to make money dairying, I would make butter and cheese both in the winter.

Mr. James M. Smith — Mr. Beech, of Whitewater, looks very wise; I think he wants to say something.

Mr. Beech — I have no particular train of thought to present to you. If any one has any questions, I will endeavor to explain.

C. L. Thompson, Marshall, Dane County — How do you keep cattle in the winter seven months as cheap as five months in the summer? And another thing: why could not a dairyman raise his own cows to keep up his stock?

Mr. Beech — In regard to the first question, I am not able to answer. We all know it takes much less land to winter a cow than it does to summer her. Mr. Smith, I think, answered the question very satisfactorily — that the extra number of cows that could be kept on the land will more than pay the cost of the labor. If a cow, as Mr. Smith claims his have, has produced him $70 to a cow, that will pay for considerable labor. An extra cow will pay the interest on $1,000 of money, or it will pay a man four months' labor, which will be more than is required to winter a cow or the labor in caring for it. You can increase the number of your cows, and a man can take care of twenty-five or thirty as well as of ten or twelve. If he is used to milking, he will milk twelve or fifteen cows without any more trouble than he will five. It may take him a little longer, but if it is his business he will do it. The greater the number of cows you can keep, the less it costs per head to take care of them.

With regard to raising cows. A man with a limited farm, if he raises ten calves this year and ten next and ten next, has got ten calves and ten yearlings and ten two-year olds, and he has no place to keep cows. I commenced dairying on the plan of buying all my cows, wintering them and milking them the next spring, and selling them off before fall. It paid me well. Mr. Smith is willing to carry his cows up to fifteen or sixteen years old.

Mr. Hiram Smith — I believe I put it eighteen.

Mr. Beech — I used to think the golden age of a cow was from eight to twelve; I will now say from five to eight. A cow that is properly fed and milked as she ought to be, exhausts her vitality much quicker than you are apt to think. I know an old man eats just as much, and won't do half as much work, as a young man. I think a cow five to eight years old is in her prime, and the more cows of that age we can have the better. After they pass that time they may give as much milk, but it lacks richness. An old cow don't assimilate her food near as well. A young cow while she is growing does not produce as much, but her milk is richer.

Mr. Adams — Mr. Smith said that in winter dairying cows should be fed not too much and not too little. I would like to know about what the daily ration for a milch cow would be.

Mr. Beech — As to the proper feed, I think from ten to twelve pounds a day of bran and corn meal, half and half, is a very fair ration. The best results I have had was from feeding half a bushel of bran a day — bran and poor shorts — what was called shorts but was actually bran; feeding it in four messes a day, without any corn meal. It was the year that the frost killed the corn in August, and I purchased four car loads of bran and shorts, about half and half, but when delivered it was coarse bran and fine bran, and that I fed during the winter to my cows, without any other feed except the frost-bitten corn cut up and shocked, and the man who bought the cows said they were fatter cows than he had ever bought of me before; and I know the results in butter were better than I have ever had with any other

feed. But still there is nothing better to make good butter than the juice of corn-meal; it makes it rich and solid, and I think the butter made upon light feed has less solidity.

Mr. A. A. Arnold — What breed of cows do you prefer?

Mr. Beech — That kind that will pay me the best; I have no hobby.

Mr. Arnold — That is rather indefinite. Is there any choice among the breeds that you would be willing to confine yourself to exclusively?

Mr. Beech — I am not able to answer that question. I have purchased most of my cows, and I have had good cows from all varieties. High-toned cows I often say imply high-toned men, and in improving our cows we often commence with the wrong animal. If you get a high-toned cow you must put her in the place of a high-toned man to have her do her best. The method I first adopted was a success at the time, in buying my cows and selling them at the end of the year. In the first eighty cows that I treated in that way they brought me $10 per head at the end of the year more than their cost. But after that cows increased in value for milk and decreased for beef, and perhaps the next eighty I ran behind as much more. I would not advise it as a rule to adopt. The rule which Mr. Smith suggests, of having a sufficient number of cows come in in the fall, so as to keep the dairy supply nearly uniform, is much better. I have attempted to do so. There has been no week for the last nine years but what I have shipped butter. I have endeavored to make about so much butter the year around; and that was the reason I first adopted the system, in order to keep up a regular supply of butter.

James W. Smith — How large is your dairy?

Mr. Beech — About thirty cows.

Mr. Hiram Smith — You took some exceptions to the age of a cow, that I said a cow was a profitable milker until eighteen. You place it at eight years old as her prime. If she is eight years old in her prime, commencing at two years old, she is six years reaching her prime. If she is eight years old in her prime, she will wane no faster than she increased from the start, which would carry her to fourteen years at least before she was any worse than

the cow you started in with. I admit that a cow eight or twelve years old is worth more than one older, but it seems a slaughterous way of dairying, and I have not got sufficiently demoralized to sell off good ten or twelve year old cows. My friend Beech has got advanced so he can do it.

Mr. Hoxie — A good many that are interested in this question of ensilage would like to know if you have practiced that, and if you have, state your views; and if you have not, give us your opinion.

Mr. Beech — The nearest approach to ensilage that I have had was the year the frost killed the corn in August. The corn was just in the milk. I cut that up and put it in shock, and as late as November I stacked it. I thought it had spoiled in March. It settled all down, and smoked somewhat as though it was spoiling. I put that down in the boxes in the yard, and they ate it with the utmost avidity, and I remarked at the time that I thought it was as good as a matured crop of corn. It approached the nearest to ensilage of anything I know. I like canned fruits in the winter, but I would not like to be kept on them entirely. I think change is good, and the more variety the better. I have no doubt ensilage has a place in the dairy system of feeding, but it will never entirely supplant green feed. We must recollect that in winter cows do not need quite as much moisture in their feed as they do in summer; evaporation is not as rapid, and we keep our cows in the stable. I do not think they need soft feed as much as they do in the summer, and I do not think it would be profitable if we could turn them out to grass in the winter; I do not think it would pay us well; therefore I would follow nature in some measure. The natural proportion is less moisture in the food. We ourselves do not use quite as soft food. I have practiced some the cutting of fodder; I think it increases its value, but whether it increases its value enough to pay for the extra labor is a question.

Mr. Kellogg — What about roots for feeding?

Mr. Beech — I have a windmill on my farm, and I can pump water with that cheaper than by hauling it in the roots.

Mr. James W. Smith — What do you consider a good average for a cow, say for five years, or for a dairy of cows, such as you have?

Mr. Beech — I am not able to answer, because I continually change my cows; but this I do claim, that any lot of good, fair average native cows, such as you gentlemen buy, if they are milked, can be made to produce three hundred pounds of butter a year per head. When they are coming in you may expect less. I think it can be done if they are properly managed, but I would not make that as a statement which I would feel bound to substantiate.

Prof. Henry — How many pounds of milk do you think a cow weighing a thousand pounds ought to produce?

Mr. Beech — I am not able to state that. There are cows that produce a large amount of milk that are worth but little for butter. There are other cows that produce but little milk that are valuable for butter. But these individual tests I have never gone into minutely, because I have no time to experiment. I am leaving that to be proved at the Experimental Farm that we are appropriating money to, at Madison, and we shall be glad at any time to receive definite information.

Mr. Ford — I would like to ask the gentleman, as well as Mr. Smith, whether he has ever used gypsum or other plasters, and if so, with what effect?

Mr. Beech — My lands are low, and most of them inclined to marshiness. I have very much doubt about the propriety of using gypsum. Mr. Smith's land is high and dry, and he might use gypsum.

Mr. Ford — I understand Mr. Smith to say that, by the winter keeping of cows, a given number of acres will keep the same number of cows for seven months that in the summer five months will keep; I understand Mr. Beech to say that it more than makes the difference of the cost of the labor. I understand both of them to agree, therefore, that it is more profitable to keep the cows up and feed them on hay or cut fodder than to pasture them, but yet I understand that both of them pasture their cows. I would like to see them get out of that.

Mr. Beech — We do not want to make all the money that is made, we are too lazy; and if we did make it we should have to support you fellows. We shall more and more grow into the habit of summer feeding our cows, whether we shall ever reach the point of keeping them in the stable exclusively. If we do, it will be when land is more valuable than it is now.

Mr. Ford — I have no doubt that what they have stated is substantially true; I have had experience to that same effect, but how far does it go? I notice that my neighbors, who feed their pasture short and put them in early in the spring, do not get anything like the amount of pasturage out of those pastures that I do by waiting until the clover or grass is up four or five inches and then turning the cattle in. I think that is a partial answer to the question why it is that hay and cut feed goes farther than pasturage. The plant gets a strength and maturity which makes a food which is out of all comparison with a young food, which is nipped when it first grows.

Mr. Hiram Smith — I think Mr. Ford has answered the question himself. The food grows more mature, and I gather my ideas from the facts in the case. I pasture one hundred acres five months, and I winter the cows on the proceeds of eighty acres or eighty-five during the winter. The idea came to me from the facts of the thing, and, come to reason upon it, I find that I am fully borne out that fodder corn will produce a good deal more feed than any two acres of grass. If you take one acre or a half an acre per cow, or even a quarter acre, of fodder corn, you offset nearly an acre of pasturage. That is where the gain comes in. The nutriment in an acre of corn is far beyond any possible nutriment derived from an acre of pasturage. We do not keep them in the stable all summer, because we consider it much healthier for cows to run at large, and those that have tried it find that it is a matter of the price of land whether they keep cows in pasture or in yards and stables, and feed them altogether in the stable. There is no doubt it is more profitable where land is worth over $50 or $60 an acre, so far as the cost of the feed is concerned; but there is a little doubt as yet whether they would remain as healthy

as to run in the pasture during the summer time. I think it is a very easy and plain question.

My custom is to give to fifty cows one hundred pounds of corn-meal and two hundred pounds of bran per day, in two feeds, which makes from six to eight pounds to each cow per day. This I know is none too much, and the next variation will be an increase. This they must have in order to produce the best results. I think it is to be impressed very forcibly upon the minds of everybody, that they must have properly cut hay. Old hay standing until July, and badly cured, perhaps, in many cases, is unfit food for a milch cow.

Mr. James M. Smith — At what time would you cut timothy?

Mr. Hiram Smith — I would not have a great deal. I think clover is more profitable. I always sow timothy, but do not rely upon it; but the timothy can be cut at any age, that is, if you have it with clover, because you must cut the clover, and the timothy, of course, is not injured. If you cut the hay early enough to secure the best results in clover the timothy will not suffer, but it must be cut in early bloom before it is all in blossom, before any of the heads begin to turn brown. Then we have the necessary ingredients from which the cow can manufacture milk. It is demanding too much of a cow to try to produce milk out of old stale hay; it don't exist in the article, and therefore in endeavoring to do so there is loss.

As to the use of gypsum or plaster, I find it a great convenience. It keeps the pastures growing. You can see it for three years upon a meadow, and I hardly know what sum to fix that would induce me to abandon sowing it every year, at least half a bushel an acre upon every bit of grass land I have. My land is what is called red clay or marl, and the subsoil is red clay.

A member — What is your method of cutting clover?

Mr. Smith — My custom is to commence cutting immediately after the dew is off: running two mowers, because in other portions of the day it is not advisable to cut; therefore the mowing is usually done in ordinary weather in the fore part of the day, and frequently stops at ten o'clock; at other times goes on until

noon. Then the tedder is run over just before noon on the earliest cut. The rake follows in the afternoon. This we call the first day's haying. In the afternoon the rake is applied, and put into rows, and the hay put into cocks. If the weather is fair the next day it is turned out and drawn in in the afternoon. If the weather is not fair it remains there one, two, three or four days. But it should require pretty good signs of fair weather to turn out a very large amount at once. Then it is turned out as soon as the dew is off, and aired, a very light tedder run over it, and then the wagon follows in half an hour after the tedder, and as I use a loader it is very quickly loaded — only requires six men to run on and load the hay. There was a merchant visited my house a year ago last summer. He was brought up a farmer; swung the scythe and the cradle, and did all the drudgery appertaining to farming thirty-five years ago, and he said that he had carried with him constantly the idea that it was very laborious business. He watched my men during the process of haying one day, and as he sat down to tea he said to me, "You have not had a man here that has worked an hour to-day; all he has done is to drive around a good team on a spring seat, and you have got in more hay than we could get in in three days." Now a loader is as much advantage to a man using a large amount of hay as the mower, and very frequently of a great deal more consequence, because if rains approach suddenly, as they often do, by running in four loads an hour it is a great advantage when the hay is in right condition to go in, instead of getting in perhaps two loads in the same time. The grain growing crops takes less than four per cent. from the soil; the rest comes from the atmosphere; and that is the theory in using gypsum, that it attracts the qualities necessary to the growth of plants from the atmosphere. Therefore I think it is a much less severe tax upon the soil to cut early, and the plant is in much healthier condition, and remains in good condition much longer. Of course the clover plant does not last a great many years. Three years I believe it is called by most. But if the meadow is never pastured there is constantly clover heads falling down out of the reach of the mower, and it re-seeds

itself. Clover meadows treated in this way reseed themselves, and remain good clover meadows that can be cut two crops a year for ten years or more.

A member — Which is the most profitable to raise and feed to dairy cows, fodder corn or clover hay?

Mr. Smith — I hardly think it worth while to make the experiment to know the exact difference. They are both very profitable.

Senator Anderson — Is an acre of fodder corn more valuable than an acre of corn matured?

Mr. Smith — Perhaps not any more valuable when you come to the question of chemical nutriment, but it assimilates better, makes better fodder, and answers the purpose. I think there is more nutriment in a matured crop, but it is a much greater tax upon the soil. You cannnot get something out of nothing, and if three tons or two tons of corn are produced from the soil, it has to come from its value, and the growing green crop takes much less.

Mr. Stickney — I would like to ask whether, beyond the grasses and clovers, there are any other farm crops that can be profitably produced as food for cows, and if so, what?

Mr. Smith — My experience has mainly been with grasses and fodder corn. It being so very satisfactory I have not felt the necessity of experimenting. Some have given their experiences in meetings of this character in regard to millet, and have told very large stories; evidently somewhat wild estimates instead of actual results. Fodder corn and clover seem to be as good as anything that I know of with any positive knowledge.

Mr. Stickney — While I accept Mr. Beech's answer to the root question, I have always been taught that roots had a value other than their simple nutriment for stock, and I am still loath to give up the idea that roots can be profitably used. I would like to ask Mr. Beech if, to a limited extent, carrots, for instance, could not be used in his manner of feeding.

Mr. Beech — I would value the roots in their place, but I would not depend upon them exclusively. I have no doubt carrots have their value, but they are raised with difficulty and require so much

labor that we sometimes fail. The cultivation of them comes at a time when we are giving our attention to general farm work, and we often neglect them. I have no doubt that a good crop can be made very profitable, but I would never abandon the use of grain to feed roots. The labor of raising and handling them takes away from their value, but they have a value I have no doubt. We used to raise largely rutabaga turnips for feed, and we valued them highly; but where we can raise corn as we can here, I hardly think it is worth while for a man to pay much attention to roots, or that it should enter very largely into his system of farming.

Mr. Stickney — I confess that in a free fight my sympathies are strongly with the weaker party. In this matter of ensilage, a great deal of discredit is being cast upon it by remarks from all sources, and perhaps wisely, to a degree. Yet there are one or two things yet in its favor. Is it not likely to be a fact that in feeding this ensilage we commit an error; that the exclusive use of ensilage is the fault? When Mr. Smith visited Mr. Mills' with me we said at once that he was committing a very great error in not feeding his stock sufficient of that. He fed that and nothing else except his meal. But he committed an error in feeding it too sparingly. His stock will come out looking like the stock spoken of, or worse, next spring. Still that should not be charged entirely to the ensilage. I have in my hand a statement from a Massachusetts party, who has fed ensilage in about equal proportions with other food; giving one feed a day of dry food, and a full allowance of meal, making perhaps half his feed of ensilage, and he is very enthusiastic over it. I would like to read for a moment his closing sentence.

Senator Anderson — I call for the reading of the whole article.

Mr. Stickney then read the following article:

"MY ENSILAGE EXPERIENCE.— On the 8th of May, 1880, I visited the silo of Dr. Bailey of Billerica. I saw then and there the condition of his cattle, sheep and swine that had been wintered mainly on ensilage, and received from the doctor such kind and intelligent answers to my queries concerning all the details of the new system of curing fodder for ensilage, that I was favorably

impressed with the new process, and at once, on returning home, commenced arrangements to plant corn for the same.

"I planted six acres with about two bushels of seed to the acre. The crop varied from eight to thirty-five tons to the acre, some of it being badly lodged.

"In August I began to dig for a silo forty feet long, sixteen feet wide and sixteen feet deep; about one-half under ground and on a side hill; a good stone wall up to the top of the ground; then a wall made of small stones and cement mortar, putting two planks up at the sides to keep it in place until it dried. Put two inches of cement mortar inside of stone wall. Cash paid for cement, $73.25; lumber, $157.55; laying stones, $47.00; mason, $95.00; carpenter, $28.20. Drawing cement from depot, lumber, stones, sand, etc., with my farm teams, also assisting the mason, carpenter and stone-layer with three farm hands, which are not reckoned in.

"The latter part of September I harvested my fodder, cutting it with a Baldwin cutter into the silo. Used a six horse power portable steam engine to run the cutter, cutting it half an inch long. Also put in some rowen, which made better ensilage than fodder corn.

"On the first day of December began to feed the ensilage to forty head of cattle, consisting of twenty milch cows, one pair of oxen, and young cattle as I raise them. Gave them two feeds a day, or two bushels to each full grown animal. Also gave one feed a day of coarse hay and one of husks; the milch cows one quart of meal and two quarts of shorts. The cows gave a good flow of milk of the best quality and flavor, a specimen of which I furnished, with some of the butter made of milk from cows fed on ensilage, to the legislative agricultural committee, by request, both of which were pronounced by them of the best quality. The cattle looked as though they were fed from a summer pasture. I fed them until the 12th of the following April, when the ensilage was used up.

"In the year 1881, I sowed about twelve acres, putting in a half bushel of Bailey's ensilage corn to the acre. I tried four rows of common western corn through the center of a field of forty rods long, treating it all alike, and saw no difference in the yield.

Planted with an Albany corn planter, rows four feet apart, kernels three inches apart in drills; manured with stable manure at the rate of ten cords to the acre, thoroughly mixed with the top of the soil. Think a half bushel of seed is plenty to an acre, the large stalks being more easily harvested, and no waste after being made into ensilage.

"Last winter, hundreds of farmers and others visited my silo. Many seemed to like the new system, and went home to plant and build and reap the profits from the same, while others feared that it would finally injure the animals that ate it. I sold hay enough to pay for the cash bills of the silo the first year. This year I have sold $500 worth and have more to sell.

"Scientists may try to explain how very little nourishment there is in ensilage, as they do to explain how little power faith in Christ has in the human heart. But so long as cattle thrive so remarkably on ensilage, and men are by faith changed from vice to virtue, science may stand and look on while experience leads the world.

"I would as soon think of engaging a passage in an old sailing vessel while a modern steamer was ready at the wharf, as to take the old way of drying everything subject to our variable climate.

"Yours for improvement,

"DANIEL STRATTON.

"HUDSON, January 1, 1882."

Mr. Kellogg — One of our best dairymen at Janesville raises seven thousand bushels of mangel wurtzels a year to feed to his dairy. He furnishes pure milk in that way, and don't have to water it.

Prof. Henry — Possibly in my remarks I have seemed to discourage the building of silos by our farmers in the state of Wisconsin. I believe that, occupying the position as I do as an experimentalist, some things that I might carelessly say would have a very bad effect. Not that I want to overestimate my work, but what I state I wish to state authoritatively, and in such a way that I need not back down from it. The reason I urge caution is this: Our statements come from eastern men who have small farms, where labor is cheap and land dear. Silos are built

mainly by men who live in the city, and have often country estates. In other cases they are built by men who sell milk to our cities, and carry on dairy operations on a different system from what our people must in the state of Wisconsin. Another reason is, that as yet we do not know the best methods of building silos. Instead of spending $500 for laying heavy walls for a silo, when by waiting a year we might find that wooden walls would do, and in many places we could plaster directly against the silo, I feel that we had better wait until we learn. Last year the yield of ensilage was put as high as seventy tons to the acre. This year these same crops went only as high as thirty-five tons. All over the country they are coming down in their estimates. A farmer might build a silo with the expectation of getting thirty-five tons and not get half that. Again, in the methods of cutting it may be possible in the future that we may get better cutters, or our good cutters may be brought to the front more than they are now. It will not pay a man now to buy a cutter until he is pretty certain of its character. Four tons of fodder going through a cutter is a pretty hard strain on the machine, and you do not want a little machine weighing one hundred and fifty pounds to stand the strain. Dr. Stevens in his "Ensilage Cutter" speaks of putting his sixteen-year-old carriage horse into a tread power, and running at a very high speed, and cutting fine ensilage. We put two heavy horses on our farm, one of them weighing, I should think, one thousand five hundred or one thousand six hundred pounds, into our tread power that we can saw wood with very nicely, and the water ran off those horses; and when we put in a lighter team that we paid $3.00 a day for with a man, they could hardly make the cutter budge when the knives got the least dull; and we finally had to change, at a cost of about $40 in our expenses, and put on a completely different power where we could work four horses, and then, when our knives got dull, as they would between morning and noon, it was all those horses wanted to do to run the cutter. As long as things are in this chaotic state we had better be careful. If men were just starting to build threshing machines to supersede the flail, and we had half a dozen machines that were doing all sorts of work, and men were con-

stantly improving on them, I would say, "Hold on, don't spend $50 or $ 600 to thresh your grain for one year," and so with silos. I would say a man who wants to build a silo will save from $200 to $300 by waiting a while, and finding how he had best make it, and also the best place to put it. It takes time and money and observation to bring all these facts together, and that is the reason I urge caution. Our experiments I hope will be more satisfactory as we continue them, and when all these facts are brought together I think will be the time. Farmers can make money now if they will cultivate their farms properly. Ensilage is not going to revolutionize the world. Money will be made by the sharp, shrewd business man in the future as in the past.

Mr. Ford — I think we are making haste quite as slowly in this business as Prof. Henry could desire. We had a lawyer come here last year and lay down the law, and we were going to make our everlasting fortune by ensilage. Now we are going to make everything on the sweets. There is a lamentable indefiniteness in this question of ensilage. In the first place, on the amount that can be produced on an acre. It ranges all the way from ten tons to seventy tons in the estimates. One farmer in New York reported that he raised seventy tons; another says the fair average will be ten or twelve tons. The experiments on the university farm, I understand, range from sixteen to twenty tons.

Prof. Henry — Forty-two thousand eight hundred pounds was the best yield.

Mr. Ford — That is one of the indefinite things that makes it so discouraging; we do not know whether it is profitable or not. Now I understand Prof. Henry, when he speaks of the average value of this ensilage, to say that one pound of timothy hay is worth from four to seven pounds of ensilage.

Prof. Henry — We are weighing twelve to fifteen animals, and weighing the food of those animals. When we are just starting it seems as I report, but I do not want to be committed on that.

Mr. Ford — I am simply speaking of the indefiniteness of our knowledge. Now if we take five pounds of ensilage as the value of one pound of timothy, then if you can raise three thousand pounds of timothy on an acre of ground, you have got to have

fifteen thousand pounds of ensilage to answer to that. Then the extra cost of raising and cutting this ensilage is to be put against the cost of making the hay. Now I do not know as we have any figures of comparison between that and clover. I suppose that Mr. Smith would say that clover is much more valuable for feeding to cows than timothy. It seems to me we are quite in the dark here.

Mr. W. B. Phillips, Lake Mills — I wish to say one word in indorsement of the remark made by Mr. Smith, that early-cut clover is very desirable as a feed. But there is one difficulty in securing good hay from early cut clover, and that is the great length of time required to dry it and get it in a condition to preserve as hay; and especially is that the case where very green clover is put in cocks. It is quite frequently the case, after we have put in the cock a crop of green clover, that it has taken a week or more to dry sufficiently to go in a barn. By the time it gets finally dry there generally comes up a rain and wets it through. Still, after all, we had rather have green cut clover that has been dried and wet than to have ripe cut clover any way. The question has often occurred to me, could we not, by the use of canvas caps, so protect those crops of green clover as to prevent that. I would be glad to hear from any gentleman that has had any experience in that.

Mr. J. M. True, Baraboo — I have been hoping that some gentleman would mention this matter of hay caps, and that the subject would receive that attention that its value demands. I have used, for the last few years, hay caps, not made of canvas, but of strong cotton cloth. "Atlantic A" sheeting is sufficiently strong, and answers every purpose that I think would be obtained from more costly canvas. This can be readily obtained two yards in width. Caps made of this material will nicely protect your hay. By experience the past season, when we were having very severe rain, was that clover hay, capped, would stand a rain that would soak a cock that was not covered completely through. I think that any man that wishes to raise clover hay, as all the best farmers must, must come to see the importance of using caps, which can be secured at a slight expense.

Mr. A. A. Arnold — I presume if I should state how I save my clover hay you would say I was an old fogy, and did not understand my business. I think that experience proves that covering cocks of clover hay is work thrown away. If clover hay is exposed to dew or rain it does not destroy the feeding qualities of the clover as much as the commencement of self-combustion or "heating." Heating the hay destroys the feeding qualities of hay more than the exposure to rain, I believe. I think Prof. Daniells corroborates the testimony of other men that have experimented, that when clover is put into cocks, the heating destroys the chemical qualities necessary to animal growth more than being exposed to moisture. Now the way I save my clover hay is, in the first place, to insure a good heavy crop and cut it down whenever it is ripe. That is what a large farmer has got to do. If he has got a small patch and lots of men he can do things nice, and he can cover it up with caps, etc.; but if he is going to have twenty or thirty acres, he would have to have a good many caps and a good many men cocking hay. If the hay is fit to put in the barn, put it in; if it is not, leave it out until it is fit. Put it in the barn as soon as it will do, and clover will do well if there is no moisture in it. If there is any moisture in it, it will spoil. The moisture that is in the clover itself will not spoil it. If you are afraid of its spoiling, put it in comparatively wet. If it smokes, it is all right. It might as well smoke there as to smoke in the cock. It will all be confined, and if it rots even on the top, it is no worse. If you want to have clover hay rot, put on two or three feet of straw, and you will find it rotted two or three feet on top, and the clover heads underneath as green as when you put them in. That is my experience. I never had any trouble with my cattle eating clover in winter, but I find it difficult to compel them to eat clover in summer. Clover is not good for cattle in the summer time, too much of it. If you have a clover pasture and a timothy pasture, they will eat the timothy right to the ground and leave the clover entirely. Confine them entirely to clover and they will not do well; they will bloat and you will have all such trouble. You have got to have something besides clover. It works well in the winter, but it is not a good

diet all the year around. I believe old pasture is the best, where you have a variety for them to feed from. I presume I shall be criticised on this, and it is open to criticism, but I do not believe it is a good plan to cock up hay.

Mr. Ames — I would like to ask these experienced gentlemen in regard to pasturing cattle on clover in the summer. There has been considerable difficulty, to my knowledge, in the last two or three years, of men losing cattle by turning them on to clover. I never had any trouble myself, but such has been the result with a good many farmers. I want to know what the opinion of Mr. Smith or Mr. Beech is.

Mr. Hiram Smith — As Mr. Arnold says, old pasture is best. Fresh red clover is not good for pasture; the flavor is not perfect, especially when in bloom; but an old pasture is the best. My practice was a few years ago to have one hundred acres of old pasture for fifty cows. I have been gradually encroaching upon that pasture by plowing up about four or six acres and sowing it to fodder corn, adding at the same time four or five cows a year. I am going to continue that until I bring up somewhere. I shall reduce my pastures and increase my fodder corn, and increase the cows until I hope to attain to keeping one hundred cows on two hundred acres of land. There is not an average of twenty-five kept now in the state.

Mr. Stickney — In feeding fodder corn, after cutting the corn is it fed directly, or is it better to pile it and let it lay a while, or something of that kind? Some recommend cutting twelve hours in advance of feeding. Is there any difference, and if so, what?

Mr. Smith — There may be a difference, but I do not know the distinction if there is any, and therefore I do not meddle with it.

Senator Anderson — There are many farmers here who are not dairymen, whose cattle have bloated on clover. I have pastured cattle on clover for the past twenty years, and I have not been troubled with bloat in cattle for the last ten years. My practice is to keep ashes and salt mixed together in a trough, where the cattle can run to it at pleasure and eat all they want. Many of my neighbors have lost a great many cattle. Two years ago, I think it was, there was a very warm, damp season, and the white clover

bloated the cattle very badly. A large number of farmers pastured young clover. My young clover in the field will be up fifteen or sixteen inches high on the stubble cut early. I do not think it is much benefit to clover to let it stand and rot down, and I turn cattle or sheep or anything on it, and I find no difficulty in cattle bloating where salt and ashes are mixed together. I recommend that to the farmers. If they have not common salt, get rock salt, and have a lump lying around conveniently. I would mix the salt and ashes, perhaps half and half, or perhaps two-thirds ashes, and keep it there all the time. Cattle will not eat too much if they have it all the time. If you give them nearly all ashes the first time they won't eat too much.

Mr. True — I wish to make a single remark in reference to the value of clover hay. If the amount of clover hay consists very much in the amount of leaf that is contained in the stock, it seems to me that hay is best that is cured without too much stirring. I am a small farmer myself, but I think if I were a much larger one I would use caps, and keep hay very much as suggested by Mr. Smith. The first day put it in cocks, and before night I would have my caps on, then I should feel very safe if it had to stay out two or three days; but if it was soaked with rain and saturated, and had to be turned and re-turned, I think it would leave it in very bad condition. I have never had any trouble in heating in cocks of clover that had been dried to the extent Mr. Smith suggests. I think they will stand any amount of time desirable, if protected from this foreign water.

Mr. Toole — When Mr. Arnold spoke against hay heating I expected to differ with him, but finally agreed, because when my hay is in I do not care how much it heats if it is well kept. I have tried a great deal to air my hay, and the more I aired it the worse it moulded. A year or two ago I was tempted by what was said to pack my hay away almost green. The result was that in the barracks it heated so that one would almost think there would be spontaneous combustion. It settled a great deal, and, although it had more air than I think was beneficial, yet the mould did not reach very far down. The hay was of a light brown color and had a curious smell, perhaps not so strong as ensilage, and

more pleasant, but still it was changed somewhat chemically. The result was that anything that eats hay at all, that could get that, would eat every stalk of it. I think though the chemical changes might cause some loss, still, when it causes the cattle to eat all of the stock with a relish, I wish to have my hay heat and settle, and be packed as tight as it can be.

Mr. Palmer — I wish to indorse what Mr. Smith said in regard to the importance of cutting hay green, and about the importance of hay being packed in the barn. I thought when Mr. Arnold commenced talking I was not going to agree with him, but I see he does not object to its heating a little in the barn. I hardly ever leave clover out more than one day. I cut it as Mr. Smith does, and usually draw it the next day. I have not a tedder but have thought of getting one. I usually commence cutting at night before the dew falls, or in the morning after the dew is off. In the afternoon, if the weather seems favorable, I hardly ever cock it up, but leave it in winrows until next day, and rake it and draw it in the barn. I do not know that I ever have a new man come to work for me but what he will say, "That hay will spoil if it is brought in." It sometimes gets pretty warm, and right on top of the hay it will be wet. The day you commence drawing it will be quite wet on the surface. I either then throw off some of the surface or put on salt. I do not believe clover is worth any more than straw, if you leave it until it is ripe. I do not believe it is worth drawing to the barn; but if you cut it early you can get two good crops, and one crop is worth three of the dead ripe ones, in my opinion.

Mr. Stickney — It is customary with many, I believe, to use salt as they pack clover in their barns, and perhaps more if it goes in green. I would like to ask the experience of anybody that has tried it and feels sure of what it will do.

Mr. Horton — This last summer I cut about twenty acres of clover, and packed it away in the barn. We cut it down and let it dry out, put a tedder over it, cocked it up, and then I would spread it out again, and it did not seem to be very dry, but it looked so rainy that by and by we went to work and drew it in the barn and put it on the barn floor. The barn is about twenty-four feet

high. We filled it clear to the top. By and by it got to heating, and on the top it got to be as wet as could be. It seemed as though there was a steamer under it that steamed the whole thing, and pretty soon it began to smell. You could smell it for half a mile. Pretty soon it got through heating. We dug down in there. For about two feet it was all burned up; just as black as charcoal. You could pick up a handful of it and squeeze it all to dust. The boys put eggs in there, and they would cook as hard as if they were boiled for an hour. We salted it, but it did not seem to make such difference. It was burned clear to the bottom.

Mr. Ford — Last summer I made about one hundred and forty tons of clover hay. About half of it was stacked out doors, and about half of it put in the barn. That that was put in the mow was put in somewhat according to Mr. Smith's plan, quite green, and that that was stacked out doors I left perhaps a week or ten days. It was a bad season to make clover hay. As far as I know, that that was put in the barn quite fresh, to-day has the color of the clover and the blossoms, and is as sweet, good hay as anybody could want, and I believe that it is the most valuable hay and the most valuable feed that can be made on the farm. When I was a new hand in the business everybody told me that the hay must stand out in cocks at least a week or ten days. That that I stacked out doors had the benefit of that and the benefit of those heavy rains. The result of it is, that that was put in the stack is not worth any more than so much straw. That that was put in the barn quite fresh I consider to be as valuable as any timothy hay. Still I am a little afraid; it looks to me like a great experiment to put green clover, with so much moisture in the mass, in the barn, and I want to ask Mr. Smith again if he feels like thoroughly recommending putting the clover in the next day after it is cut, and whether it is safe even with salting.

Mr. H. Smith — I do not think salt cuts any very important figure in preserving hay. I have tried it several times and could see no particular benefit. It would be as black with salt as without. I would not recommend a heavy crop of hay being put in the next day by any means. It would dry sufficiently in forty-eight hours, or thirty-six perhaps, but it is not safe to put it in

where the crop is large, and the stalks are large and full of juice. I have never had good results when done so; but where the clover grows very thick and in so very large stalks, and the weather is very warm and dry, I have had good success in putting it in the next afternoon. But it requires extra good weather, and the atmosphere in a condition to absorb moisture very rapidly. There is sometimes more absorption going on in two hours than there is in two days in other conditions of the atmosphere. It ought to be dry, so that you cannot wring juice out of it. But I am very much in favor of the method of capping clover hay. I think we shall have to resort to that. We must raise clover. Now the question is, how shall we make a sure thing to protect it? If caps will do it, the expense will figure but very slightly, and I think it would do it.

Senator Anderson — Is it the mammoth or medium clover you raise?

Mr. Smith — What is called the medium clover.

Mr. Ford — Suppose the mow is tight, something like a silo?

Mr. Smith — The tighter the mow the greener it can go in. That is my experience. I heard a statement made yesterday about a very intelligent man in Jefferson county, that a few years ago put five acres of wheat into a mow about twenty feet square, running four chimneys up to the upper end. There no injury occurred. The chimneys were so hot sometimes he could not bear his hand over them. They carried off all the excess of heat, and the wheat came out in fine condition. It is a new thing to me. Whether that could be applied to a hay mow would be of some consequence.

Senator Anderson — I understand that putting chimneys up through their stacks has been practiced in England for many years.

Mr. Smith — I have had the very best success in cutting corn fodder and drawing it in in about a week or ten days after it is cut. It will heat something like clover hay. I take a pole about eighteen or twenty feet long, build a platform around it and attach three or four rails at the upper end, making a chimney. You can stack fodder corn a week after it is cut, and it will keep

in very fine condition. That is the reason I am waiting about silos, because I have had such good success in stacking fodder corn early, before the rains. By this process of building a chimney, I think it is going to be as beneficial and not as much work as putting in a silo. I think it is going to be exceedingly difficult to prove that silo hay is cheaper than corn fodder properly raised.

Mr. H. W. Williams, Madison — I have used lime on clover hay, and I find it invaluable for preserving the hay. Take two quarts of slacked lime to a ton of clover. Put on some rye straw where the clover is wet. I found it kept the clover well.

VETERINARY PRACTICE AND DISEASES OF DOMESTIC ANIMALS.

BY E. W. PALMER, V. S.

For more than a hundred years, in these United States, improvements in every department of science and practice have constantly crowded upon the heels of improvement; yet the veterinary practice is little sought for, poorly represented, standing low in the minds and estimation of the people. Fortunes have been donated by individuals to colleges; legislatures vie with each other in making appropriations to universities, and congress has appropriated lands liberally for educational institutions, and untold millions more to railroads and other improvements, much of which has been misplaced, forming bulwarks and monopolies for the people to contend with; and yet we are plodding along in carelessness and ignorance, greatly in need of better facilities and better veterinary surgeons. If ignorance is bliss, and misfortunes and losses in domestic animals economy, let us accept the result, saying no more about imposition, doubting no more the ability of the thousands of good Samaritans who are sympathizing and aiding in a laudable manner, if not scientifically, the aches, pains and sufferings of inferior creatures.

The science and practice which I would advocate is as valuable, consistent to nature's animals, for the purpose of ministering to their physical wants, relieving their aches, their pains, and prolonging their lives, as that practiced on the more essential human

being. We have only to look around us to find willing minds and ready hands to minister to the wants of diseased creatures, the inferior order of creation; a work as acceptable to them, the owner, and God of nature, and honorable to manhood, as when the welfare of a person is concerned; and should we view or estimate the practice in ratio to the untold millions of domestic animals now in this country and being raised, to whose welfare it is directly connected, then this science should receive the support of every husbandman and stock-raiser in our land. Our government, legislators and educational institutions should lend a more helping hand,

> That science and knowledge, here untold,
> Might assist the farmer's fold.

The knowledge of veterinary science and practice cannot be acquired without diligent study and close application. It is only the property of the faithful student, close observer and careful practitioner. In order to obtain the necessary knowledge, skill and experience for the profession, many have had to spend the May-day of their lives, for the opportunities and facilities are not within their reach. And men will tell you, after enjoying all of the best opportunities in the land, that they are yet found wanting. Mystery after mystery, secret after secret, hid away behind the curtain of knowledge; waiting, staying, existing, till European veterinarians shall solve the problems and clear the mystery. Experiments may do in human practice (I do not know), but most certainly not in veterinary. As for myself, I will not try it except upon the most urgent request of the owner of the patient. There is no doubt in my mind but that thousands of horses and cattle are sacrificed for the want of a knowledge of anatomy, physiology and patheology as connected with the animal races, and not sufficiently applied in the practice of veterinary science.

Let us compare for a moment the superior advantages which the humane practitioner has over our farriers and doctors, both as to their scientific knowledge and the superior means at their command for assisting them in obtaining the character, location and intensity of the various complaints peculiar to the human race. The doctor, if he has been a faithful student upon his practice

and science, careful, thoughtful, and having disciplined his mind in some regular school, and in that of a well trained mind and knowledge which enables him to understand and interpret the physiological laws which preserve health and life in the constitutions of organized beings; also to comprehend the why and wherefore of diseases; to be able to institute sanitary and other regulations, and to select suitable remedies preparatory to meeting the various indications of each and every form of disease. And when a person becomes the subject of disease, and the doctor is called upon to exercise his skill, the latter receives valuable information respecting the sickness, pains and aches of the patient from the family and friends around them. Not so with us veterinarians. Our patients are deprived of the power of speech; they reveal their sickness by the membrane of the nose; move of the ear; expression of the eye; the pulse, and many other expressions too numerous too mention,— all of which must be closely scanned in making a physical exploration. The pains, the aches, the cold, the heat, their exposures and abuses, they cannot tell. We have other difficulties to encounter of no less magnitude. Our patients are often located in places uncongenial for well animals, and do not always receive that attention from their owner which the urgency of the case demands. The good nursing and kind attention which often proves of so much value in the restoration from sickness in our race, is often denied those of the inferior creatures — all tending and showing how embarrassing the condition of the veterinary surgeon, and how necessary and important it is that a practitioner of our art should be thorough, and the master of his profession. It is a fact that a large portion of farmers, stock-raisers and others do not realize that the structure of veterinary science rests on the same intelligent basis as that of human medicine and practice; but such are the facts, and we should not disregard them.

Whether we prescribe for a man, horse or any other creature, the laws of animal economy are the same; all require the same sanitary treatment, and the less medicine the better; especially in acute diseases. The propositions for restoration to health and that of the constitution, are all founded on the same intelli-

gent basis. The importance, therefore, of educating men for the profession is evident and conclusive. The necessity is further demonstrated in the almost daily experience of those of us who, as a matter of necessity, are obliged to do the best we can for the sick and diseased animals, having but little knowledge of those advantages which a thorough course of training affords; and when a ray of light does flit across our path, or some new theory opens up the way to success, we feel more than ever our want of skill and science. It is true, in many respects, that we are groveling along in the dark; our best intellect and most searching minds have hardly lent a passing thought on this subject. Why all this lethargy on the part of those that should be willing and interested?

Some of you may be content with reading Blane, Percival, White, Mayhew,' Youatt, Dadd, Navin, and other treatises on the domestic animals. All were possibly good in their day; some are now, and will be in the future; but diseases are changing according to climate, location, and the peculiar condition the animal may be in at the time of contracting disease; and I believe I may safely say, that no book, no treatise on the diseases of domestic animals, will be found sufficient to enable the would-be student to successfully enter upon the practice of veterinary surgery, or satisfy any very sanguine expectations. The young mind needs a leader, teacher, a solver of those great problems of science too deep to read out, too important to study out without practical scientific application, which time, opportunity, perseverance and convenience will only supply, except the practical field, which ought not to transpire till some training has been had and performed; for with the best of knowledge, best of care and treatment, there will be misfortunes enough to discourage a practitioner by times.

These are facts learned by some experience with the practice in many peculiar conditions and circumstances; therefore it is befitting now that we should put our shoulder to the wheel, to clear away the great amount of cloud, ignorance and superstition which has too long lingered around the stable and barnyard; bringing to the service some of the latent ills that breed disease

and destruction in the domestic animals of various kinds of the farmer and herdsman; bringing life, comfort and safety out of mystery; confidence and success out of ignorance; profit and wealth where once disorder and loss prevailed. We should build our structure of veterinary science, and the practice therewith of the diseases of the inferior order of creatures, so honorable, worthy and intelligent that any and all persons who would choose to make that their occupation, would feel that their calling was high, honored, respected; and that they occupied a place nearly if not quite equal to other professional men around them. Then and not till then will we receive the full benefits of this calling. It is pride and ambition that makes the start, that brings forth science and knowledge; it is application rich and rare, that brings us satisfaction.

There never was a period in the history of our country when the services of educated veterinary surgeons were as much needed as at the present time. For nearly forty years diseases in domestic animals have increased to an alarming extent; importation of stock from the eastern continent has been so extensive, studs and herds are so large and numerous, that we have the material in bodily form to contain an element deposited away in some obscure place in germinating conditions liable to attack our noble horse, ox, cow, sheep, hog, and all domestic animals, when the farmer, herdsman or owner is the least aware of it.

Pleuro-pneumonia in the east; Texas fever in the south; stepe, murin and blackleg in the west; in cattle, epizootic, distemper, scarlanta, contagious lung complaint in horses, goiter and foot-rot in sheep, fever and cholera in hogs,— these added to the many other climatic, acute and chronic diseases which domestic animals are liable to, make this subject of such magnitude and importance that this feeble effort will come far short of doing the subject justice.

PREDISPOSING CAUSES OF DISEASES.

To explain the cause or causes of diseases occurring among domestic animals is a great undertaking, and I shall mention but few of the most important and interesting facts connected with this subject. The causes of diseases may be very intelligently

classified under two heads, viz.: predisposing and exciting (excepting in old animals with feeble constitutions and declining life, without any other assignable cause for disease and sickness). Among horses and cattle we find ample illustrations of the hereditary tendency of internal form, disposition, habits and disease. That like produces like is as sure in faulty and bad dispositions as in smooth and beautiful forms; in diseased and debilitated as in healthy and vigorous constitutions; in gentle and kind as in fiery and bad tempers. In the horse certain sorts of limbs are notoriously predisposed to disease. Bone spavin is most usually seen where there is a disproportion in the size of the limbs above and below the hock; curb, where the hock is straight and lower limb turned front; strains, where the limbs are round and the ligaments confined at the joints; and navicular disease where the chest is narrow and the toes turned outward. Among horses so formed these diseases are quite common, and are brought on by causes which would be inadequate in more perfect conformation. Ringbone is quite often hereditary, and is generally confined to horses with too upright posterns, causing too much concussion on this part of the structure. Periodical *opathialima*, gutla-serana (or glass eye) and cataract in horses are generally hereditary and usually destroy the eye. Yet they may be brought on by some exciting cause, more likely to be found in horses with weak or deranged internal structures, appearing as acute catarrhal inflammation of the haw, sometimes called hooks, and serves as an excuse for the performance of a most barbarous operation not sanctioned by science or common sense, viz.: amputation of the haw, which only aggravates the disease and deprives the horse of a useful appendage to the organs of vision.

TREATMENT.

In the early stages of the disease, when scalding tears run copiously over the cheeks and the eyelids become swollen, is the time for treatment. Let there be no harm done; ascertain the cause, if possible, by careful examination; keep the patient in a dark, well-ventilated stable, giving light diet; bathe the eye with an infusion of poppies and hops, or a solution of sulphate

of zinc, twenty grains; sugar lead, twenty grains; loaf sugar, one dram, and rain water, one quart. If improvement does not appear soon, employ the best veterinarian in your reach, with the intention of not destroying the eye by neglect or a barbarous, inhuman treatment.

Colic often can be traced to inherent tendency, and occurs often in animals having a morbid appetite and large, roomy abdomen, giving them an ungainly appearance; yet it is also true that diseases may occur without predisposition or hereditary conformation. But predisposition exists in nearly all cases, and it only requires some knowledge of anatomy and physiology on the part of husbandmen and horse doctors to detect it

Grease, or grece-heels, is nearly always confined to plethory systems and lymphatic temperaments. The disease consists in a morbid condition of the sebaceous glands of the horse's heels and fetlocks, occurring in various degrees of intensity. This is a most loathsome disease, and is always more or less hereditary, terminating badly in many cases, proving more than a match for the best skilled veterinarian. It is usually brought on by carelessness and neglect in not keeping the horse's legs clean after having been out in wet and cold weather, or in keeping the animal in bad managed and filthy stables. Horses of weak and unsound constitutions are more prone to be attacked with contagious diseases than sound ones, and often form original diseases within themselves, such as glanders, tearcy, distemper and contagious lung complaints, sometimes spreading the disease to an alarming extent and ruinous condition before the nature of the malady is detected, or the condition of affairs determined. In fact, I think there is not an external failure of the whole conformation of the horse but what is hereditary to some extent; liable to become injured and diseased on the slightest exposure; and more obstinate in yielding to treatment when diseased than the more perfect, strong, evenly balanced structure and vigorous constitution.

These propositions may be very reasonably applied to internal structures, but not to so great an extent. The two great life-giving organs, the heart and lungs, being located in the cavity of the chest, and other organs of the vital system being directly con-

nected with them, and with a powerful covering of membrane bone, ligaments and muscle, shielding them from many of the exposures that the outward structure comes in contact with; and receiving the first and greater aids of nature given to and being in animal life, they develop and outgrow physical deformities to a greater extent; and while these vital organs are growing, expanding and developing into more perfect form, the outward structure should, in the same ratio; but many times they do not, and often deformities increase rather than diminish, and for these reasons the young and growing animal should have all the advantages that the God of Nature has given and man can provide, such as breeding, feeding, raising and caring for them in an intelligent, consistent and business like manner, so that ringbone, spavin, curb and colic, navicular grease and founder may find no place around you.

EXCITING CAUSES.

By far the best and easiest way to cure diseases is to keep the disease and animal apart, if possible; but horses and cattle and all other animals will become sick sometimes, and the owner will have recourse to medical treatment, when research will be made for an exciting cause, among which are the following: Bad management, exposure, unwholesome food, over feeding, want of exercise, giving too much and improper medicine, overtaxing the muscles, breathing impure air, and changing from one condition to another without the animal being fitted for the new position.

Disease, however, sometimes occurs when no exciting nor any other cause appears; yet with the exception of those maladies produced by miasmatic influences, it has not been discerned. Finally, we may conclude that the cause may be within the body as well as around about the animal. With these considerations there should always be the greatest research and the most careful and well timed diagnosis made that can possibly be.

WHAT ARE THE MOST COMMON DISEASES.

With my experience I would say diseases of the respiratory passages and organs; lung complaint, the most prominent on the list. There are no other diseases that can be excited in so many ways as those confined to the air passages and lungs. Our climate

has a great bearing or influence on the prime exciting cause (exposure), the weather being changeable the year round with but very few exceptions. Further, the largest portion of our domestic animals are raised and owned by farmers, who put them to the most varied uses — the horse more especially — sometimes without regard to whether the creature is constitutionally fitted or has been accustomed to the requirements. The horse must push or pull, walk or trot with a load, run or jump, stand or go, wet or dry, with some of our boys. These are some of the necessary and unnecessary exertions of the horse to fill the place of the farmer's steed. No other class of business men demand such perfect structured and strong constitutioned horses as the ordinary farmer. With all these facts in view, farmers invariably sell and dispose of their very best horses, which should not be to so great an extent.

Nearly all of the contagious diseases are directly or indirectly located upon the lungs. Let the contagion be from whatever form, or the contact from whatever nature, the lungs must suffer and the air passages become more or less diseased. Post-mortem examinations nearly always prove these facts. Many times lung diseases are partially cured, but terminate in after years in some other form of disease; onward, downward, steadily declining, until all of the vital organs and the whole system becomes one diseased mass, being a most pitiful spectacle to look upon, coming to the end of life full of contagion. This is the end of contagious lung complaint, previously spoken of in this paper, of which I will give its first symptoms. The first is a soft, loose cough, with a slight catch after the paroxysm; a clear discharge from the nose, sometimes flakey; watery eye; appetite little impaired; spirits dull, the animal becoming easily tired with any exertion, without any other very prominent symptom of a serious nature. These symptoms may vary according to the conditions and circumstances surrounding the animal during the progress or continuance of the disease.

The heart is an important organ, but has no disease directly its enemy, and never fails unless some other member fails first. It has its fuel and support from other vital members of the body; it

is controlled by the instinctive nervous will powers, and when they say "go," it moves the animal unless the load is too heavy, or some erring member fails for the want of vital power to get into condition. The heart holds the same relative position to the other organs as the engine to the railroad train, or the government to the people. It is never found wanting so long as all other organs and structures are sound, healthy and vigorous. It is often said that domestic animals die with heart disease. It may appear so, but if the true situation was known, it would be that some other organ was diseased. For instance, dropsy of the heart is a disease of, or confined to, the mucous and serous membranes surrounding the heart and lungs, caused by a failure of the secretive organs to deposit aright or carry off the fluids in a proper manner. There are many diseases shouldered on to the heart for the want of a sufficient knowledge to discern the true cause and condition of the disease. Other proofs could be brought to substantiate these views, but I must pass on to more important matter.

DENTITION AND DIET.

Farmers, stock raisers and owners of domestic animals seldom realize that they are responsible to some extent for the future life and welfare of their animals; but such is the fact. It is admitted by veterinarians and best informed persons, that all the diseases of the digestive organs are excited directly or indirectly by errors in diet; consequently the means of prevention should be known and used accordingly. No special form of subsistence should be used any great length of time, but it should be changed according to the changes of season at least. The fact is, no simple article of food or diet, let it ever be so rich in the elements of organized tissue, can long support the organs and keep them healthy. Napoleon once tried to live on beef jelly alone, and consequently came very near dying. Thousands of poor Chinamen are obliged to subsist on rice to a great extent, but an occasional dog or rat supplies the required elements necessary to prolong life. If you keep your animals long on one kind of diet they become restless and liable to gnaw mangers, posts or anything that you may hitch them to; possibly become cribbers, too.

Your animals want, as Napoleon said after his tried ordeal of beef jelly fasting, some little occasional rubbish to vitalize the stomach and bowels. The digestive organs must be made to labor hard at times, or their functions will become dormant and deteriorate. The stomach must he made to work for a living by times, for work agrees with the animal as well as man. Coarse, clean fodder stimulates the horse and develops his latent powers, invigorates the gastric secretions, and rules the active solvents of the food. Horses that become dyspeptic have generally lived too long on dainty viands, without proper care, food and exercise. Many horse-owners are constantly devising means to increase the appetite of their horses, without knowing or realizing that a small quantity well fed, well neutralized and well digested, would be sufficient. I do not advocate sudden changes in diet, with any domestic creature; commence gradually to change on to all of the various articles of food designed for animal beings. They will soon become accustomed to changes. Never over-feed because you have made a big drive or done a hard day's work. This would be combining two evils, and might prove ruinous to the horse and expensive to the owner

INFLUENZA OR CATARRHAL FEVER.

This disease is known by a regular muddle of names, some of them very unappropriate comparing them with the nature of the disease. The applied names are as follows: Scarlanta, epizootic, catarrh, pink-eye, horse ail, distemper, epidemic, fever, stiffs and Norman disease, and have been treated in as many ways. The last name has some historic comparison, as the disease had its origin probably in France over two hundred years ago; yet I would not use the name, not wishing to give an expression that would in the least become a barrier on one laurel of the Percheron Norman horse, one of the noblest draft breed standing on the American soil. This is comparatively a new disease to this section, and its nature is but little known by the masses, and not fully understood by the veterinarian. It is with some degree of embarrassment that I attempt to present any new observations of its nature and results. It has been quite prevalent for the last two years, leaving its wayside landmarks all along its course. It

is epidemic in its nature, appearing among many horses in the same locality at the same time. The symptoms are not always the same in every case, varying more than in any other disease that has come under my observation, and for this reason it has obtained its great supply of names. Its prominent features are, the horse will be found languid, with no disposition to move without urging; is very weak; generally off of his feed; sometimes breathes with difficulty; eyes bleary; sometimes swallows with great effort; feet and legs cold; pulse increased in frequency; general debility is quite prominent; and should discharge mucus from the nostrils (this is considered a favorable sign); the glands sometimes become swollen under the jaws, and should be blistered or opened as soon as pus forms. The patient should have the best of care and close attention; never allowed to get cold or wet or otherwise exposed. If the animal should appear to need treatment, the following will be found valuable in the milder form of the disease:

Hyposulphite of soda, pulverized, eight parts; saltpetre, pulverized, one part; canadencis, two parts; sulphur, one part; rosin, pulverized, two parts; oil-meal, eight parts. Mix and give in tablespoonful doses twice per day.

This disease is confined more to the full developed horse than younger ones, many times terminating badly, leaving large numbers blind in one or both eyes, or otherwise with stiff, groggy appearance, and running mucus at the nose. It has been severe on the foals of last season. I never knew so many disasters in this respect in one year before, with no better prospect next spring, unless some freak of nature terminates this malady, or some new preventive means may be devised. Over twenty cases of this disease have come under my observation in the last three months. Some have done nicely without medicine; others have recovered with little treatment. Some have been stubborn cases; one died after three days' sickness, with the best of care. Many have died without treatment, the owners not realizing that the animal was seriously ill, or that their horses were suffering with anything but the mildest form of distemper. How this disease ever crossed the briny deep, or whence it came, or where it goes, I do not know.

Having now written longer than I intended to, without any show of coming to the end of this subject, and fearing that I may be taking up time that could be better employed, I will bring this paper to a close, hoping that this feeble effort may prove a drop in the balance tending toward a better standing and a greater knowledge of the veterinary practice, and a greater work upon each and all of us to learn more and think deeper upon the welfare of the thousands of domestic animals round about us.

DISCUSSION.

Mr. Kellogg — If Mr. Palmer knows anything about hog cholera, I hope we will pitch right into him and bring him out for a few minutes. Some of my friends in the adjoining towns to where I live have lost two thousand dollars this last year by hog cholera.

Mr. Palmer — I said to Superintendent I. P. Roberts, who is now Professor of Agriculture in Cornell University, of New York, more than five years ago, that nothing but quarantine and annihilation of all the hogs with hog cholera would stop it. All you have got to do is to send to the commissioner of agriculture, and he will send you a report on the subject. The report is exhaustive, and it will tell you that there is no cure for it except that.

Senator Anderson — I have made an arrangement to have a bill drawn to-day to introduce into the legislature to-morrow, to provide a penalty for a man's importing a diseased swine into this state. There is now a penalty for importing diseased sheep or cattle, or horses, but not swine.

Mr. J. M. Smith — What are you going to do with those in the state?

Senator Anderson — Of course we cannot impose a fine on that, but it would be to every man's interest to isolate them as much as possible. The disease may be carried readily in many ways. There is no cure that I know of.

Mr. Toole — A few years ago, thinking to improve our hogs, we sent to Illinois. The result was that cholera was introduced. We lost very heavily. After experimenting with all the remedies we could, we came to the conclusion that the best we could do was to guard against it as much as possible in the future. I hope

every farmer present will feel the importance of keeping diseased hogs isolated as much as possible. I don't think it goes through the atmosphere, but you can scarcely avoid having a hog affected if he comes anywhere near where those who have been sick have been. I think that every case in our part of the country could be traced in contact in some way with where other hogs had been.

Mrs. I. Clark, of Galesville, read a paper on "The Mental Outlook of Women."

After which Hon. A. A. Arnold said: "I do not think it can be impressed upon us any too often that we desire a mental improvement in women, especially in farmers' wives. The last paper refers to their duty to mend the boys' pants and darn their stockings. I have observed that boys that went barefooted and went with ragged pants were more apt to make smart men than those that had their pants well mended and had shoes and stockings. If that be the reason, I do not know but it would be a good thing for us to encourage the ladies to neglect their children in this regard. It does not make much difference about their pants or their stockings, but they have got to have the right amount of mental culture at home, otherwise they will never make men. I believe it is proven by experience that many of our smart men had smart mothers. Then it is necessary that the mothers should be what the children should be, and we like to have ladies with us that are companionable, and none so necessary as our wives, and we ought to encourage them to keep even with us at least. The trouble is that some of them are going away ahead of us, and becoming "the best man of the two." We will have to put up with that once in a while, but we will have the satisfaction of knowing that we will have some smart children, and when we get old we live in our children. If our children are what they should be, it will be the result of our having our homes what they should be. There is a great deal of fault found because our young men desire to leave the farm. The truth is our boys are taught that their lives are only a life of drudgery; mothers say it and fathers repeat it, and everybody says it, and they become dis-

gusted with the life before they have got their education. Therefore it is unsafe to send them to school. Many farmers say if you send a boy to school you spoil him for a farmer. Education never spoiled a man for a farmer, nor for anything useful. The fact is our early education has been wrong; children are taught to dislike what we would like to have them like. We farmers should be careful how we talk to our children. I do not care whether my boy is a farmer or what he is; let him follow whatever occupation he is best suited for; but if it so happened that he must be a farmer, I would not want him unhappy all his life. Very few men have the privileges we have. Many of us are inclined to desire some other life, to get into some other position, and very many that have left the farm deplore it. We are not aware of the superlative independence of a farm life. We do not have to ask anybody any questions about how we must do this or how we must do that, or what we must do in order to be popular, nor what to do to get an office. We have an office of our own, and live on our own territory, and it is nobody's business how we conduct our affairs so long as we conduct them so as to be successful enough to keep off the county. I had a resolution prepared while the ladies were reading, that I think would embody the sentiments of this convention, and it embodies the idea I desire to advance. It is as follows: "WHEREAS, Governments are organized and maintained for the mutual protection and happiness of the governed, wherein each individual agrees to do certain things for the benefit of all, and all for the benefit of each; and WHEREAS, The germ of good government is propagated in the home; and WHEREAS, We believe the efforts put forth by the ladies in their healthful, well directed appeals to the popular mind, to correct what is bad and advance the good in our homes, are beneficial in their influences, therefore, be it *Resolved*, That this convention tender these ladies that have read papers before this convention, our sincere thanks in token of our appreciation of their efforts."

The resolution was adopted.

Prof. Henry—I was just thinking that I had a notion to give up my business and start out as a book agent. I believe I could

do great good; I honestly think so at times. I should not sell the latest written book however. I should try to see if I could not introduce into the farmers' homes of Wisconsin a magazine of some such nature as Harper's Magazine, or The Century, or Scribner's. I visit a great many farmers' homes, and I am sorry to say that I almost always leave those homes feeling that the farmer's wife and children are miserably treated in regard to reading. In the larger places we do not feel it, but off in the country where there are nothing but little railroad stations to trade at, we have no idea of the literature that goes into the farmers' homes at such places. The papers are cheap advertising papers. Farmers often try to get just as cheap a paper as possible, and the husband nearly always subscribes for the paper with total reference to his own wants. If he is a pretty good farmer, his best paper is one that gives him an idea of the crops and the markets. If he is a stock-raiser, he takes a stock journal, and feels that he is doing a good deal. If he is a dairyman, he possibly takes a dairy paper. But to find a magazine in a farmer's home you will have to pass to the twentieth house or the thirtieth or fortieth before you will come to one. The boys have few papers. They are expected to read the county weekly and some city weekly, and if those two papers are furnished, along with some agricultural paper, the father thinks he is doing pretty well. Some farmers take six or seven, but I ask you farmers that take so many, to stop and think if there is one paper that is devoted to your wife, her culture and improvement. Now I think we ought to have a revolution in this direction. I speak of those magazines simply that I may fix your minds upon something definite. My business is altogether dealing with facts. The ox is to me what he weighs and will sell for. The horse is of a certain value as to whether he has the spavin or not; and so with all my business; it is what this will yield and what that is worth, and so in my speaking I try to come right down to business, though very often I wish you would generalize from the particulars I give. Take this subject of literaature home and think of it. I think that there ought to be going into each house, at least once a year, some birthday or Christmas present in the shape of a volume of poems, or something like that,

not to lay upon the table in the best room and not be read, but to be put right where the children will get hold of it; and there is a blessing in such a poet as Longfellow, who has worked his way into the hearts of all the American people. Happily, our publishers have forced their books upon us. Do not think you are doing enough when you subscribe for the book that the book-peddler brings to your door, and gets you take by staying all night and throwing off a little on the book. We want a better class. At the American Book Exchange, of New York, you can buy some of the very best books at three and five cents apiece. I have sometimes thought of seeing if we could not introduce into our schools a system whereby every scholar before leaving the district school should have read certain books such as Pilgrim's Progress, Robinson Crusoe, Gulliver's Travels, and eight or ten other works, and ending with our better authors and poets. I think all fathers and mothers should see that their children have read such books early in life. Then there is another kind of paper that I think we should get for the boys. You will pardon me for particularizing, but sometimes that is just the thing we want. It is easy enough to shoot at the sun, but we never hit it I had rather shoot at a mark that I can hit. There is St. Nicholas, and books of that class, that for two or three or four dollars can be brought into the house. Another thing: at these conventions I nearly always find that the farmer goes, but the farmer's wife does not. The farmer usually says, "I wanted my wife to come, but we both of us could not, and she thought she had better stay at home." That is all right possibly, but now when you go home are you going to see that your wife goes to some place and spends as many dollars as you have spent here? Are you willing to do that? Are you willing to stay home next time and let your wife go? There is the place that we get ahead of the women, if we do, in mental culture. They generously think they will stay at home and see that the chores are done and that things do not go to odds and ends. Are you willing to see that your wife has a recompense for staying at home? It is a lonesome day that the woman stays at home all day, with her husband at these meetings, and then for her to have no recompense is

where the wrong comes in. I believe that in these days women should go to these conventions. Wives should go with their husbands, and the children should be brought. I find mostly gray haired men in these conventions, and every time I go into a convention I count the young men there. I may confess a little selfishness there, but I am interested in the young men in the line of education. I find very few young men. I do not know why. Possibly they are at home taking care of the cattle. I find very few women. Now I do not think we ought to be quite so selfish in this respect. When our convention have as many young men as old, as many women and girls as boys, then our conventions will be what they should be. I tell you, sometimes we think we are pretty pious, we think we are pretty good; but if you look at the selfishness that crops out in men, taking the rights away from women, you would see a wrong that reaches mountain high. Let us every time we get something that pleases us that our wives have helped us to, give them an equal chance for some benefit. Life is pretty dreary upon a farm. Haven't you looked at these farm houses as you rode by upon the cars and thought how lonesome it must be there. There is a little world shut into those four walls. I pity the woman that is shut up there. We must get away from our farms. The women must get away from our farms if we are going to keep up. City people are improving very rapidly. The better classes in the city have so many lectures, such sermons in their churches, such chances in libraries, that the people in the country cannot have. They grow fitful and fretful over their continual round of labor. Another thing: spring is about here. How many dollars are you going to spend for new varieties of oats and potatoes and beans and corn and spring wheat that will certainly fail, and how many dollars for flower seed? It is right at hand. You can decide the whole thing in a month. How many hundreds and thousands of dollars are you going to put out upon your fields, and how many dollars in the front yard? The front yards of the farmers of Wisconsin are the disgrace of the farming community. Such looking places as you see indicate that the farmer does not spend three dollars a year upon the front yard, which is generally half an acre, or not more than a quarter or an

eighth. Would it not pay to take a pencil and paper and figure the expenses for tobacco and railway expenses and other expenses for coming here and say to your wife, "you can have so much for something besides clothing." I think we should do that, and let them pay that out as they please. You could say, "you can have the labor of the hired man for three days in the month of February and six days in the month of March and nine days in the month of April; you are entitled to that much for helping to feed that man for thirty days in the month, and you can have the team a day or two, and you can boss that hired man, and see how it is yourself to be boss of the farm one or two days in the month."

Mr. Ames — It is not my fault that my wife is not here. I invited her to come and wanted her to come. I never take a journey of any importance without my wife goes with me. She has been with me three times in five years, and I saved my money instead of using it for tobacco. I say this for the ladies, so they will see I am not a filthy tobacco user. I saved my money instead of using it for tobacco for this very purpose, that as we got in better circumstances she might enjoy these privileges, and it is not my fault that she is not here. I would have been glad to have her here, and I told her I would do the best I could to make her happy if she would come, but she thought she had rather stay home with her daughter. The last speaker spoke of having the hired man work in the front yard. Why, sir, I could not get a hired man to go in my front yard. I have not a lawn mower, I use a scythe. The old man has to do it himself. The hired man would cut the tops of the grass off and leave it in a ridiculous position. For a farmer, I should not be sorry to have any of you see my front yard, though it is not fixed up; but if I live and am a farmer twenty-five years more, I will have a good farm and a nice home. I have one of the best farms in Dane county, and my wife has helped to get it. As to literature, of course we do not go in as you city people tell about, but my sons and daughters spend their time at home with a flute and organ and such books as we have. My boys do not go and climb up upon the dry goods boxes in town; they spend their time at home. My youngest boy goes to the post office for the mail and he returns

in half or three quarters of an hour. I have another son that is a farmer. There is a great deal said about boys not liking the farm. I have raised three boys. I used to talk with such men as Mr. Van Slyke and Prof. Sterling, and ask them what they thought about educating boys at the university, and they said if we wanted them professional men to send them to the university. Prof. Sterling insisted strongly on my oldest son's going through college, but they have all got a business education and they are efficient as school-teachers. My oldest son is now teaching a term of school. My youngest son will be here at some future time when he gets through school-teaching. I want him to teach school when he is young, because it is an improvement to his mind above chopping cord wood and working on the farm. I want him to improve while he is young and build himself up for future usefulness. I have another son who is farming near Brooklyn. My little boy has gone to Dakota to make his fortune. He wrote to his mother, "Mother don't be afraid of me; I will try and be a man; that is what I am trying to do," and I believe it; I have every confidence in him. I believe if we would all try to make home pleasant for the family there would be no such thing as the boys running away or wanting to go away from the farm. My boys don't want to, but they are said to be an exception, and I believe it, and I give their mother a great deal of the credit for it, too. In future conventions she will be with me if she is able to come, if I come.

Mr. Kellogg — There are many things I would like to say, but I don't know what to say; I don't like to take time, but I want to prolong this discussion. To change the subject a little, I went down stairs and brought up specimens of apples that were injured by the insect that is preying upon the apple. This is done by the curculio or the apple gouger; we are not prepared to say which, or whether it may not be both. Now the question is, how can we head off this insect that is upon our fruit. The remarks in the paper about the insects that are upon our flowers made me think of the insects that are upon our fruit, and that sent me down-stairs after these specimens.

Now, in reference to home reading, the evenings spent at home

are the most precious memories of the past two winters at our house. I have just counted up from memory twelve papers that we take. The first thing is the Youth's Companion. I have two boys and two girls, and they want the first look at it. They can tell from the pictures what the nature of each story is, and we have got to sit down and read that paper through from beginning to end. One reads for the benefit of five, and we do that in preference to letting each one take the paper by turns. If there is anybody less than a hundred years old that does not like to read the Youth's Companion, I would like to have him stand up. I never saw a boy or girl less than a hundred years old but wanted to read it. It is the best paper for the youth that there is in the United States. Four of the papers that I take are devoted to the children entirely, besides The Youth's Companion, and all the papers have children's columns in them. The paper that does not have that in is not worth taking. My wife is at home and I am glad she is. It is not hardly a safe place for a woman to be here and bang around for a week. It is difficult to find suitable boarding places for them. It is difficult to have friends enough to accommodate the wives of all the members that come up here to the conventions, and she has got the money to spend when I get back home, to go somewhere. She got that before I started. She is a little the smarter of the two. She don't need to go to conventions.

Mr. Hoxie — I am afraid that some, hearing what Prof. Henry has said, will go away with the impression that all these homes that he has told us about having seen as he passed along on the railroad were desolate homes, without books or papers. If he would go into many of those homes he would find the books and the papers and the organ and the flute; and then again, if the boys and girls in those homes wish to go out in the evening they do not expect to be met by a drunken man or a loafer or anything of that kind. Then again, if the professor will think a moment he will remember that all our presidents, with the exception of the present one, perhaps, were reared on the farm, or with farm associations. Just so with all the other smart men, as I see them before me and count them; they had their birth and educa-

tion on the farm. When our boys look upon this and see it is history, a city is not quite so attractive to them as some would lead us to understand.

Mr. Miles Norton, York, Dane County — I think I can point out German boys and girls that are brought up at home and have half the comforts that my boys have, yet they stay there until they are twenty-one. You may talk about these desolate homes, but the farmer and the laboring man make all the wealth of the nation. If the city of Madison has wealth, and the boys and girls ride in carriages and wear fine clothes, where did they get that money? Where did it come from? I say it comes from labor. Go through the country and I am willing to admit there are a good many desolate homes, but you will find a great many men that are poor, that have worked hard for a living, and are working to-day, perhaps are not able to take twelve papers, but they bring up men for all that. I think the farmer is entitled to something. He makes all the wealth. Unfortunately he is the poorer class. Why is it? There is a reason for these things. Perhaps this is not the place to discuss the reason.

Mr. Harris, Minnesota — I always feel good when I get into a company of men who respect themselves and their callings. This is my second meeting with the agriculturists of Wisconsin, and I think I have found myself in just such a company, — men that respect themselves and love and honor their callings. Such men make good citizens, and their sons will be very apt to grow up to be good citizens and intelligent, influential men. In our meetings of this kind in Minnesota we do not get an audience of ladies as you do here. We thought this year we would have it. We got two or three of the ablest ladies in the state to come and read papers, but they did not come out. I do not know whether it is the inclination of some men's boys to stay at home and others to wander away or not. I live one mile from a village where there are a great many attractions for boys, and I have always experienced a great deal of difficulty in getting my boys to go to that village after sundown. If I forgot my mail and wanted a boy to go down and get it, it was pretty hard work to get a boy to go down and get it. If he went he would be back in a

few minutes. I furnished them with amusements, and also with a good deal of substantial, and some fictitious, reading at home. We take about twelve papers, about four devoted to agriculture, one or two to politics, two or three to horticulture, one to religion, and a magazine for the girls, and a sporting paper for the boys, the American Field, and my boys prefer to stay at home and study those, with occasionally a nice book for a Christmas present, than to go to town, and they never show any inclination to smoke cigars or drink whisky or anything of the kind. I have often wondered why there are not more young men and more boys that enlist in this horticulture and agriculture. There is something wrong somewhere. I have sometimes thought that if the ladies would come out the young men would, but I think the fault lies away back of this. I think if our associations of this kind were backed up by county and town organizations doing the same work, that our boys and girls would get interested in it and would have a desire to go to these larger gatherings, and that they would improve their meetings and get up papers and take part in discussions. We would find that it would be a very easy thing to sustain state agricultural and horticultural societies. But we have no time to talk on that. I only wish to allude to the first paper and the birds. A wise providence arranged everything just about right, I think, on the earth, and man protects these things occasionally, and therefore we find that some of the animate creation become detrimental to us and require active and strong measures for their extermination. I will put in a plea for the crow and the blue-jay, because, although they have those traits which they are accused of, and the crow destroys birds' eggs and is not a pleasant singer, and is said to pull up the corn, nevertheless they are an enemy to an insect which is now preying upon the country, and which I believe, if crows had been let alone, they would have kept under. That is the larva of the May beetle, a white grub. I find that in all the states where the crow has been nearly exterminated this grub is destroying our strawberries, meadows, orchards and grain-fields, and one of the best enemies of that grub is the crow. The blue-jay has been the means of planting a great many forests since settlements commenced in Wiscon-

sin and Minnesota, and I presume he has been at that work for ages, carrying the acorn and beech nut and hickory nut, taking all those things from their native places; and that is one way forests have sprung up and spread through the country. I think he is one of the best helps in disseminating forest trees that we have; and after he has got the start made, the squirrel comes in and helps, and perhaps the mice, etc. There is another bird, which I have not heard mentioned, and that is the jaw-hawk. I have reference to the butcher bird. I find him to be one of the most useful birds to the farmer and horticulturist that we have, and yet sometimes he gets into the nest of the thrush or robin and destroys the young. He does not do it universally, but yet it is the law of nature that those things should be done to keep under even the useful birds, or they would become too numerous and prey upon us. The butcher birds destroys a great many mice. I have been in orchards where they were and I have seen mice hung upon forks of the trees; they kill so many more than they could eat. I have noticed them destroying the May beetle and the grasshopper the same way. It looks some like the blue-jay. They are noisy at the time they have young. Then is the time they are most beneficial. He is also a winter resident in this country except in very severe seasons. I am going to ask the privilege of taking these apples to Minnesota. In two weeks Mr. Riley, the entomologist of the government, will be there, and I am in hopes he will bring out some information that will be of benefit. If he should do so, he will let the people of Wisconsin, as well as Minnesota, know through the papers. I have always learned something by visiting you.

Mr. Toole — I wish to say something in regard to this matter of the protection of birds. In our locality farmers are talking quite seriously of protecting birds from their protectors. I refer to the game birds more especially. We have our game laws, which are zealously attended to by our town sportsmen, but some time in August they are out in full force, and the birds are nearly exterminated by these professed friends of theirs. It seems as though, if we are going to save the prairie chickens, we must protect them from these men who enforce the laws to protect them.

I notice that many of us are inclined to pitch into somebody, and I notice that we like to uphold the idea that we are not guilty in any respect; yet I think that in our locality, where the farmers are as intelligent as the average, that the variety of papers are not taken that should be, and I for one will honestly plead guilty in one respect. We take the Agriculturist and Prairie, and we added last the Rural, and we have the Chicago papers, and for two or three years a magazine has been talked of, but for some reason or other we could not take it. I think we will this year. Whether farmers' homes are lonely or not in the winter time depends very much upon the people. I remember two farmers' families in our neighborhood, and one of them this fall was lamenting the coming winter; she so dreaded the long, dreary winter evenings. The mother of another family, speaking about it, said it was the bright part of a farmer's life, their long winter evenings; they never were long enough. Yet in each family they take few papers. The one that finds the evenings so long I am quite positive takes no paper whatever. In the other they take a few, but music fills up the balance.

Mr. Harris — I would like to say one thing. My sons have quite a taste for the things I have. About three years ago one of my sons took it into his head that he wanted to get up a museum and cabinet, and they talked it with each other and they both agreed that they wanted to. They have made a collection of the birds of Minnesota, about two hundred mounted specimens, most of them pretty well done. They have nearly all the animals they can get hold of in the country. They have a very fine collection of insects, and the eggs of a majority of those birds also, and they are now making collections of various other things — minerals. My son paid out $30 last week for minerals from Colorado, and is picking up everything that is interesting in traveling through the country. If farmers will encourage their sons in this, if they have a taste for it, they will find it one of the best means of education. It brings them right down to where they can illustrate things, and gives them the object lessons, and the best method of education is by object lessons.

Mr. Hoxie — I wish to offer the following resolution: "*Resolved,*

That we request the legislators to so amend bill No. 243, A., to authorize the erection of a suitable building for the use of the State Historical Society and Supreme court, that provision shall be made in the proposed building to accommodate the business of the State Agricultural and Horticultural Societies; and further *Resolved*, That until such building is erected, or other suitable rooms provided, said societies be allowed the undisturbed possession of the rooms now occupied by them." It may be well to say a word in reference to the resolution, as some may not know that we have been locked out of this room, and that that book-case was torn down yesterday morning from the position it occupied between the two rooms. We do not know but next year when we come here to have our meeting we may be barred out of the building altogether, because it has been stated as a fact that there is not a single state senator this winter that represents particularly the farmers' interests, and only one of the State Board of Regents that is a farmer. We want this matter brought before the legislature, so that when we come to this building, which has its foundation upon the agricultural interest, we shall not have to knock at every door, or have to take off our hats and bow to get in.

Senator Anderson — Perhaps that resolution ought to have said, during our annual meeting, or something of that kind. That would give us the undisturbed occupation of the rooms for the year. I was very sorry to hear that one of the officers around this building said that if he had full control he would kick this meeting out of this room. If I was governor I think I would kick that man out of office pretty soon. It is well known that the farmers of the state of Wisconsin pay perhaps two-thirds of the tax of the state, yet if you ask for any appropriation you have to go and beg for the privilege of the use of the money you pay. I asked for an appropriation for this agricultural society once. I got into trouble. It was voted down in the senate by a two-thirds vote. I took the trouble to go after that body and have the vote reconsidered, and finally got it passed. One young lawyer came to me and said, "Why should your agricultural and horticultural society ask for an appropriation, any more than any other occupation or business?" Says I, "Young man, were you educated at the uni-

versity up here?" Says he, "Yes." Says I, "Who educated you?" Says he, "I educated myself." Says I, "Who paid the bill? We are paying $40,000 a year taxes to that institution, and we would like the privilege of using a little of our own money." He could not answer that argument very well. That is just about the way we are treated every time if we ask for an appropriation. They think you have no right to ask for an appropriation. They say other occupations do not ask for them. I was discussing the question with a member to-day. I said, "We, the farmers of Wisconsin, pay annually perhaps several hundreds of thousands of dollars in the shape of duties on imports, to support your manufacturers in the state of Wisconsin. Why should we not have the privilege of supporting some of our own institutions?" We not only pay duties for the support of manufactures, but we are paying, to-day, perhaps two or three dollars a thousand more for lumber than we would have to pay if it was not for the duty on lumber, forbidding Canada competing with the lumber interest in the northern part of the state. There is a good deal of opposition from the lumber regions in the northern part of the state to our appropriations. I hope the resolution will pass. I think it is about as near right as we can get, only we do not want to occupy the room the whole year. I think the state officers around here are only your hirelings. You work hard to pay them their salaries, and you pay one of these men for loafing around here more than than you pay a hired man for working hard all the year. I was on a committee a few years ago, and found thirty-eight men around this building; two carpenters, a gas-fitter, etc. There was one room where one man got $2,000 for doing nothing, and another man got $1,500 for helping him, another getting $900 for doing the work. That is the way the money is expended. If the taxpayers of Wisconsin knew how matters are run, and how their money is expended, there would be quite a change in public sentiment; they would demand a reform.

Mr. Adams—I think there is manifest propriety in complying with Senator Anderson's idea and amending the resolution as he suggests, but it seems to me there is no objection on the part of the state officers or their subordinates to the agricultural society

occupying this room. We applied to the superintendent of public property for a room in which to exhibit our fruit. He answered me very cordially and said that we should have one, and he named one of two rooms which I might select, and I did so. There are some other accommodations I wanted. I wanted to have a man occupy the room nights. He was very cordial, and it seems to me there must be some mistake. I do not know of any objection on his part to our occupying the room.

Senator Anderson — I will only state that I was so informed to-day that that was the remark made.

Mr. Hoxie — I had it from the members of the executive board. That is the reason I offered the resolution. A number of years ago, by a joint resolution of the two houses, these rooms were set apart and designated as the state agricultural rooms for the use of the State Agricultural Society; but the present summer, after the State Board of Control were assigned to this room, because they could not find any other, and Mr. Bryant, when a member of the executive board, went to consult on the matter, they wanted the other room and the vault adjoining it for the State Board of Control, and Mr. Bryant stated to Governor Smith the substance of that resolution. He said it was no law, but simply a resolution, a sort of an act of courtesy by the legislature by which the use of the room was granted. I thought if we had any rights it was time that we had those rights defined, and that, if any provision can be made in the building which is to be erected, we should have undisturbed possession. One of these doors was barricaded and nailed up, and the other door was locked; and the statement which Mr. Anderson refers to, of the superintendent of public property, that if he could have his way he would kick the whole thing out of doors, I thought he made to some others, and may be next year when we come here we will be out of doors, and so, in all respect to the august body assembled above, I have submitted this resolution, and I do not know but it might embrace more; but that is sufficient.

The resolution was then adopted.

Prof. Henry — I think that vote is correct, but let us remember one thing. When we hear that they are putting up a building

to cost a hundred or a hundred and fifty thousand dollars, let us not talk next fall about immense taxes, without putting in a qualification that some of those taxes are just. If, after this legislative session is dismissed, they seem to have spent a good deal of money, let us be careful not to talk too much about expenses. These members of the legislature are pretty much afraid of the farmers. Let us not ask them to spend money, and then when they come up on election day and want our votes, let us not criticise them for being extravagant. It is the farmers that talk about high taxes, and the legislators come here and in some way try to cut down taxes. If you say they are extravagant, mean something. Don't say "We are spending money, we are spending money; we want taxes cut down, we want taxes cut down." Don't make sweeping statements. That building will cost a large sum whether we have agricultural rooms in it or not, and probably if we do not get rooms there, we may get the rooms now occupied by the Historical Society, which I think would make pretty good rooms.

Prof. Daniells of the University of Wisconsin was then introduced and spoke as follows: I had the pleasure, gentlemen, some ten or eleven years ago, of addressing the Northwestern Dairymen's Association, at Whitewater, upon the subject of feeding stock, and from time to time I have, as many of you know, addressed the farmers' conventions in this state in regard to the same subject — economy in the use of foods. I intended to be with you last February in your meeting because I had something I wanted to say to you. I had a text obtained here in the market. I could buy at that time corn in Madison for $9 a ton and pretty fair hay for $10 a ton, that is, farmers were selling corn at $9 a ton when the market price of hay was $10 a ton. They were selling their corn and feeding hay, I presume. Marsh hay brought $8 a ton when corn was $9. It seemed to me at the time that farmers could not afford to be dealing in that way. They could not afford to be selling corn for $9 a ton when they could feed their corn and sell their hay for the same price. The value of food depends entirely upon the nourishment that animals may get

from it, the nutritive material which exists in the food which may be taken up by the animal in the manufacture of meat or other useful products. The composition of these foods of different kinds, grains, hay and coarse fodder, is a matter which is relatively easy to obtain by chemical analysis, the object of analysis being, as you doubtless all know, not the determination of the absolute amount of the different elements which are present in the food, but the determination of those organic compounds which form the valuable portion of the food; for instance, the quantity of nitrogenous matter which goes under the name of albuminoids, the quantity of fat, and the quantity of carb-hydrates, or starch and sugar, and other substances of similar composition. Now the composition of food does not always indicate its actual value. We may have foods which have very nearly the same composition, yet in which the real feeding value will differ greatly. That is, the value of food depends, not upon the amount of material of each of these different kinds, the amount of the albuminoids, or of the fat or of the starch, sugar, etc., but it depends upon the amount of these substances which are digestible, which the animal can appropriate to itself. Take for instance woody fiber, which has precisely the same composition as starch, yet is, if not absolutely innutritious, almost so, because the animal cannot digest it. So that by obtaining the amount of the albuminoids and the carb-hydrates, as starch and similar substances are called by chemists, we do not get at the real value of the food, because we do not know by such an analysis how much of that material the animal can appropriate to itself. On this account, and in order that we may know the exact value of a food, we must know how much of the food is really digestible by the animal. Now in regard to this particular question, the digestibility of the various kinds of cattle food in common use, we have no statistics which have been obtained by experiment in this country. In Germany a great quantity of valuable statistics has been accumulated through a long series of years, by the active work of many agricultural chemists in the numerous agricultural-chemistry experiment stations which they have. Allow me to call your attention for a few minutes to the amount of digestible matter in some of the more common foods used in this country, as deter-

mined by experiments performed in Germany. I will say that these results are taken from the tables of the renowned Dr. Emil Wolff, who probably has done more than any other man in this line of experimentation. He began experimenting nearly twenty-five years ago, and has continued to the present day. He is perhaps the best living authority upon this subject. The experiments from which the results given in his tables have been obtained, amount to the number of five hundred and eighty-one single experiments on the digestibility of various kinds of food, and with different kinds of domestic animals.

Prof. Daniells then exhibited the following table:

VARIETY OF FOOD.	ONE HUNDRED POUNDS CONTAIN—		ONE HUNDRED POUNDS CONTAIN OF DIGESTIBLE—			VALUE OF ONE HUNDRED POUNDS.	NUTRITIVE RATIO.
	Water.	Ash.	Albuminoids.	Carb-hydrates.	Fat.		
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*		
Hay	14.3	6.2	5.4	41.0	1.0	$0.65	1:8
Corn	14.4	1.5	8.4	60.6	4.8	1.12	1:8.6
Oats	14.3	2.7	9.0	43.3	4.7	.98	1:6.1
Bran	13.1	5.4	11.8	44.4	3.0	1.04	1:4.4
Oil cake	12.2	8.8	24.8	27.5	8.9	1.71	1:2
Green corn	82.9	1.3	.07	8.4	0.3	.10	1:13
Ensilage corn	78.6	1.7	.07	10.4	0.5	.14	1:16.6

I have given in the first column the per cent. of water that exists in the various kinds of food; in the next column the per cent. of ash. Of course the amount of water and the amount of ash, as such, amount to nothing. They do not enter into that portion of the substance which we should properly call food. They may assist digestion to some extent (especially the water), but there is some doubt whether food is any more digestible when it is moist than when it is dry; that is, I mean, whether it is moist as hay is in the form in which we usually feed it, or whether it is absolutely free from water. In the third, fourth and fifth columns I have given the per cent. of digestible substances, as shown by actual experiment: first, albuminoids; second, carb-hydrates,

which include starch, sugar and woody fibre, so far as it is digestible, and next, the percentage of digestible fat. I would say here that the function of fat, in the animal economy, is precisely the same as the other carb-hydrates, which include the starch and the sugar, but the fat, on account of its chemical composition, is supposed to be very much more valuable — two and a half times more valuable than the other carb-hydrates, although the function is the same. On this account it is usually put in a column by itself. The hay, the composition of which is here given, is what the Germans call medium hay. It has been found by comparison of many analyses, that so far as the composition is concerned, American hay is a little better than the medium hay of the Germans. In regard to its digestibility, no experiments have been made. Of medium German hay, in every one hundred pounds there are five and four-tenths pounds of albuminoids digestible, forty-one pounds of digestible carb-hydrates and one pound of digestible fat. In every one hundred pounds of corn there are eight and four-tenths pounds of nitrogenous matter (albuminoids) digestible, sixty and six-tenths of carb-hydrates and four and eight-tenths pounds of fat. You see there is more than one-half as much again of the albuminoids digestible in corn than in hay. There is nearly fifty per cent more of the carb-hydrates, and there is almost five times as much fat digestible. Dr. Wolff supposes that if the value of a pound of the carb-hydrate portion of the fodder is taken as one, the value of a pound of the fat and of the albuminoids should each be reckoned as five; that is, one pound of fat or one pound of albuminoids is worth to the animal as much as five pounds of starch or other carb-hydrates. Taking the values given by Dr. Wolff in German money and reducing them to equivalent values in our money, we find that, disregarding small fractions, one pound of digestible albuminoids and fat would each be reckoned at four and four-tenths cents, while a pound of the digestible carb-hydrates would be reckoned at about nine-tenths of a cent. These values have been obtained from the average prices at which for a series of years cattle food could be obtained in Germany. I do not suppose that they represent the actual

values of these different food ingredients here. But I have no doubt they represent the relative worth, not the absolute cost. I have taken the standard of value as it is used by Dr. Wolff and reckoned the value of these different foods, counting one pound of albuminoids worth four and four-tenths cents, one pound of fat the same, and one pound of carb-hydrates worth about nine-tenths of a cent. Taking these values and remembering that they are only relative values as compared with each other, it brings the worth of one hundred pounds of hay at sixty-five cents, one hundred pounds of corn $1.12. Now let us take oats. Of one hundred pounds of oats nine pounds of albuminoids will be digested, forty-three and three-tenths pounds of carb-hydrates and four and seven-tenths pounds of fat. The worth of that hundred pounds of oats, reckoned by the standards to which I have called your attention, would be ninety-eight cents. The bran given in the table is "fine wheat bran." Precisely what that means I cannot tell; I am not well enough acquainted with German bran. If it is finer than our ordinary bran it would be a little richer. Our fine bran is slightly richer than coarse. This bran contains eleven and eight-tenths pounds of digestible albuminoids, forty-four and four-tenths of digestible carb-hydrates, and three pounds of digestible fat, and reckoned by the standards we have taken, is worth $1.04 per hundred pounds. I have put oil cake down in the table, although it is not used very largely here in Wisconsin. It is used much more largely in the east, and still more largely in Europe. This is linseed oil-cake; that is the ground residue of the linseed after the oil is pressed out. In one hundred pounds of oil-cake there are twenty-four and eight-tenths pounds of nitrogenous material digestible, almost one-fourth of it; twenty-seven and five-tenths pounds of carb-hydrates are digestible, and eight and nine-tenths pounds of fat. This is worth, according to the standards we have adopted, $1.71 per hundred pounds. The principal foods that farmers use in this vicinity are hay, corn, oats and bran. Now the principal point to which I wish to call attention in this connection is, that farmers were selling corn for less per ton than hay was bringing, while their corn was worth $1.12 per hundred pounds, if the hay was worth sixty-five cents per hundred. Very

often also farmers sell their corn at a low price and keep their oats to feed horses, when the oats will bring a high price in the market. I confess that I would rather feed a horse on oats than corn, if I was going to drive him; but when we compare the money value of the oats when sold in the market, and the real value they possess as food with the same values of corn, we see that there is a much greater profit in selling the oats and feeding the corn. I have frequently advised farmers to do this, and I have induced one man to do it, and he has concluded he has made money by following the advice. Please remember that the values given in the table are the relative values of one hundred pounds and not of a bushel; one hundred pounds of corn are worth $1.12 by these figures, and one hundred pounds of oats are worth ninety-eight cents. Two bushels of corn is a little more than one hundred pounds. A bushel of corn would be worth at that rate sixty-two cents, and calling one hundred pounds of oats three bushels, oats would be worth about thirty-two cents a bushel; the oats are worth about a cent a pound, the corn considerably more than a cent a pound.

Let me call your attention to another point. The figures of the table do not represent the real relations in which these materials will always digest. In the nutrition of animals regard must be had not only to the starchy material which is required in the food, the substances which comes under the head of fat and carb-hydrates contained in the fourth and fifth columns of the table, but animals must have nitrogenous material as well. It has also been found, by a large number of experiments, that this nitrogenous material must bear a certain definite relation to the starchy material, if we would obtain the best results from food having a given value; and the particular relation which the albuminoids should bear to the carb-hydrates depends upon what the animal is doing. If it is an animal in store, he may have more of the starchy material, with less of the nitrogenous material. If the animal is fattening, he requires more of the nitrogenous material than he would were he a store animal. If the animal is laboring, he requires more of the nitrogenous material than if in store. If it is a cow giving milk, it requires a larger proportion of the nitroge-

nous material than if it is in store. I have put in the last column of the table what is usually called the nutritive ratio. It is simply the ratio between the digestible nitrogenous material and the digestible non-nitrogenous material of the food, and you will see that these foods differ to a considerable extent in this respect. I have used the sign of proportion to represent the ratio. "1" represents the albuminoids all the way down. For each pound of digestible albuminoids in the medium hay there are eight pounds of digestible carb-hydrates. In the corn, for every one pound of digestible albuminoids there are eight and six-tenths pounds of digestible carb-hydrates. In the oats the ratio is as one to six. You see the ratio here increases; which increases the value of the food. In the bran it is as one to four and four-tenths, and in the oil cake as one to two; one half of the digestible material is albuminoids.

The third edition of Dr. Wolff's book gives a large number of tables relating to this subject which are the result of direct experiment and which appear to me to be of the greatest value to those who are feeding stock. With oxen in store, that is oxen which are performing no work, and are not fattening, the food may be poor in albuminoids; the ratio may be as low as one to twelve. That means that in feeding, a full-grown animal that is producing neither flesh nor milk, and is being kept without losing or gaining materially, a food poorer in albuminoids than hay, and hence cheaper, may be given. It only requires a ratio of one to twelve, while in medium hay we get one to eight. One could mix in with that hay enough of straw or of some other coarse feed which was less rich in nitrogenous material than hay to reduce the nutritive ratio to one to twelve. Wool sheep require the nutritive ratio to be one to nine; horses at light work one to seven. Horses at heavy work require one to five and five-tenths, a food even richer than the oats, but not as rich as the bran in nitrogenous material. A milch cow, to give the best results, requires for one pound of albuminoids five and four-tenths pounds of carb-hydrates. It has been found by experiment that a dollar's worth of food given in these proportions will produce the best results. You will see that a milch cow requires more costly food

than an animal in store. In order that the foods given in the table may have the values there given, it is necessary that the food should have about the composition which I have given you; that is, for an ox which is in store, a full grown animal, a dollar's worth of food will produce the best results when it is given in the proportion of one pound of the nitrogenous material to twelve pounds of the carb-hydrate; not that the animal will not thrive better with a richer food than that. When the animal is fed according to these rules the value of these foods is as given in the table, otherwise the values would be less accurate.

Mr. J. M. Smith — Does that rule hold good with all breeds of cattle?

Prof. Daniells — That rule holds good with all breeds that have been experimented with. A very large number of animals have been experimented with of different breeds. The idiosyncracies of particular animals seem to affect them, but on the whole, breed does not seem to have any special effect. You could more easily lay flesh on a Short-horn, perhaps, than you could on an Ayrshire, but food having any particular nutritive ratio would affect both breeds alike. Having a little blank at the bottom of the table, I have given there the digestive ingredients in green corn as it is cut in the field, and green corn in ensilage. Green corn as cut from the field has eighty-two and nine-tenths per cent. of water, and in ensilage, which is what the Germans call "sour hay," there is seventy-eight and six-tenths per cent. There is one and three-tenths of ash in the corn, and one and seven-tenths in the ensilage. In both there is seven one-hundredths of a pound in every one hundred pounds of digestible albuminoids, eight and four-tenths carb-hydrates digestible in the corn and ten and four-tenths in the ensilage, three-tenths of fat in the corn and five-tenths in the ensilage. According to these standards green corn is worth ten cents per hundred pounds and ensilage fourteen cents. The nutritive ratio is one to thirteen in the corn and one to sixteen and six-tenths in the ensilage.

Mr. Harris — Has that corn ears on it?

Prof. Daniells — It is green fodder corn. I have taken the results of German instead of American analysis, because there are

no American analyses which give the desired information. They simply give the results of chemical analysis without giving the proportion of "digestible" ingredients, so that one cannot get from them the relative values of the different varieties of food as one can by taking these figures showing the digestibility of each. Now I feel very confident that these figures express nearly the relative value of these different kinds of food to a farmer for feeding purposes, not their value in the market. I do not suppose you are going to get sixty-five cents a hundred pounds for your hay and $1.12 for your corn. But we can learn from this table that when properly fed the *relative* value of these varieties of cattle food will be as there given.

Mr. J. M. Smith — In other words, when hay is worth $13 a ton corn is worth $22.40 a ton.

Prof. Daniells — Yes, sir.

Mr. Ford — The feeding value of hay would be about six and one-half times as much as ensilage.

Prof. Daniells — Six and a half times as much as green corn. A pound of ensilage is worth a little more than a pound of green corn. There is a loss of organic matter by fermentation in ensilage. The loss is in water partially and in the carb-hydrates most largely. It is quite possible that a portion of the carb-hydrates are converted into fat, as there seems to be so much larger a proportion of fat in the ensilage than in the corn.

Mr. Ford — So you would have to make fifteen tons of ensilage to get the value of seven tons of hay?

Prof. Daniells — Yes, in about that proportion. Now if you will allow me to call attention to another point: Dr. Wolff gives five varieties of hay, all of the same general character, except that the variety of grasses differ. The poorest variety has three and four-tenths pounds in one hundred of digestible albuminoids, while the best has nine and two-tenths pounds, almost three times as much; but the poorest variety of hay has in all seven and five-tenths pounds of albuminoids, while the best variety has thirteen and five-tenths pounds, so that not only is there more of the albuminoids in the good hay but there is a larger proportion of them digestible; so

that the difference in the value of hay is due not only to difference in the composition of the hay, but as your hay is improved in quality, it is improved in a much larger degree in the per cent. of digestible material contained in it. That is also true of all these different kinds of green food that come under the general term of hay.

Mr. Kellogg — Have you any new facts about ensilage?

Prof. Daniells — No. Ensilage is not a new thing in Germany. It has been known more or less there for about twenty years, and it is a thing which has its good side, but I think by and by farmers will go into it more carefully than they are doing at present. I have no doubt it will be a valuable addition to food. And it will bring the attention of farmers to the value of what has been known for many years as soiling stock; that is, instead of turning an animal out to gather its food, taking three or four acres to keep an animal a year, they will keep the animal confined and raise food for the animal, and they will in this way increase their capacity for feeding stock I think three to four times upon a given quantity of land. In that respect ensilage will be of great advantage.

Mr. Ford — Have you anything to show the value of the common red clover as food compared with the other hay?

Prof. Daniells — The common red clover is a richer food than hay. In Dr. Wolff's tables are given four different kinds of clover with which feeding experiments have been performed. I did not put the red clover in my table because, so far as I have seen, red clover is very little used in Wisconsin except as a manure and to bed cattle. I think I never saw more than two loads of good red clover in the Madison market. I do not mean to say there may not have been more, but I do not recollect of having seen more than two that one would buy for anything but bedding.

Mr. Ford — It is very generally used on the farms for bedding and it is fed sometimes to hogs. It is not used in towns for horses or stock, but it is on farms.

Prof. Daniells — The poorest red clover given by Dr. Wolff contains five and seven-tenths pounds of digestive albuminoids

to one hundred of clover, the best ten and seven-tenths; the mean is seven pounds. Of digestible carb-hydrates we have thirty-eight and one-tenth per cent., and of fat one and two-tenths. The relative value of common hay as compared with clover is as two hundred and ninety-two to three hundred and sixteen, but I cannot put it into figures because it is expressed here in German weights. There is not any doubt but that clover hay is much more nutritious than the other hay.

Mr. Kellogg — I think by the scientific exposition here given of the value of corn and oats that the professor does not get at the practical value as we understand it. Oats for horses in the summer are worth more than corn. We do not care anything about what the price is. The fact that bran is of a higher value in feeding than the other food somewhat astonishes me.

Prof. Daniells — Street-car and omnibus companies of large cities having several hundred horses to feed, know that at the usual prices, corn and bran are much cheaper to feed than oats. If the results of these experiments as here given are true, they seem to me to be eminently practical. If they are not practical they are valuless.

Mr. D. McDonald — When Mr. Kellogg contends that oats are better for horses in summer, I would infer that he thinks corn is better in winter. I have had occasion to use horses to the utmost that they will do, and sometimes over-do at certain seasons of the year. In winter I do not have very much for them to do. I have tried feeding corn in the winter and I have tried feeding corn in the summer. My experience is that when I feed corn in winter I regret it all summer, and when I try to feed it in summer the horses almost always fail to do my work. With oats I have succeeded well all the year round, and I feed plenty of them.

Mr. Isaac Clark, Galesville — It does not surprise me at all that your figures show that bran is worth what it is, but I am more surprised that we farmers say that we are surprised that you make it out the value it is. I have fed corn, oats and bran to my horses, and I can safely say that bran was the best thing I ever fed horses, especially in the summer season. I prefer bran to oats in warm weather, and I prefer corn in the winter season. I never

had teams do better than when I fed them with corn in the winter season.

Mr. Smith — Do you mean bran or middlings?

Mr. Clark — Simply bran. We do not expect to feed bran the same as you do corn or oats, but you give them the same value in bran as you do in oats or corn, and you will find that your teams will do better, be much more healthy, and much more satisfactory in every way. The hair will look slicker, and they will do your work upon the farm handily, and there is no danger of heating or over-feeding when they are heated up. We usually buy bran for $10 a ton. It is higher this winter; this winter they are asking $13 or $14 a ton. A peck of bran will weigh about two pounds and a half. Now if you pay a cent a pound for it, that will be two cents and a half, and you would think that quite a large feed; and yet the expense is small. When we feed a peck of oats at a cent a quart it is eight cents; so you will see the difference. A half a bushel of bran is calculated to weigh about ten pounds. A peck weighs five pounds, and at $10 a ton it would be two cents and a half for a peck of bran.

Mr. Williams — Do you suppose a horse could do hard work on bran?

Mr. Clark — As hard work as any man can do on a farm.

Mr. Williams — I have worked horses, and I have fed about a quart of wheat to a bushel of oats, and I find that I have the best horse in that way, but bran I do not think much of.

Mr. Ames — Would not one-half in oats ground and mixed with bran give more substance and strength to the horse, and would not it be appropriate? I am well aware that bran for feeding young stock or anything that is growing is not very good food.

Mr. Clark — Will you please tell us why?

Mr. Ames — I cannot do it. I feel as the rest do, that we do not get substance enough with the bran alone.

Mr. Clark — The proof of the pudding is the eating of it.

Mr. Speer — I consider that these tables are valuable, but I think there is danger of their leading farmers who have never given them any attention astray. I have raise a great many pigs in my time. I have found that corn is not a suitable food for

young pigs. I have found that it is not suitable food for calves. It is not suitable food for any of the young domestic growing animals. Pigs or calves, or colts, or any other young animals will grow much faster on oats than they will on corn. I have found that the finest bran, when it has been ground over and bolted again, has got a great deal of nourishment in it. I have found that pigs will be much more healthy upon that bran than they would be upon corn, and less subject to cholera than they are when they are fed upon too much corn. I believe our cows are subject to abortion in some instances when fed too much corn. Corn ranks high for certain purposes, but we should use other articles for a change. An animal does not desire to have corn from one end of the year to the other. For fattening animals there is nothing better; but we should change the feed often, and not neglect the oats, and we should not neglect the bran.

Prof. Daniells — Beans are considered pretty hearty food for a man, but a man would not want beans every day, the year around. On the same principle, no animal wants the same food right along. An animal wants a change of food, the same as a man does. I desire to show how well Mr. Speer has observed, in regard to feeding young pigs. Corn is not a good material. The proportion of the nitrogenous material for a growing pig should be as one of albuminoids to four parts of starchy material. Now you see corn contains more than twice as much as that. What is true of pigs is true of all growing animals; they must have more of the nitrogenous material, the muscle-forming material, it is sometimes called, which is rather a misnomer. Dr. Wolff gives the tabulated results of nearly six hundred experiments, for the purpose of showing how, at the different stages of growth and with different animals, these different ingredients of the food should be rated. Let me call your attention to another thing. There is an American work on feeding stock, written by Dr. Ormsby, who is chemist to the Connecticut Agricultural Experiment Station. It embodies, up to about two years ago, the latest investigations that have been carried on in Germany, and gives almost all of these investigations of Dr. Wolff. We know almost nothing of these things except as we have learned them from German investigations.

Any bookseller can get Dr. Ormsby's book for you for $2.00. The title is "Cattle Feeding," by H. P. Ormsby. I do not believe a man who has a horse or cow can afford to go without that book. If you have only one horse or one cow to feed, the information you will get from that book will be worth ten times the cost of it. Besides the profit, I am confident you will all take great pleasure in studying the book. Every one who has an animal to care for ought to have it. If you buy the book and come up here next year and say you have not had the worth of it, I will buy it of you, and pay you the original price of the book.

Mr. Hiram Smith — I think there is a very wild notion in regard to light bran and heavy bran. Most farmers think if a bag of bran weighs pretty heavy that it is more valuable to buy than light bran. My idea is that the lighter the bran the more worth you get for a dollar. They complain because the millers dust and sweep their bran so much, but they are doing me a service in my opinion. The more they sweep it the better I am satisfied, for the lighter a dollar's worth of bran is the more value it has.

Prof. Daniells — I am going to work just as soon as I do not have to teach a hundred students every day, and find out whether coarse bran or fine bran is the most valuable. I can give you Dr. Wolff's figures, which are four hundred and seventy-four and four hundred and seventy-five, as between the coarse and fine bran. Coarse bran he rates at one pfennig higher on a kilogramme.

Mr. Ames — To me this is the most important part of this convention, because it hits directly on raising young stock, and you hit my ideas on that in regard to feeding this light feed. My idea of taking care of my lambs latterly has been just what I saw in The Rural. I had been practicing it five or six years before I saw it there. I take my lambs off early from my ewes, because they do not amount to anything in hot weather. This year I took them off the 1st day of August. They are the best lambs I ever raised in my life. The way I commenced feeding them on the start was to take bran and oats and feed them from that time on until winter set in, and now I feed them oats and corn. They are one hundred per cent. better than the lambs I used to raise in the

ordinary way. I think it is so with all young stock — I think the light food is better than corn.

Prof. Daniells — A cow who is making a calf has to keep herself in health in a somewhat abnormal state, and besides that has to produce new material to the amount of that calf. We of course could not expect her to do that unless we gave her additional food.

Mr. Clark — In the matter of hay I am a little surprised with the remarks of the professor, and I am also surprised that in most of our markets where we take hay to sell they appreciate red clover as lightly as they seem to. I hardly know how the farmers in our section would keep up the fertility of our soil without this red clover, and I think we are situated much as they are in other sections of this Northwestern country. Still I am aware that most people have an antipathy to it in the villages and cities where they procure this red clover hay or where they buy hay of any kind.

Mr. Smith — You do not carry it to market to sell, do you?

Mr. Clark — No, but I am speaking of its value. For the feed of milch cows I think it is superior to any one kind of fodder unless it is fodder corn. In our market, where I live, they all want timothy hay. That is the poorest hay I know of to feed to any kind of stock that I feed. It is wonderful to me that men do not appreciate clover hay more in the villages. They keep cows, and certainly it is as good as anything for cows if we do not feed too much. There is danger, if the hay is not in proper condition, and the danger is that they eat too much and get the heaves. That is the only trouble. If you will only give them a certain amount, and all they should have, there is no danger about the heaves. The second crop of clover is the best feed, and you can half winter your swine, if you please, by cutting it early. The second crop of clover is very valuable to feed in conjunction with corn. I think my friend Smith will bear me out in the statement that in cities like Madison, La Crosse and Winona, where we market our hay, that they will pay no attention to clover, and pay perhaps $12 to $14 and $15 a ton for timothy hay, and it is the poorest feed I can have and draws very heavily on the soil. I think it is

more exhaustive on the soil than wheat or oats. Clear timothy hay I never raised. I never sowed but one acre, and it nearly ruined that acre. I broke it in the spring and sowed it to wheat, and it was two or three years before I got a fair crop off that piece of ground. I shall sow clover, and in that way I can keep up the fertility of the soil. Instead of depreciating in value, our farms where clover is sowed are appreciating in value yearly.

STOCK BREEDING, STOCK GROWING, FEEDING, ETC.

DISCUSSION.

Mr. Ford — I have come here to learn. I cannot enlighten this convention at all, but I am very desirous of hearing men who are practically engaged in this business speak on this subject. We in Wisconsin are a good ways behind Iowa and Illinois and Kansas, and I fear even Minnesota, in the breeding of choice kinds of stock. The broad plains of Kansas and Nebraska, Montana and Wyoming are opening a large field of demand for stock. As I have read, they are importing in Wyoming and Nebraska large numbers of thoroughbred bulls to cross upon their native stock. We are a little north of the corn belt of Illinois and Iowa, and the question I would like to hear discussed is whether we cannot breed these thoroughbreds for the western plains, as there is a very large call for cattle to supply those plains, and especially young cattle. Now, not having the blooded cattle in any large quantity, they come and take our scrubs and everything of that kind; but can we not make money breeding for the western market, to say nothing about beef, and which breeds are the most profitable in this northern climate?

Mr. James M. Smith — There is no doubt that there is a great difference in the different breeds of cattle, each breed being peculiarly adapted for some specific purpose, and no one breed being best for all purposes. If we want to go into stock-growing for beef, it is probable that our best interests would be found in growing Short-horns and Herefords, or the polled Angus, the last named being very scarce in this country, but in the last few years they

have ranked very high in Europe. At the last great International Exhibition they took the first, second and third premiums for beef purposes, the Short-horns taking the fourth as beef cattle, that exhibition being supposed to contain the best beef cattle of the world, and the best judges. But of these we have very few here, so that we should be confined to the Short-horns and the Herefords for beef purposes. I know of some gentlemen who are making money raising cattle for beef, principally grade Short-horns, in Fond du Lac county. They have been in the habit of turning them over to the butcher at two years old, having the calves come in the spring. During the hard times in the years from 1873 to 1878 they were in the habit of getting not less than four and usually five cents a pound, live weight, and making them weigh about twelve hundred pounds, live weight, thus bringing them to $55 or $60 apiece at two years of age. It was certainly a very handsome business and a very good business. Those farmers are doing well, and yet I think there is but little doubt but that the true interest of the great majority of Wisconsin people will be found to be best advanced by going into dairying; I think that has been demonstrated almost beyond the possibility of a doubt. Of course, there are exceptions to the rule, but the great dairy interests along through Northeastern Wisconsin, particularly in Sheboygan county, have been so successful as to demonstrate it beyond all peradventure. I remember when I came to Wisconsin, twenty-six or twenty-seven years ago, living close to Sheboygan county, a large portion of it was hardly considered worth ten cents a section, except for the timber that was on it. I know one man that had a section of land there and he let it go to stop paying taxes on it; he did not consider it worth anything. To-day I do not believe that land can be bought for $75 an acre. I don't know who owns it, but I know the section of country it is in, and I know it is a most beautiful dairy country.

Mr. Hiram Smith not many years since made the statement that Sheboygan county would in the near future receive $250,000 per year for its dairy products. Last year the product of Sheboygan county, in cheese alone, was $700,000, and the other interests in connection with it, butter, milk, etc., would raise the amount

to probably over $1,000,000; and this is not a single exceptional year, but has been going on steadily and increasing, until I think that there is no doubt that the farmers of Sheboygan county are the best off financially of any county in the state, and I do not know but we might say of any county in the northwest of equal age. What is true of Sheboygan county would be equally true of other counties. They have not an exceptionably good location. There are other counties just as well located. If that is so, the next question is, what is the best breed of stock for dairying? Here we have Ayrshires and we have Jerseys. Some few claim that the Short-horns are good, but I think it is generally admitted that they are not as good for dairy purposes as either Ayrshires or Jerseys. Regarding the Ayrshires, I will relate a little experiment that I made a year ago this winter. I have one Ayrshire cow that is considered a very good cow. A year ago, she and two native cows came in, early in the winter or late in the fall. One of them came in a little before the Ayrshire and the other a little after, so that they were about even. I put them into stalls in my barn and fed them just alike. The feed was measured out but not weighed. We fed as near alike as we could without weighing. They were fed the same kind of feed and fed at the same time, for about three or four months, and the butter weighed. The Ayrshire made a little more butter than both of the others, and she ate no more feed than either of the others. They were all of them well fed. I mention this to show the difference between animals in their power of assimilating food and making it into butter. She ate just half as much as the other two, and out of that made a little more butter than the other two, and kept that up for three or four months. The others were natives. One of them had a little touch of Short-horn in her, possibly a quarter, but not more than that I think. They were considered good cows. I bought them for the purpose of feeding some refuse food, roots and such things, and turn it into milk and butter.

Mr. J. S. Harris — I do not hear anybody in this state say anything about a breed of cattle they call the Holstein. I saw a

couple of heifers of that breed that were very large. Would they not be a good breed for milk and beef?

Mr. Smith — I suppose perhaps they would. They have been in the country but a short time. It seems hardly possible that they should have become sufficiently tested so as to know just what they will do. I have no fault to find with them, but I did not mention them because I knew so little about them.

Mr. Harris — It is two years since I saw those heifers. They were then about coming in. There was a record made of the milk. One of them I believe has given more pounds of milk than any other cow in the state of Minnesota. They are hoping great things from them. They have created considerable excitement, and I believe that Col. Thompson, the great dairyman over there who milks about four hundred cows, thinks they will be a fine thing to cross, and will be useful for milk, and they will be very profitable for beef. On the 29th of February there is to commence a course of lectures at the state university in Minnesota. The first week is to be devoted to stock, dairying, etc., the stock interests of the country, and our commissioner of agriculture, Mr. Loring, is to open the meeting. Those lectures are to continue through three or four weeks. The second week is to be devoted to horticulture, the third week to the grains and grasses, the fourth week to bee keeping and Amber cane and miscellaneous things. If any of the farmers of Wisconsin should have occasion to go into that country, it might pay them to vary the time a little so as to attend some of those lectures. I understand the professor at the university has secured very able men from abroad, and Prof. Riley, the entomologist, is to be there one or two days and talk about insects, injurious and beneficial, etc. If any of the farmers of this state can attend those lectures it might be very beneficial, and they might have the benefit of the reduced railroad rates which I understand they are making arrangements to have.

Mr. Ford — I would like to get the convention back to feeding for beef for a little while. I see some gentlemen here who have some acquaintance with eastern breeding. I would like to hear from them in regard to what is the best breed for beef in this

climate, and what money is to be made out of it; whether this climate is a little too cold for the Short-horn, and which is the best breed in reference to the western market.

Mr. McDonald — I can give you very little information in that direction, but I have read different accounts at different times; since George Macombie, of Aberdeen, Scotland, first exhibited polled Angus cattle in England, he invariably carried off the first prizes there on his non-horned cattle. Since that time I have been watching their record right along, and I think, as a general rule, that they carry the first prizes over Short-horns and all others, wherever they are brought by competent breeders in competition with the other breeds. There are very few of them in this country. The demand for breeding stock is so great in Scotland at the present time that it seems as though it was beyond the reach of our farmers to get hold of any of them to be enabled to profit by them here. It seems that cattle as well as other stock are sold often at fancy prices. The general farmer does not seem to find it profitable for him to venture out in that line. I know of a great many that have ventured out on high-priced animals and never got their money back. I think they might better look in the first place to getting high grades, and keep getting as high as they can afford to, and not get beyond it. We are looking, I suppose, for the kind of stock that will pay us the best. My experience has been that I can raise a three year old colt at an expense not exceeding $10 or $15 over and above what I can raise a steer of the same age for, and often when they are ready to go into market the colt will out-sell the steer about double the money. I think before a farmer runs into Short-horns, Holsteins or Jerseys, he had better look in that direction a little. I see that Prof. Henry is in the room. He might give us a little light in regard to the Holsteins. He has experimented in that direction. I have little to say on the subject at present.

Mr. Ford — As to the difference in profits between a three year old colt and a three year old steer that Mr. McDonald has spoken of, I suppose that an average price for a farmer's colt three years old might be $75. Remember I am not talking about blooded

stock. I believe that a three year old Short-horn steer, well fed, will bring $75. Won't it, General Bryant?

Gen. Bryant — Yes.

Mr. Ford — I believe there is more risk in raising a colt and more expense until you come to the last fattening, than there is in a steer.

Mr. McDonald — I hope there is no one present who will be misled by the remarks that Mr. Ford has just made. He speaks of an average selling for seventy-five dollars. I admit the point. Then he speaks of a good three year old steer, well fatted, put into the market. Let me put as good a three year old colt against his three year old steer.

Mr. Ford — I was told that Mr. Lysaght sold eighty two year old steers in Chicago last spring that averaged over one thousand and eight hundred pounds, and he got sixteen cents a pound for them. That may be a big story.

Mr. Broughton — Mr. Lysaght has now sold out his farm and sold off his stock. He wants to retire from business. He does not regard it as profitable enough to stick to.

Mr. Ford — I am told that he has made one hundred and fifty thousand dollars in that business. He is able to retire.

Mr. Broughton — He was able to retire before he began.

Mr. L. Shiveley, Evansville — Mr. Lysaght has been a very successful raiser of horses. He went to Canada and brought back some of these heavy Clyde horses. He could hardly get one to run over three years old but he would find spavin or something would ruin them, but his Short-horn steers would never be ruined. At the age of two to three years old they generally brought him from seventy-five to a hundred dollars a head, and his calves he would generally sell for fifty dollars a head, that is, bull calves that were big enough to wean. He would not sell anything for less than that. He went to Kentucky and bought a thoroughbred horse. He said he wanted to see if he could get a colt up to be a sound horse; he wanted one for driving. That was about the extent of his breeding in that direction.

I would rather raise five steers to the age of three years to keep them sound than one colt to that age. I raised a pair of three

year old grade steers myself that I sold for one hundred and fifty-six dollars last spring. They were two years old, past, coming three. I sold them the 1st of March and they would have been three years old in April. One was a half-blood and the other three-quarter-blood. The half-blood appeared to grow the best. I think the best stock for our common uses are our grade Short-horns. Some of these Holsteins will hardly give milk enough for a calf, but there are milkers among the Short-horns that will give a good quantity of milk.

Mr. Smith — Do you keep a dairy?

Mr. Shiveley — No. I send my milk to the cheese factory.

Mr. Smith — Can you tell whether the amount of feed that the grade Short-horns ate until you fatted them and turned them off would have brought you more or less money if it had been put into milk and sent to the factory?

Mr. Shiveley — I think that by careful management you can make either one win. If you manage your calves carefully after they get to be four weeks old, and get them to eating oats, you can raise a calf very successfully by a little pains. It spoils a cow, in my opinion, to let a calf suck it. I think you can raise two calves a year from a cow, and make more money than to send the milk to the factory. Turn off one when it is three months old, and put on another and turn that off, and I think you will make more money than to send to the factory. Still it spoils the cow. If you have a cow you think anything of, you do not want to use it in that way.

Mr. Ames — We want to educate farmers to think. A great deal has been said about Mr. Lysaght. I would not want to live where he has sold his Belleville place, but it is a place to make money. He has gone into all branches of business. He has not only dealt in horses and cattle, but I have known him to drive one hundred hogs to Oregon, his market place, that would weigh three hundred pounds apiece. He went in there, and the men that don't think raised all the good stock they could, but he got hold of them, and he has got hold of the corn fields too. Mr. Ford was telling about our shipping our scrub calves to Iowa. I consider it a great misfortune to this country to even ship them, but

that is the feature of our country. He says he does not think we are in the corn belt. I think we are. I think we are perhaps as successful corn raisers as any other state except Iowa.

Mr. J. M. Smith — The average yield of corn per acre is some two or three bushels larger here than it is in Illinois for a series of years.

Mr. Ames — Now we want to educate men to think. I was in a store at Oregon a few days ago. The man buys eggs and ships them, and he says, "There have been eighty cows shipped out of this place within a few days, and there have been eighty calves shipped with them; that is one hundred and sixty head, and what few are left their cream is to be brought to Madison to manufacture into butter." In the place of that, there should be a butter factory or a creamery at Oregon. We want to educate men to think. We do not want to talk particularly about Lysaght. He is rich. We want to educate the average farmer. It does me no good to have a good farm if all the farms in the neighborhood are poor. A man coming in to buy a farm does not want to settle in such a place as that. We want to educate men to plow less. Sheboygan county is the Herkimer county of the northwest. We cannot all do as they do there. Some two years ago I read that they had thirty-five cheese factories, and I suppose they have doubled it since that time. What will do for one county will not do for another. I live in Dane county, and I am proud that I live in such a rich and good county, but we want to educate men to think more and plow less.

Mr. Ford — The secretary of the society is present, and he has a great deal of experience in Short-horn and Jersey cattle. I should be pleased to hear from him.

Gen. Bryant — Mention was made of Mr. Lysaght's farm. Mr. Lysaght has been a personal friend of mine for a quarter of a century. I know it would not be proper for me to state how great his wealth is, if I knew; but I will venture this assertion, that no merchant, no lawyer, no doctor in Dane county has made as much money as Mr. Lysaght has made farming. *He* has worked. *He* has attended to his business. *He* has been a business man. He has not pursued any one particular thing, but he

has gone into all the branches of farming and attended to it, and kept his books as well and as straight as a merchant has kept his balance sheet, and he has become a very wealthy man. If he has sold his farm, he had a right to sell it, because he has arrived at the age of fifty or a little upwards, and he has got ready to go abroad and sit down and have a good time for the balance of his life if he desires, and is still happy. He has made his money by farming. He has raised cattle and horses and sheep. He has tried to raise the best. As he told me, he never permitted any corn to go away from his neighborhood if he could get hold of it. He has believed in sending things away from the farm on the hoof and in the fleece, and not in the half bushel. I think if you will look over this section you will find that the men who have steadily pursued this course have been the men that have generally become comfortably well off. Now it is not to be expected that farmers as a class should become as wealthy as bankers, but as a rule they are more fore handed, have more of the comforts of life in their old age than any other class of men.

Now I am not here to cry up one class of cattle or run down another kind. We cannot all run to one thing. We cannot all raise Clydesdale colts. If we did we would flood the market. If everybody thought as much of my wife as I do, everybody would want her. We must have different notions. We must go into all these branches. My opinion does not differ very much from Mr. McDonald's about the kind of colts he speaks of. Anybody who looks back at the years since the war will know that the men who have made money in horseflesh are the men who have bred these large colts. They will see another thing, that the men who have made money raising steers are the men who have raised graded Short-horn steers, simply because they could bring those steers at two or three years old to a great weight — sixteen hundred or two thousand pounds — and when they take them to market they not only get the difference between ten or twelve hundred and two thousand pounds in weight, but they get two or three cents a pound difference in the whole sum. That is what makes the difference. I remember that a couple of neighbors of mine sold their steers. One got three or three and a half

cents a pound for a barnyard full that weighed nine or ten hundred; the other got six and a quarter for his, because they weighed sixteen and eighteen hundred, and that is where the profit comes in in raising this large kind of steers.

If a man wants a beautiful little cow, if he is situated so that he can make butter and nothing else, then he must get a smaller grade of cattle, something that has been bred for years and years for that particular purpose. Then he must take the cattle that we speak of, and which stand now at the head in the markets of the world for making butter, that is the Jersey cattle, and those cattle have been bred on the Island of Jersey for more than a hundred years for one particular purpose, and that is to get the most cream they can from them. That is what they have bred them for. They have not permitted any other kind of cattle to be there. So in England they have been breeding Short-horns and Herefords, but it has been for another purpose; it has been for beef, because the Englishman likes beef; and as long as there is an English *nation* and an English *home*, good roast beef and good tables, and all that goes to cheer a man inside will be attended to and sought after by the English people; and that is why the products of our markets are seeking those countries, it is because *they* want what *we* raise. You have heard that there are some specialist farmers. Take for instance our friend Hiram Smith. He is a specialist. You have heard him read his papers year after year and they re number one. He has been successful in dairy farming and in nothing else in the farming line. He has been very successful, and he thinks and talks that it is all nonsense to raise sheep in this state, that we ought to raise sheep in Texas and raise cattle on the plains beyond the Mississippi — and make milk a specialty in Wisconsin. I do not believe everybody is constituted like Mr. Smith. I do not think everybody would be successful in that particular way of farming. It is my notion that the general farmer should raise everything that he can, so that if one thing fails he has got enough out of something else to pay his taxes.

Mr. Broughton — I would like to ask where Mr. Lysaght got his agricultural education.

General Bryant — Mr. Lysaght got his agricultural education right out of his own head, from his own daily experience from the time he began to farm until now. He was a better farmer last year than he was twenty-five years ago when he commenced to farm in Belleville. Any of his neighbors, and there are a great many of them here, will say he has grown a better farmer every year, and that is what we all ought to do.

Mr. Broughton — Didn't he get an education in Scotland or England in an agricultural college?

Gen. Bryant — Mr. Lysaght I suppose is a Scotch-Irishman. He is an Irishman that has got a good many of the grand old Scotch abilities for farming. But he was not such a farmer when he first began as he is now. He has grown with his years, as we all ought to. I remember that I brought to the fair here the next year after the war a Short-horn bull and a Short-horn cow. These grand men who sell these grand cattle and took our premiums at the fair a number of years, the Kisers, had not got any Short-horn cattle then, but they were men of sense. They took a look at my bull and cow, and they said, "If George Bryant, who only farms nights and Sundays, can raise such cattle as those, we who devote our whole time to farming ought to get some ourselves." They went and bought some of Brockway, and in less than two years had beat me out of sight, as far as Short-horns are concerned.

Mr. Ford — These Scotch, or Scotch-Irish, as far as farming is concerned, are a pestiferous people. They have come all through this country and somehow have got the best brains and make the most money and get rich, and I think it is against the declaration of independence. How have they done it? Gen. Bryant is a great deal more more experienced a farmer than I am, but I want to take exception to one thing that he recommends, and that is general farming. I believe that every successive year is demonstrating that specific farming is going to be the thing; that special breeding and breeding to special ends is going to be what makes the money. These Scotchmen come here, and every one of them is well acquainted with the thoroughbred stock in their own country, and they have been the means largely of bringing into this country and Canada some of the best strains of blood we

have, and they have gone on producing them, and the people have almost invariably made money out of it. There is Mr. Robinson, an old Scotchman in the northwest part of this county. He commenced with money enough to buy one forty-acre tract of land, I think it was $50, and he has been breeding cattle ever since, and to-day I suppose he is worth as much as Mr. Lysaght. The banker at Monroe, Mr. Ludlow, has made, I suppose, an independent fortune out of it. Any man that has followed any one of these specialties, I do not care whether it is breeding Short-horns, or Clydesdale horses, or going into the dairy business, if he has kept his eye on the gun all the time, as a business man must, he has succeeded. I maintain that in this northern latitude we can feed Short-horn grade cattle and sell them in Chicago and make money out of it. I think it is the most profitable business, unless it is dairying, that we have. In regard to the feeding, that is another thing. I need enlightenment on that subject. By the appearance of the men that have been in it, I am satisfied that it is one of the most profitable branches a farmer can engage in. I think a farmer wants to take his specialty and educate himself for his specialty. All the professors of agriculture point to one thing, that we must devote ourselves to specialties and the farmer must be a scientific man. There were articles read here this year and last year that would be a credit to any scientific department. Take the lecture that Prof. Daniells delivered and the lecture that Prof. Swenson delivered, and is capable of delivering in his line, which requires a special education in that department. We have got to educate ourselves in that way. There is such a competition that if we succeed in this age we have got to succeed in specialties.

Mr. Broughton — I would say also that I believe that Charles Miller, who bought Mr. Lysaght's farm, is a Scotch-Irishman, and if that breed is so successful it is very important for the young ladies and gentlemen to consider that, at a certain period of their lives, with reference to raising a fine breed of men.

Mr. Shiveley — My experience has been that a farmer should take up a branch of the business, but keep an eye on them all. You will fail some years on some things but hit some others, and

almost invariably you will hit something every year. If we all go into one branch of business and that fails, then we are done for that year, and we have got to commence anew; but if we have a little of everything we are apt to pull through.

Mr. Ford — I will qualify my statement as to the smaller class of farmers. They cannot take the risk. But I am speaking of the men that have the ambition to make fortunes for themselves.

Mr. Shiveley — I am quite favorable to raising sheep. I think we can raise sheep with our cattle, but we do not want to let them run together. We want to fence them apart. Sheep and horses, or hogs and cattle, can run together very well. But I believe in raising sheep.

Mr. Ames — Let me ask the secretary of the State Agricultural Society if they have on their list any premium for grade cattle.

Gen. Bryant — There is no premium for grade cattle.

Mr. Ames — Let me ask your reasons for it?

Gen. Bryant — I have not myself any reasons for it. The State Agricultural Society has not given a premium on grade bulls for many years, but up to two years ago they gave premiums on grade females. The reason the board chose to strike that out was because, in the Short-horn class, it was said that men brought pure Short-horns and called them grades and of course walked off with the premiums. When they struck it off one class I said, "If you do it for one kind you had better do it for all," and that is the reason, probably, it was taken off.

Mr. Ames — I move, then, that we have judges that would have an eye of discernment sufficient to discover these wrongs and frauds. It seems we are to grant premiums to Iowa men and Illinois men instead of granting premiums to Wisconsin men who take upon themselves to improve their stock. It is true we get grade cattle here just as good as any in the market for meat, perhaps better, but there is one inducement less to keep it up, because every man has a pride to come in and compete for a premium. I had a fine heifer and a yearling and a calf which my son was making arrangements to bring up here, but he wrote to Judge Bryant and found that there was no premium on them. The heifer is now owned in the town and is noted for her fine-

ness, but what inducement was there to bring her here? My son would have had a pride to have brought her, but he was shut out. You talk about farmers' sons leaving the farm. That is one cause of it, that there is nothing to encourage them in their progress. We cannot all be breeders; if we were there would be no market for our cattle; but there should be a premium on grade stock to encourage their being raised.

Mr. Ford — I would like to ask if any one can give me light on the difference between the different systems of feeding cattle to make beef. One system is feeding corn in the ear or in the shock, with hogs following them. The other system is stall feeding with ground feed and ground meal. Can any one say which is, in this climate and section, the most profitable?

Mr. Broughton — I would answer that in part by saying that Mr. Ludlow, of Green, and Mr. Chadwick, of Dane county, feed shelled corn to their cattle without any grinding, and that seems to be getting to be the practice in the vicinity by the best feeders. They feed them in open sheds.

Gen. Bryant — They feed them all the time, from the time they get them until they sell them, summer and winter. The main object with those feeders is to stuff it to them all the time, from the time they begin until they sell them.

Mr. Ford — I notice in reading the agricultural reports that in the east the feeders, who have to be a little more careful than they are here, feed ground meal almost exclusively. The theory is that by the meal the digestion is two-thirds done and that the cattle can very thoroughly appropriate everything. Our farmers have a rough way in this section, I think, of feeding in the shock and letting the hogs follow and pick up what is scattered, and pasture the steers. They say it is more profitable. The eastern farmers do not think so. Our corn at present is worth but fifty per cent. of what eastern corn is generally worth. Under the circumstances the query is, would it not be more profitable to feed meal?

Mr. Shiveley — I feed my cattle on shocked corn in place of hay. I do not feed them much hay. I let the hogs run after them, about two pigs to one steer, and hogs will do well after cattle; I believe better than with clean corn.

Mr. Ford — Have you ever tried feeding them meal?

Mr. Shiveley — Yes, I have fed them meal and tied them up. They did not do so well. I do not like the idea of tying them up. If you feed them meal they will do very well, but I do not think so well as with shelled corn.

Mr. Ames — Nothing has been said about raising calves yet. In a small farm we have only a small territory. If farmers would take their calves when they first find them, and go to feeding them and take care of them, by two years old they would be as large as farmers' three year old steers are ordinarily. Cattle are not my specialty. Sheep are my forte at present. But I have two steers feeding. Those steers have had grain ever since I could learn them to eat. It is quite a job to learn calves to eat grain, but I do it. I fed them all last summer, and they got their regular half bushel of feed every day. I get my corn and oats ground together, and then I mix bran with it half and half, and I wet it a little so that it is damp, so they will not spit it out and waste it, and I placed it all last summer in a box, and they would go up and eat it, and when I come to put them in the barn I go right on feeding them. If I sell those steers I am going to realize out of them what a farmer gets out of a three year old steer. My idea is to grind the feed. I have ground more feed than any other man in my town, unless it is Joseph Kiser. I am eleven miles from the mill. That is the greatest misfortune I have in trying to be a good farmer, but I prefer using ground feed. Most of us are small farmers. We want to educate that class of farmers to hold their stock, and not ship it off to feeders, but hold it and get what is in it. If you can get out of a two year old, by stuffing it, what you get out of a three year old, do so. Twenty-five years ago one man saw me feeding my young cattle corn, and he said to me, "Don't you make a mistake to feed those cattle when they are so young? If you begin when they are so young you will have to keep it up as long as you keep them." His ideas were Vermont notions thirty or forty years ago. In my opinion we can feed from the time we find our cattle until we get them into money, and feed profitably. In rearing colts, in my opinion, if we would feed bran and lighter feed to our breeding mares, and to our breeding sows,

and even to cows, I believe the breeding would be much better and stronger; they would enter the world in better shape; they would have more bone, and muscle, and sinew. That is what we want to start with, and then put the fat on afterwards.

Mr. Broughton — I would like to hear about this pampered stock, those that have been fed highly from the beginning, as to their breeding qualities. You buy a pampered bull and he is likely to be a failure; and just so with hogs and sheep. I have been fooled a number of times in regard to that. And whether or not, in feeding heifers highly from the beginning, whether they are not likely to abort. They may be something like the aristocracy in the old countries, infertile. You may get a good price for this pampered stock from those who buy them, and then they may be a failure with those who buy them. That is a pretty bad state of things. To be sure a big price is nice, but when you come to raise no stock it comes back on a fellow.

Mr. Ford — I would like to ask Prof. Henry whether in his experience with the Holstein they excel in any particular except in the quantity of milk.

Prof. Henry — I hate to be put on a witness stand in a case like this, because we all have our prejudices as to the varieties of cattle. A Short-horn man will look at a Holstein or a Jersey from a Short-horn standpoint. I will examine a Jersey to see how wide she is across the flank, what kind of a neck she has got, etc., while a man who believes in Jersey cattle and breeds for milk will look for signs and qualities entirely different. If you can find a man that says anything against Short-horns while talking with a Holstein man, you will tickle him every time.

Mr. Ford — I do not think we have got any specialists here whose toes would be trod upon by your giving your honest opinion.

Prof. Henry — I never saw anything as trivial as a dog fight but what every man in the crowd took sides, and I expect it will be so here to day. We have on the farm a cow which cost the regents five hundred dollars, with a calf by her side, an imported Holstein cow. The cow had sold, I believe, the last time she changed hands, for seven hundred dollars. The man who sold

her to us said he wanted to quit the business and he sold the cow and calf for five hundred dollars, and the regents traded the calf by her side for a small bull calf, with a noted Short-horn dealer, giving twenty-five dollars to boot, so that the cow and calf cost us five hundred and twenty-five dollars. The bull is a very fine specimen of the Holstein stock, and, if we can get good quality of milk from the Holstein cow, the steer will be worth considerable. They had a very careful herdsman, and in talking with this herdsman, who did the milking, he told me that the cow was not a very good cow, but I thought it was owing to some want of care perhaps in the way she milked, the boys not feeding her carefully. I came to the farm with strong prejudices in favor of the Holsteins from the fact that I had spent some time in visiting a famous herd at Syracuse, N. Y., where I saw one cow that was giving eighty pounds of milk a day. She was milked five times a day, and her best record was eighty-two pounds and twelve ounces in some twenty-four hours, being milked five times a day. They had to milk her five times a day, because the milk would run from the udder if they milked her only three. They claimed they were not feeding over heavy. Our cow was put to the test. The test is given in the regents' report, but I will read you some of the statements. There is not anything easier for farmers to make mistakes about than the quantity of milk a cow gives. Our estimates about milk are of the wildest character. A man will milk a cow under the best circumstances, and he will estimate that the cow in eleven months will give so much milk, and will make the statement public. The fact is, very few scales are put upon our farms and they are not always used after they are put there. We set this milk in a Cooley creamer. When we try an experiment on the farm we try to carry it through. Every day on the farm there are twelve or fifteen animals going on the scales, and the food is being weighed there every day in such a way that we can calculate on its correctness every time. The chemist analyzed the milk of the Holstein cow. Her solids are low, which indicates that she is not a good cow for this purpose. Her fat is less than three pounds in one hundred pounds of milk. She was fed a mixture of ground corn and oats or ground corn and barley, ten

pounds a day of that, together with such pasture as she could pick up on the University farm, which is not good feeding ground, the high ground being shaded with trees and the low ground being marshy. On June 20th, she gave twenty-four pounds and two ounces in the morning, and twenty-one pounds and four ounces at night, and on seven milkings, added up, she gave one hundred and fifty four pounds and nine ounces of milk. That milk was set in a Cooley creamer, the temperature being kept at forty-five degrees, care being taken to secure all the cream from the top by allowing part of the skim-milk to go into the cream, and the cream all taken off between one milking and another. The butter was salted one ounce to the pound, when ready for market. From that one hundred and fifty-four pounds and nine ounces of milk we churned three pounds and four ounces of butter. Four tests were made. General Bryant had been bragging, through the papers, about his Jersey cow, to use the strongest terms; that is, he had been making public statements. I suggested that we take the cow to the farm and see what we could do. So he let his cow go down, with a calf by her side to keep her company, and her milk was put to exactly the same tests. She was fed through the twelve days' trial one hundred and twenty-three and one-half pounds of corn meal, in addition to the pasture, that is, a little over ten pounds a day. We analyzed the milk and found that the solids in this case were 13.60 per cent., while with the Holstein it was 11.22. With the Holstein the fat was 2.8 in one hundred pounds, while with the Jersey the fat was 4.8 nearly. In the case of the last cow, for fear our butter might have more water in it, and finding something curious about the butter, we analyzed the butter, and the analysis is given here (in the Report of the Board of Regents), if any one cares to read it. The first test was made August 15th, when the flies were very bad and the cow very nervous. The test with the Holstein cow began on the twentieth of June. The test with the Jersey began when the pasture was shorter on account of the drouth. I tried to keep the cow in the barn and bring her feed before the test begun. It took two weeks to get ready for the test, and the flies were very troublesome, so I concluded it was better for her to

run in the pasture. She seemed to do better and give rather more milk. She gave in the morning of August 15th, fourteen pounds and six ounces, and in the evening thirteen pounds and three ounces, and so on for six milkings, which gave eighty-one pounds and six ounces of milk, from which we obtained four pounds and four and a half ounces of butter, while with the Holstein we obtained only three pounds and four ounces from one hundred and fifty-four pounds and nine ounces of milk. Now, I will give you my conclusions. In twenty-five milkings the Holstein cow gave five hundred and two pounds and fourteen ounces of milk. In that, according to the chemical analysis, there were 14.5 pounds of fat, which made eleven pounds and eight ounces of butter. In twenty-four milkings the Jersey cow gave three hundred and six pounds and three ounces of milk that contained 14.6 pounds of fat, one-tenth of a pound more than the Holstein's. That made sixteen pounds and one ounce of butter. With the Jersey cow we got more butter than there was fat, while with the Holstein cow there was more fat than butter, and that is what set us to analyzing the butter in the second case. We found the butter to be normal. It was salted one ounce to the pound and prepared for market. I have figured a good deal on that analysis to see why it was. In the first place, with the Holstein cow, the analysis showed that there was left in the skim milk .77 of a pound of fat in every one hundred pounds of milk we set, while, with the Jersey cow, there was only one-tenth of a pound of fat left in one hundred pounds of milk. You see, we literally skimmed all the butter out of that milk. It would take one thousand pounds of that skim milk to make a pound of butter.

Mr. Ford — I suppose the milk weighs about the same for each cow?

Prof. Henry — Yes. The Jersey cow's would be possibly a little lighter.

Mr. Ford — What would be the proportion in bulk during the time?

Prof. Henry — It is nearly five for the Holstein and three for the Jersey.

Mr. Ford — Was the amount of feed each cow had the same during the time of milking?

Prof. Henry — They were fed about half the time oats and corn and half the time barley and corn, half and half; about ten pounds for the Holstein, and a little over for the Jersey, but scarcely any.

Mr. Ford — So the Jersey had as much food as the Holstein?

Prof. Henry — Except that the pasture was decidedly poorer for the Jersey.

Mr. Ford — Would not that show, as far as that is concerned, that for milk, where they want to sell the milk to towns without regard to quality, the Holstein cow would be the most profitable, and the Jersey most profitable for butter?

Prof. Henry — We must not generalize. All the Jersey cows may not be like that Jersey cow, and all Holstein cows may not be like that Holstein. If I were to take a gentleman from this crowd and analyze him and get his abilities, and say that all this crowd was like that man, possibly some of you would object to it. We only had one Holstein cow and one Jersey, and I think this ought to go on record. When we hear the Holstein men and the Jersey men talk, let them bring on their facts. If you will send any good Holstein cows here we will take them and feed them and put them through the test.

Mr. Ford — As you only had one in each case, that would be a small foundation on which to act. Do you know anything about the Herefords?

Prof. Henry — Only such as I have seen at the fat stock show at Chicago. I have seen the Herefords there.

Gen. Bryant — I want to correct Prof. Henry when he said that I had been bragging. I never brag. I was simply giving a statement in the newspapers of tests I had made in my crude way. I want to say another word to my friend Mr. Ford. He wanted to draw out a comparison between the Holsteins and Jerseys; he wanted it of record that the Holsteins would be a great deal the best for a man who was going to sell milk in a village and cheat the people of the village with poor milk, and keep his Jersey's milk at home and make money on that making but-

ter from it. You can see that it takes less time to milk six or eight quarts of milk from the Jerseys than it does to milk twelve quarts from the Holsteins, and a man could go to the pump and make the Jersey milk equal in poorness to the Holstein milk a great deal easier and quicker than to milk so much longer.

Mr. Adams — As to the question which my friend Ford propounded to Prof. Henry, I would call the attention of the convention to the fact that he has been with us but a very short time and has had but a limited opportunity to make experiments on the different breeds of cattle. The farm itself, under previous management, has had little experience in this matter. What he has given us is confined simply to facts as they have transpired, and as facts transpire in the future we shall undoubtedly have those facts given to us in regard to the merits of the different breeds of cattle as shown by scientific experiments.

Prof. Henry — We have got one Short-horn cow that never gave more than fourteen pounds of milk the best day she was milked this summer after calving. Now if you have got a good Short-horn that you think will give twenty quarts of milk a day of good milk, send her down to the farm.

Senator Anderson — I can select a Short-horn cow that will give more than that.

Prof. Henry — If any man has a good Short-horn and is interested in the matter of Short-horn cows, let him send her to the farm. If any man has a choice animal of that kind, send her to the farm for a month. If you have a native cow, let us test her. Remember we can get at the facts quicker if you will help us. The farm cannot buy every cow that is claimed to be a good cow. If you send a good cow there, it will help you by giving her a reputation, and it will help us. I will agree that the chemist will analyze the milk and the skim milk and the butter, if you want it, and we will use the Cooley creamer, or we will adopt any other system you want, and I will watch the whole thing. We do not care how much time it takes. We will feed the cow right and attend to her, and if it takes us all day, all right. They have orders there never to strike an animal. Sometimes it takes us an

hour to get them on the scales, but my orders are never to strike an animal.

Mr. Hazen — You say the experiment with the Holstein cow came on in the month of June. How long had that cow been giving milk? What time did she drop her calf?

Prof. Henry — The Holstein was eight years old and calved May 7th. The Jersey cow was five years old and calved May 2d.

Mr. Hazen — Is it not a fact that the longer a cow is giving milk after calving the richer the milk is? Have you made any test in that direction?

Prof. Henry — No.

Mr. Hazen — Is it not a fact that when the season is a little dryer they give a better quality of milk than they do in the month of June when the grass is moister?

Prof. Henry — I have not had experience enough to say. The farmers here can tell as well as I can.

Mr. Hazen — It takes a certain amount of feed to support the animal, and after that you get your profits. The Holstein cow might support her animal ability with the ten pounds of feed and the grass, and perhaps might not do a great deal more than that. Being so much larger she would require more food than the Jersey cow. While ten pounds of food would be sufficient for the Jersey cow, all she would want, and would enable the Jersey cow to do her best in the way of producing good rich milk, with the Holstein it would not. I see a chance for a difference on that point. The ratio of milk was as three to five. You did not tell us how much butter you made from the twenty-four milkings of the Holstein cow.

Prof. Henry — In twenty-five milkings the Holstein cow made eleven pounds and eight ounces of butter. In twenty-four milkings the Jersey cow made sixteen pounds and one ounce of butter.

Mr. Hazen — You said also that there was more fatty matter left in the skim milk of the Holstein cow than there was of the Jersey. That I suppose is a fact. The Jersey milk will raise the cream more readily than that of any other breed of stock we have, and the skim milk is poorer. Allowing that to be the fact, would

not the Holstein milk be worth more for feeding purposes after you had extracted the butter from it?

Prof. Henry — Yes; but it will not pay to leave butter worth thirty cents a pound in skim milk, when you can get oil meal for a cent and three quarters a pound.

Mr. Hazen — I think the test was not a fair one between the cows, owing to the difference in the season and the time of calving. There would be a difference in favor of the cow in August, no matter what kind of a cow it was. And in regard to feed, you want to give the cow about what it will eat and make use of; anything short of that will not give the best results.

Mr. Jones — Were these cows kept in a pasture alone, or with other cattle?

Prof. Henry — They were kept with the cattle of the farm, which are mostly Short-horns.

Mr. Jones — It is very apparent to me, that in the test made with these two cows, the odds were largely in favor of the Holstein. She was tested at her own home, and at a season when grass was most succulent and best. The Jersey was in a strange pasture, in dry feed, flies troublesome, an underling, in a herd of Short-horns. She must have been a remarkable cow to have done as well as she did! With General Bryant's well known kindness to, and fondness of his Jerseys, we wonder he permitted such a test.

Mr. Ford — In regard to feeding full blood or grade stock — if my reading is correct, the tests that have been made, and the proofs at the Chicago Fat Show and other tests, in England as well as in this country, show that the first in order, in fattening qualities, at the same age, are grade Short-horn steers; second, full blood; third, Herefords, and fourth, polled Angus — I think in that order. As to the question why the society does not give a premium to grades: Colonel Reynolds says it is because General Bryant does not favor half-breeds (Laughter). That is slightly political perhaps. There is no danger but that our farmers will grade their stock fast enough. There is no propensity, it seems to me, so strong with the American farmer as that of mixing the blood of any of his stock, thinking that he improves it by making a mongrel. All kinds of

mongrels are bred. They have an idea that it is better. I believe the grade Short-horn has proved to be the best for beef purposes, and next to that the pure breed. Is that so?

Prof. Henry — Yes; but I want this to go out to the farmers: that grades ranging from half up to seven-eighths full blood are the animals for money for the butcher. A farmer came to me the other day, and said he thought he would get a Short-horn cow of me. I said, "It will not pay you to do it. You will take that cow out on the farm, and unless you get a good price for her calves you will never get your money back. You will be lost out there in the country, away from the market for bulls, and it will not pay you. You will make more money off the grade." I think I was correct. For milk you want grade animals. For beef you want grade animals; but somebody must keep full blooded animals. The raising of full blooded animals is a trade, and it requires capital, judgment and great experience. That must be left to a certain class of men, whom fortunately we have; men who live in the city, men who are accounted fancy farmers, but who are the greatest blessings to our country we have; men who do not make any money in the business, men who sink money, yet they are the true missionaries in our farming business.

Mr. Ford — Would you advise farmers to breed from anything but thoroughbred bulls?

Prof. Henry — *Never.* We cannot be too emphatic about it. Here is one of the finest things ever done in the state. The farmers in Sauk county clubbed together and went to Illinois and got noble Norman stallions, costing $2,000, and they have improved the horses in Sauk county in the most wonderful manner. There were fifty or a hundred clubbed together to do it. I believe they were worth to Sauk county $100,000. The colts of those horses are wonderfully fine animals for grades; but here is a farmer who had a colt, probably he had to pay ten or twenty dollars for the use of the stallion put to a common mare, the colt is half Norman and half common horse, and now they are raising those up for stallions, and Sauk county is going to go right down. There is that stallion worth $2,000, and they say the colt ought to be worth $1,000, when the colt is worth just what he is for a gelding. If

the poor scrub bulls around the country could be butchered to-day, and we would go without calves for five years unless we used full bloods, we would make an immense advance; but at the same time the common farmer does not want to handle Short-horn bulls. He wants to go to the fancy farmer and get the blood from him.

Mr. Ford — I do not understand you to recommend the Jerseys for the mere matter of butter.

Prof. Henry — The great cow on our farm to-day is a grade Jersey cow. She is giving more milk than the Holstein cow and beating the Short-horn all hollow. I would not take a hundred dollars for that cow to-day.

Mr. Ford — What is the use of breeding all this time with so much care if they are not likely to excel in the line to which they are bred?

Prof. Henry — It is a little difficult to explain, but those breeds are bred up to a delicacy and fineness which are in one sense against them. You have got to get the ruggedness and hardiness of our native stock. You couple the hardiness of the scrub stock with the fine qualities of the thoroughbred, and you get a better animal for profit. I think it is just as certain with milk as it is with beef. I would not to-day have full blood Jerseys on our farm for milking purposes any more than I would have full blood Short-horns for beef. They are too expensive. They are for another purpose.

Mr. Ames — It is said that steel rubbing against steel sharpens it. Now I do not want to be understood by any means that I advocate using grade bulls. I patronize these so-called fancy breeders, and in this way I have got my stock up so they are near fifteen-sixteenths. That is the kind of stock I want to have brought to the state fair. It is not inferior cattle that I ask this favor for which I think we are entitled to. I ask that we may be encouraged in patronizing these men. We cannot all be breeders. We do not want to be. I ask to be encouraged. That is the reason why I ask for a premium on grades — grade females and steers — not grade bulls.

Mr. A. A. Arnold — It is evident, from the remarks of Prof.

Henry, that he is pretty well read up in the theory of grading stock of pure-blooded animals. The theory is correct. I believe it is so held by all, that the best way to get good cattle is to use thoroughbreds. You must have the thoroughbred on one side in order to secure the quality desirable. But there is one remark he makes that I take exception to. I am nothing but a common farmer. I have a neighbor, Mr. Kennedy, who is nothing but a common farmer. We are not fancy farmers. But we are breeding full blooded Short-horn cattle. To show whether or not it can be done by a common farmer, or whether it is profitable, I can state that in 1873 I put about $1,000 into blooded Short-horn cattle, and now I have twenty-seven or twenty-eight of such cattle, and have sold about $3,000 worth of such cattle. These twenty-seven or twenty-eight are all females except three. I have made no pretensions to be anything more than an ordinary farmer, and I do not live near a city. I have had no opportunities of selling fine blooded cattle. My first purchases were all Short-horn cows. I have bred from fashionable breeds of Short-horn bulls. I have ordinarily sold my bulls for from $60 to $200. I have not had a market for high-priced bulls if I had had them. My neighborhood did not demand it. I did not have reputation sufficient to warrant it. If I had had the best kind of a pedigree bull I could not have got ordinarily over $100. Farmers do not know the difference between a fancy Short-horn and an ordinary Short-horn bull. I say this to encourage common farmers in purchasing full-blooded Short-horn cattle, both females and males. If a man is so poor he cannot afford to buy them, he had better buy a grade. If he is worth a little more, he had better buy a full-blooded Short-horn cow and bull. That is my opinion, and these breeders do not want to monopolize anything. It is not in accordance with our theory that we should monopolize anything. I think farmers can breed full-blooded cattle and make it a profitable thing.

Prof. Henry — I do not say for the farmer not to use a full-blooded bull, but there are plenty of farmers that do not need to buy any females that ought to pay $100 or even $500 for a bull. By all means, every farmer that has a male should have a full-

blood. But if a grade Jersey will give as much milk as a full-blood Jersey, why have a full-blood? If a $40 grade Jersey will give as much milk as a $125 full-blood, why pay the $125, unless you wish to raise calves to sell to your neighbors for breeding purposes? If Mr. Arnold had had to sell his animals to the butcher, would his Short-horn cows and steers have paid him as well as grades?

Mr. Arnold — If that was the case, it would not; but we raise almost all animals for the market, and inasmuch as there is a market for full-blood animals, and especially on the male side, it does. If a man raises a bull calf, at the age of one year he gets $100 for it. If he raises a steer, at the age of three years he gets $100 for it. Which pays the best?

Oliver Gibbs, Jr., Lake City, Minn.— I have been requested by General Bryant to make a statement in regard to winter feeding of shoats. At our Minnesota flouring mills we have a large accumulation of cockle taken out of our wheat. This cockle is generally thrown into the rivers, or otherwise destroyed. Farmers sometimes want it for stock feeding, but the mills will not sell it to farmers in small quantities for fear of having to buy it back again in future crops of wheat; but those who are known to have mills to grind it in, or perhaps any parties at a distance, may secure it by car-loads, at present, at prices about the same as paid by Mr. Fox, whom I am about to mention. Mr. Charles Fox, of Durand, Pepin county, who has made $1,500 worth of pork the past year, told me that he wintered his shoats last winter on cockle purchased from Minnesota flouring mills at fifteen cents a sack, or about seven cents a bushel. The cockle was ground in a horse-power mill on his farm. He was so well satisfied with the experiment that when I saw him a few weeks ago, he was negotiating for several tons of cockle to use in like manner this winter. It is what is known as cockle screenings. Millers have ground it and sold it as feed, to some extent, but they are not doing it now to my knowledge. They are storing it up, and selling it in large quantities to those who will grind it, or throwing it into the rivers. I have been informed that they threw

it into the river at Indianapolis. If it is valuable for feeding shoats, it would be an important matter to inquire into.

Senator Anderson — I have been informed that it made good feed for sheep, but I never tried it.

Mr. Ford — I have been informed by a gentleman who has had some practical acquaintance with it, that millers consider pure cockle poisonous to cattle and hogs.

Mr. Arnold — We have a large mill in Galesville, and they are in the habit of selling their screenings to farmers where they can, but I have found they have done a great deal of harm, and I think they ought to be prohibited from doing it. It is not the cockle that kills the hogs and cattle, but we have had cattle sick all through that country by reason of eating these screenings. They do not get the smut all out. I have no doubt cockle is good enough food by itself, but smut is not. I would not dare to feed anything of that kind to my cattle. I had a Short-horn bull come near dying by having some mixed with my bran and shorts.

Prof. Henry — There are two smut experiments reported in our cattle report. I took two common cows, a black cow and a red cow, and we put those cows into the most comfortable quarters we could, and fed them bran and hay, ten pounds of bran per day to each, and to the red cow, which we were trying to fatten, we gave a peck of ears of corn in addition to the bran. We gave the corn at noon and the bran in the morning and evening. We gathered the smut from the field and claened it carefully, so that, as far as possible, nothing but pure clean spores should be fed. We began by feeding six ounces of smut a day, mixed with the bran, and we were giving no corn fodder, for I think most cows are killed by corn fodder rather than by smut. The cows did nicely, and we increased the smut to twelve ounces a day, half in the morning and half in the evening, and in all cases dry and mixed with the bran. I took the temperature at the vagina, with a regular surgeon's thermometer, and the cattle were weighed and the temperature taken before being watered in the morning. We increased the smut until we got to twenty-four ounces a day for each cow. Then the black cow refused to eat

her bran and smut. After trying some time to get her to eat it, I had to give it up, but the red cow was one of those intensely greedy animals, and she pitched into everything we offered her. We got up to sixty-four ounces of smut a day with her, a peck a day. After we got up to forty-eight ounces a day we did not try to thresh it, but prepared it by simply freeing it from the corn stalks, often leaving it in bunches of considerable size. When she was taking sixty-four ounces a day, she weighed nearly a hundred pounds more than when we started, and her temperature was practically normal all this time, and the water she drank was about as usual. I was discouraged. The boy says to me, "What shall I do about the experiment; shall we keep on feeding her?" I said, "I guess we will give it up, and say that smut don't hurt cattle." I got to thinking it over in the night, and the next morning early I said, "Go and feed the cow smut, I am going to see if we can fatten cattle on smut." We always weighed before watering, as water runs the temperature down a little, and the boy had gone out and put the bran, with the smut in it, before the cow, as usual, and he noticed she did not eat it. He went on with his chores, and in a few minutes came back. When he went away the cow was standing up, and showed no indications of being sick, except that she refused to eat that food as usual, but still there was nothing to excite his attention, and he was very careful in watching her. He came back in a few minutes and found the cow lying down. He came into the house and told me, and I went right out and took the temperature, which should be, with a cow, about one hundred and two degrees, and found it to be ninety-nine and six-tenths. I sent at once for some epsom salts, intending to physic her as soon as possible, but I changed my mind, and concluded I would not give any medicine. That was at nine o'clock, when I took her temperature. At twenty minutes past nine her temperature was ninety-eight and two tenths. At ten o'clock it was ninety-six and eight-tenths. All this time we stood there looking at the animal. She had straightened herself out quite rigidly, and there was some little froth coming from her mouth. Her reason was gone, and she was kicking with her legs, and her hoofs were rattling as

if she were shivering. By that time I got the salts, but I saw there was no use in giving her any medicine. At eleven o'clock her temperature was ninety-six and two-tenths, and at half-past eleven the cow was dead, with a temperature of ninety-five. As soon as she was dead, we cut her open, and I made as good an examination as I could. The contents of the first and second stomachs were so dry that upon squeezing them in my fist I could not get any water to run, but the cow had not been watered that morning. The third stomach was distended so that it measured eleven and fourteen inches at its longer and shorter diameters, which are usually seven and eight. In that the food was packed, and rather a dark color, but there was nothing there to have killed the animal so quickly. In the fourth stomach I found a thin fluid, almost like the excrement, and some little mucus, I think, and in the large intestines I found a great deal of mucus, and there was some inflammation in the small intestine. Since then I have been sorry that I did not examine the brain. I have heard that one man found congestion of the brain, but I did not think to examine it. This was just before Thanksgiving. In two or three days I found a sore breaking out on my neck, and for weeks I could not wear a collar; and then it broke out on my arm, and at last broke out on my hand, and that produced something like the lock-jaw. It set my body to jerking as though I had St. Vitus' dance. As long as I only killed the cow, and not myself, possibly the experiment may not be considered complete; but I am satisfied to stop there. I have been charged with cruelty to animals, putting this experiment along with vivisection, and things of that kind; but I think that that cow, and even some human beings, could afford to die if it could give help to those who are trying to live.

Mr. Ames — It would seem that Prof. Henry thinks that smut is injurious to cattle.

Mr. Arnold — While I am breeding Short-horns, I am also interested in fattening cattle. In the northern part of the state we have followed the practice of stall-feeding our cattle. I understand that the best fed cattle are those that are fed in open yards, and I believe, if I were to make the feeding of cattle a business

by itself, I would feed cattle in open yards, and I would commence in the early part of the winter and feed through until June, heavy feeds, and sell my stock in June. I think we have better advantages for fattening cattle than any other state, even Illinois. The best feeders of cattle are feeding in open yards, commencing in the fall of the year, cutting the corn green, leaving it with the stalks, and feeding the cattle in the yards, with plenty of water. They commence by not having too much, and increase their food regularly as long as the cattle will eat it well. They feed them all they will eat, the same as they feed hogs. I think that is the correct system, to fatten them rapidly, and with plenty of exercise and plenty of pure air. If they are confined in stables they have not sufficient exercise and there is not enough pure air. The best meat I ever ate was while I was in the army, in Dakota, the beef of cattle raised on the short grass, called buffalo grass. The cattle get very poor in the winter, and they fatten very quickly in summer, and the meat is juicy. Good butchers can tell by the touch whether an animal is of fine quality or not. It is not always the fattest that is worth the most in the market; it is the animal that has the most juicy beef; one that is fatted all over, and not in one spot. The old fashioned way of fattening in one bunch, and not showing any fat any other place, would not sell now at all.

Senator Anderson — I have had some little experience in feeding cattle. I do not recommend my plan to every person. There is a common idea that a steer will eat too much. Perhaps they will, the same as it was said here yesterday that they might eat too much salt. I built corn cribs in my yard; have a long shed facing the south, with a roof, and have a large trough. I built corn cribs there sixteen feet long and four feet wide at the bottom, flaring out some. Then there is a platform twenty feet long and eight feet wide, leaving two feet all around this corn crib. It stands up from the platform three feet from the ground; made substantial. Then I nail a good stout plank around the edge of the platform, to form a trough around the crib. The bottom board is loose, so that you can raise it and the corn will run out. After feeding my cattle a short time, perhaps while the corn stalks

are yet out on the grass, I turn them into the yard, and we scoop the corn into the cribs and let them eat all they want, and let the hogs run with them. I have never had a steer eat enough to hurt himself, in that way. They use a good deal of corn, but my hogs and steers do splendidly. If corn is cheap, you can feed well in that way. There is no loss whatever; the hogs and cattle are there together.

Mr. Ford — Our climate is very cold, ordinarily. Now if you let cattle and hogs run out, and feed them outside all the time, are you not wasting a great deal of food, simply to supply the animal heat which they must have? In Illinois and Kansas, where the winters are usually like those here, cattle and hogs run out all the time. They can feed cheaper than we can, in that way. But I have noticed, on my farm, that when the weather is cold you cannot make hogs gain one pound during the intense cold weather, with all the stuffing you can do. It goes to keep up the animal heat. I am satisfied we must protect our stock better, by sheds or stall feeding, or some way, at least during the winter, if we want to save our feed.

Senator Anderson — I have a large barn where I could tie them up, but I do not tie them there at all. My yard is warm, surrounded by trees. I do not live in the woods, but I have trees enough to protect my stock, and I find my stock is healthier and does better that way than to be confined in a barn or shed. Even young pigs will do better in a place where the sun can shine on them, at this time of year, even in the coldest weather, than when they are in the barn.

Mr. Ford — In your experience, have you not found it better to let the cattle off to grass after they have gone through the winter and fed this way, rather than to sell them in the early spring?

Senator Anderson — I never keep my cattle later than the middle of May. I did one year, a good many years ago, put my cattle on the grass several weeks before I sold them, but my experience that year was very unsatisfactory. I would not recommend it. If a man has good grass pasture, and during the month of April gives them pretty heavy feed, and then when the grass

comes, let them run two or three months on grass, that I think is the cheapest way, and they might do pretty well.

Orrin Thomas, Sauk County — I have been engaged in stock-raising ever since I was a child, and in my neighborhood, if there is anything the matter with cattle, they usually run to me to see what the trouble is. This winter one of my neighbors lost a very fine cow, which they thought a great deal of. They did not know what the matter was. She was taken sick suddenly and died in a short time. After a while they had a steer taken in the same way. I went over, and when I got there the steer lay there; did not seem to be in any great distress, only he was sort of groaning, but did not kick and flounce around as cattle usually do when they are sick. It was something new to me. I opened his mouth and found his mouth was cold, and his horns were cold and his ears were cold. His temperature seemed to go down as Prof. Henry has described. I took hold of his tongue and pulled it out, and he did not seem to have any power to pull it back. That morning the steer had got up as usual, and there did not seem to be anything the matter with him. I saw the steer was beyond assistance, and in less than an hour it died. We opened it, and everything seemed to be right till we came to the stomach, and that was very much as described by the professor. It was dry and seemed to be caked, but nothing sufficient to kill a steer. I could not imagine what killed it. It seemed to be perfectly paralyzed; could not get up, and could not move its limbs. We found nothing in the heart. The milt was all full of little festers. What it was I do not know. I never saw anything like it before. Around the gall there seemed to be a sort of a fungous matter that ought not to be there in a healthy state. I have butchered a good many cattle, and also taken a good deal of notice of these things, and especially of the liver. The liver seemed to be in a healthy state. That was all we could find about that steer to indicate any disease. Another neighbor had a steer taken very similarly, and he died very suddenly before he could send for me. I went up and examined the contents of the stomach, and in that the milt, about one-half of it, seemed to be

dry, and the other half was full of these little white festers. I told him if he had another one sick I would like to see it. In a day or two he sent again, and he had another that was not very sick. At first he commenced to kind of shiver, and acted as though he was cold, and the horns were cold. We thought we might as well do something to either kill or cure, and we gave him a powerful dose of vinegar and salt. He did not get any better. We gave him a powerful dose of spirits of turpentine, and poured it on his horns, and got him out in the sun and kept him moving around for a time, and he began to get better and got well, whether in spite of the medicine or by its assistance I do not know. There have been quite a number of cattle taken that way, and I was quite anxious to find the cause. We suppose smut poisoned it, but we could find no smut. We quit feeding corn stalks on that ground.

Senator Anderson — I would like to ask Prof. Henry how often he watered the cow that died of smut?

Prof. Henry — Once a day.

Senator Anderson — If the cow could have run to water any time she pleased, would it not have been better? I am not afraid of smut. I have never found it to injure cattle. I would not be afraid to give it to my cattle, and let them have all the water they wanted.

Prof. Henry — I think that is one point. There was another experiment made by Prof. Gamgee. The professor recommends that, in case of smut poisoning, the cattle should drink all the water they want. If possible, most farmers turn their cattle into the field, and the cattle get a great deal of corn to eat when they first go in, and it is quite possible some of the cattle develop a liking for smut. It is possible they will go around picking out the heads, in some cases.

Senator Anderson — Should you think the trouble is eating too much dry corn stalks and its becoming packed, not drinking enough water? I have heard of a great many cattle dying that way.

Prof. Henry — I think that is the case nine times out of ten, and possibly ninety-nine out of a hundred.

Mr. McDonald — I would like to make a remark, as there may be a good many that will go away with a wrong impression of a statement that has been made in regard to Mr. Lysaght's horses. He was the first importer I know of, of the Clydesdale horse. He went into Canada and got him, and I am satisfied that that horse has been the means of bringing three-fourths of all that have come since. I think it was one of the best things ever done for Dane county that he brought that one horse in. The statement was made that he bred Clydesdale horses on his farm until they got so ringboned and spavined that he could not do anything with them. He bred until he had about one hundred horses on his farm, I think. I was on the farm last week looking over his stock with the intention of buying a pair of good heavy horses, if he had any to dispose of. He told me he was sorry he could not supply me, that all his heavy horses were bargained off, with the understanding that he was to have the use of them until he got through with the farm. It shows that there was at least a demand for that class of horses. I believe it is true that he went to Kentucky and got a thoroughbred horse. His object was to get large, heavy, high bred Clyde mares, and cross them with the thoroughbred horse, which would give him a class of horses such as they have been breeding in England for years past, that they get their carriage horses and mail-coach horses from. They get farm horses from that class; they get a general-purpose horse; they get good-sized, good-action, hardy horses. But, in regard to spavin, I looked through a large number of horses he had on the place, and I found only one blemished mare, and he told me that that did not have one drop of Clyde blood in it; it was too grey for that. That was the only one of that stamp that he had on his farm. That goes to show that Mr. Lysaght made well out of his Clyde horses.

Mr. Arnold — While we are anxious to study the best methods of fattening stock, to raise butter, cheese, etc., we ought not to ignore the fact that we want to encourage the best kind of breeding among men. We want better breeders, and we want a better locality and better circumstances to breed them. The best place to breed a good man, I believe, is on the farm. If we can raise

healthy men, we can do some good in our nation by bringing up a class of men that will be beneficial to our nation. We ought not to desire all the good men in our profession. We have a greater lack of men in any other profession, and therefore we ought to be generous enough to allow some of our boys to go into other professions and tone them up in the things we believe in. Prof. Henry says: "co-operate and organize." That is a sort of hobby that I have. Every man has a hobby; and every man that has a hobby, they say, is a man of one idea. I had rather be accused of having one idea than of not having any; that one idea is worth something. I believe that while we are educating the best class of citizens we have, that we can learn something from others; that in our civilization we have got to have some means to insure success with other men, and that we cannot expect great results in our civilization except by co-operation.

Prof. Henry—I hope while you are eating your dinners, you will think up something in regard to our experimental farm. I have been in some of the other states, and it is marvelous to see what they are doing. I would like to know whether the farmers are going to stand by the experimental farm, or let it die. If you want to pitch into me or my friends, you may hurt me, but you cannot hurt the farm. Legislation is what we need. Let us come up here and have a warm time. Let us not go away and leave the farm to die.

THE UNIVERSITY FARM.

BY PROF. W. A. HENRY.

When I came to my department I received but little indications from the farmers that I was a member of their great body. It seemed to me that there was a feeling that I was running that experimental farm a good deal as a merchant here in the city would run his store. If I had any seed to sell which farmers could make something out of, they were perfectly willing to come to the farm or take it from the farm; but without it was something that had a direct bearing upon their work, as the purchase of seed or stock, they had no interest in it; and as for the education of the

farmer, since there was not a young man in the institution studying agriculture, I felt that I was wholly alone in my work. Now I have told the regents that the farmers ought to be thoroughly posted about the advantages offered for young men in getting an education. They have allowed me to publish a sixteen page pamphlet. Of these pamphlets I have sent several to the secretary of every Grange in the state, and several to the principal of every high school in a place of over five hundred inhabitants, and to every farmer whose name I have. My correspondence in regard to the farm is gradually increasing. Men are now not only inquiring about stock, but asking me questions about silos, Amber cane, and a great many things, which are just the kinds of questions that I have hoped to receive. My correspondence is getting to be quite a little matter for me to attend to. I have made out a list of every farmer that writes to me, and that is the way that I sent out notices in regard to this convention. They were sent out because I happened to have such a list. I have now the names of about six hundred farmers, whom I consider representative men scattered over the state, and I am anxious at all times to receive such names.

What I want to impress upon you to-day is this: I think in the first place every farmer should, when he is in Madison, visit our farm and see what we have got — not to come down there to see how nice things are, or how much there is, but what we have. One farmer said "you ought to have a wind-mill. I could not afford to run my farm without a wind-mill." Other farmers have come down there and laughed at what I had as to its crudeness and rudeness; and some have rather felt that we were extravagant in some directions, so that through a sort of a scattering fire I go plodding along. I may say, however, that I don't feel like finding fault. That is one trouble with farmers all the while. You find more fault than you think you do sometimes with each other, and more than men in other callings do. I think one of the best things sometimes is for a man to go away from home for a while. You can educate a man faster by twenty dollars spent in railroad travel than twenty dollars spent in almost any other way. You can take the conceit out of a man; you can lower his pride;

you can rouse his ambition; you can make him more of a man by taking him fifty or a hundred miles from home and placing him among men of a similar calling to his own. If I have ever had the conceit taken out of me as to the advantages or disadvantages of our agricultural department, it was when I visited Michigan and saw what the Michigan people were doing.

The state of Michigan has an agricultural college which is nearly as large in its endowments and appurtenances as our state university. I am not talking of Ann Arbor, but of the agricultural college — a college in which Latin and Greek are not taught, and the pupils are agricultural students, farmers' sons; and over fifty per cent. of those young men go back on the farms after leaving that school. There are between two and three hundred young men in that college, sons of farmers mainly, most of them from the state of Michigan, but some from other states; several from Wisconsin, Indiana, Ohio and Illinois; some, I believe, even from New York state; and there, upon six hundred acres of land, are situated buildings nearly as numerous as all those over on this hill, and a farm stocked with several kinds of cattle. They told me they paid $1,000 for a Short-horn cow simply to illustrate the qualities of the Bates family of Short-horns to their students. They have a building for the professor of botany, in which he has his botanical museum — a building costing some $6,000; an apiary, several large barns; their laboratory building, their students' dormitories, and the professors' houses — some six or eight in number — built by the state, and with college grounds as much finer than ours here as you can well imagine; ninety acres of the finest lawns shaded by beautiful trees growing there, some naturally, others planted, and the whole grounds kept as nicely as we expect to see lawns of wealthy gentlemen. This is kept up by student labor which is paid for by the state.

In that school every student has to work two hours a day on the farm, for which he receives about eight cents an hour. He can work more hours if he wishes to, and receives wages accordingly, but he must work two hours every day. These are earnest young men in appearance; they are bright and faithful, with plenty of vigor in them. They are doing well, and go about

their work willingly. There is no feeling that they are poorer than anybody else, and the wealthy and the poor man's sons are on a perfect level. One of the students is the son of Mr. Woodman, master of the National Grange, and another student there is a prince who comes from Japan. When I was over at the farm one day we saw the young fellow sweeping the dirt from one of the bridges. He was dressed as a farmer,— had on a broad-brimmed hat, and was out there scraping the manure and dirt from that bridge and cleaning it up.

President Hayes' son was there for a time before going to Cornell University. The best of it all is, these young men go right out into the world to become leaders in agriculture.

Possibly you have known the American Agriculturist, by reputation, one of our best agricultural papers. That paper is edited by a man who graduated from the Michigan Agricultural College. Professor Daniells in our State University is a graduate of that college. Professor E. M. Shelton, who went to Japan in the interest of agricultural education in Japan, was a graduate of the Michigan Agricultural College. He is now professor of agriculture in the agricultural college in Kansas, and a very able man. Professor Bessy, of the Iowa Agricultural College, who is doing so much in botany and fungi, and who is botanical editor of the American Naturalist, the best magazine of the kind in America, is a graduate of the Michigan Agricultural College. Professor Prentiss, professor of botany at Cornell University, is a graduate of the Michigan Agricultural College.

Have you seen that excellent work, "The Michigan Pomological Report," which I think leads all pomological works in the United States,— that book is got up by a graduate of the agricultural college; and then, of course, there are those men to whom I can not point, but who are doing that silent work all over the state of Michigan, in every farming community, of lifting the average farmer higher. They by their education can go into Grange meetings and help; and those men who are doing that silent work — the greatest work after all — one to which the least credit is given, but which counts the most in the end,— there are those men scattered all over the state.

Now in regard to this college: They have the agricultural land grant the same as our university has, but the state of Michigan began to foster that college before the land grant was given, so that Michigan has the oldest college devoted to agricultural science.

I had several talks with the president about their methods. He told me that they had spent upon that farm for one purpose and another, including the residences of the professors and all, over $700,000, and that the state of Michigan has given by legislative appropriations, if my memory serves me, over $500,000.

At first they had great trouble to get money. They had to go begging, and one legislature would give them a fair amount and they would go on for one year, and the next legislature would pinch them up, and so it is yet to some extent; but, the president said, "we get our money more and more easily; as more graduates go out our troubles grow less and less. We are gaining friends every day, and our friends are among the farmers."

Professor Beall wrote to me and said: "The Grangers give us great help." You should have heard Mr. Woodman talk about the close connection in Michigan between the Grange and the agricultural college. The Grangers feel that their head center is in that college.

Last winter one of their professors told me that their committee from the agricultural college went to meet the committee on agriculture in the legislature. They met with the committee, and the committee said: "What are your wants this year?" They said: "We want $25,000 for a library building. We want so many thousand dollars for the farm, and so many thousand dollars for this and that," until when they footed it up it amounted to over $60,000 that they asked that committee of agriculture in their legislature to give them. They said: "All right; but you have not asked for anything for Amber cane." One of the members of the committee said: "No, we did not think of that. "Well," they said, "you must have something for that; and you have not asked for anything for ensilage. You had better try that experiment;" and they put down two thousand dollars for these two experiments. Thus they got all that they asked and two thousand

dollars more. It was either sixty-two or sixty-five thousand dollars that that college had from the state last year.

Now let us not find too much fault. Our legislature last winter gave us willingly, and what they give us this winter I think they will give us willingly; but the first ever given by the state of Wisconsin to our agricultural college department was four thousand dollars. The forty thousand dollars to purchase the experimental farm was given by Dane county, and the other money which runs that department was given by the United States government; and four thousand dollars represents, so far, all that that has been given by this state to her agricultural college, while five hundred thousand dollars represents what Michigan has given. I do not include in this between one and two million dollars given by the state of Michigan to the university at Ann Arbor. Ann Arbor has had, I think, about two million dollars spent upon it by the state. Ann Arbor paid last year for her professors' salaries alone twenty thousand dollars more than the total income of our State University. Our State University paid last year for professors' salaries forty-five thousand in both her departments; Ann Arbor paid one hundred and one thousand dollars in her one department, and then you must add to that about thirty thousand dollars that Michigan pays her agricultural college. Those Michigan people feel pretty well satisfied with their experiment.

Now as to Illinois, I cannot tell you all they have done there, but they at one time appropriated $20,000 for horticulture.

In Kansas I see there are now bids for a new building on their agricultural college grounds. They have between two and three hundred students in their agricultural college. When I came here there was not a single student. We now have six. I know of two or three young men who speak of coming. I have talked with a great many farmers, and some say they will send their boys when they are older. Other young men have come and talked to me and said they would come, and I have seen nothing more of them.

From my three thousand circulars sent out, I think I have received only two or three letters of inquiry; not particularly encouraging; and now, of course, standing as I do, one man, with this

agricultural interest spread all over the state, it is hard work for me to attempt to talk to you and get you to spend an hour or two in the year to think of my wants or the wants of this department; and I thought if I had you here I could possibly get you to think something about it, and some time when you went home and saw young men wondering where they should go or what they should study in the future, you might possibly mention some facts gathered from this talk. Then, you see, besides this education part of the question, there is that experimental work. In Michigan they have not carried on very many experiments. They have not attempted to make it so much of an experimental farm. Whether I carry it on successfully or not depends upon a great many factors, and there is no one factor so great as the interest of the farmers in the matter.

DISCUSSION.

Mr. Arnold — I would like to inquire where the receipts of the agricultural fund that belongs to the agricultural department are.

Prof. Henry — The income from the productive agricultural college land grant this year was $15,710.28. Then there is quite a sum of money lying idle in the treasury. As reported, the balance in the treasury which is unproductive is $40,461.16. There is forty thousand dollars of agricultural land grant money lying in your treasury drawing no interest, and the interest from that which is put out and drawing interest is $15,710.28.

Mr. Arnold — What amount is appropriated by the Board of Regents for the agricultural farm?

Prof. Henry — That is somewhat difficult to get at; the expenses last year amounted to $3,560.56. Add to that $1,200 for my salary, and the mechanic arts department expenses, which will probably be two thousand five hundred dollars more. That should be added because the land grant says: "agricultural and mechanic arts." We have, say, $3,560 for the experimental farm, $1,200 for the professor of agriculture, and $2,500 for the mechanic arts department, including the machine shop. But we should be credited with what has been taken from the agricultural farm for the university, such as drawing wood and working about

the drives. We carry the wood up and put it in the wood-boxes on the fourth floor, and it is charged to the experimental farm.

Mr. Arnold — What I want to get at is this: Fifteen thousand dollars is what the agricultural department is entitled to, because that is the income,— not any more, because the other lies dormant. I think the agricultural department should be charged with the professor of agriculture, with a professor of chemistry, and then whatever expenses there are about the farm; and then it should be credited with all the work the farm does, together with what the sales are from the farm, and strike a balance, and take that from the income that belongs to the agricultural department, and we could see how much is appropriated to other departments that rightfully belongs to the agricultural department. Is not that a correct view of it?

Prof. Henry — We send our agricultural students to more than a dozen different professors for instruction. Now you see it is difficult to say what part of their salaries should be paid by the agricultural fund.

If we were to take our $15,000 a year and try to run a good college, we could not do it as colleges go now. Men have to run a delivery wagon with a grocery whether it pays or not. If we run an agricultural college we must run a good one, but $15,000 would not begin to run a college. The boys could go to Illinois, where they spend $50,000 a year, or to Michigan, where they spend $30,000 or $40,000, and get the advantages of those places.

Mr. Arnold — If the Board of Regents have taken this money that belongs to the agricultural college and applied it to pay professors in the university, they were justified in doing it. They must have been justified some way; and it is my view for them to apply that strictly to pay professors in the agricultural department whenever that department shall develop sufficiently to justify it. I don't think the Board of Regents could legitimately place that fund at the disposal of the farmers of the state of Wisconsin in making experiments, which seems to be the view that some farmers take of the matter. It is not for experiment. It is for the purpose of giving instruction. So we may not blame

the Board of Regents altogether for the course they have taken. They have but few agriculturists in that board, and we have found some fault with the management by reason of there being only a few; but it seems to me that the sentiment ought to be such as to compel the Board of Regents to be liberal in that department, and grant to the extent of their ability, which is the amount of the income, which is $15,000. I think that point is clear, and I desire to make it clear that we as farmers of the state may understand it. It seems to me that will be a correct statement of the condition of things. If we look over the report next year we will know just where we stand, and why it is that the Board of Regents have diverted this fund from the education of farmers to the education of men perhaps who intend to devote their lives to other pursuits. Don't you think I take the correct view of it?

Prof. Henry — It looks to me so. There is one curious thing in this land grant,— they put in a clause that not a cent of the money should be spent for buildings, but they did not say whether it should be attached to other schools. It says: "To found a college where agriculture and the mechanic arts shall be the leading branches taught," and not to the exclusion of other studies. There being no one to decide how the state should use it, when the state got it they began to use it as they thought best.

Mr. Arnold — What does the tax amount to paid by the state to the university each year?

Prof. Henry — From the university fund,— this land given by the United States government to the state of Wisconsin, $13,900 comes in from that source; from the agricultural college fund, $15,700; from the state tax, $44,500, and about $5,000 from students' tuition.

Mr. Adams — Several years ago in one of our conventions, I heard the president of the university talk a little on the subject of the agricultural department. If I recollect, he was ready, as far as he was concerned, and he was confident that the Board of Regents would be prepared to expend money in that department just as fast as the demand for expenditures there increased; and I apprehend that we shall have no trouble, if that department

becomes filled with students, about the expenditures. But what we need, at present, is students from our own ranks; and it is for ourselves to determine how many shall be there. Its prosperity depends upon patronage.

Mr. Broughton — I wish to offer a resolution to show you the shadow of coming events. Not that any action is expected at present in regard to the matter. It is this: "WHEREAS, it appears that the department of agriculture, as connected with the State University, is overshadowed and dwarfed in its usefulness by such connection, therefore *Resolved, by the Farmers' Convention now assembled:* That such connection be dissolved, and a separate agricultural college be established that will be untrammelled in its usefulness."

Mr. Ford — I hope no action will be taken on such a resolution as that, if it is offered as a resolution. It seems to me that it is quite premature. This thing is now in its infancy; it is very weak, and we had better treat it carefully. But I submit to this convention, that the remarks of Professor Henry in their effect, should be profoundly humiliating and mortifying to the members of this convention. You seem to sit here as if you had no interest in this state; as though you existed by sufferance; and if you could only get the legislature to dole you out one, or two, or three thousand dollars, for the purpose of aiding you in making experiments, it is about as much as you dare do. Who are you anyway? What kind of an opinion have you of yourselves? Are you as mean as your actions would imply? Are you as insignificant? I am well aware that public opinion sneers at the Granger; the politician sneers at him; the lawyer sneers at him, and the business man sneers at him; and the common saying is, that here is a convention of men with hay-seed in their hair. It is contemptuous all the way through. The farmers of this country are looked down upon; they are considered an inferior class; and they are justly so. They do not respect themselves. They come here in this cringing way to ask one or two thousand dollars of the legislature. The farmers, if they understood themselves, own the state; they have made this state. This is the only convention that meets here that can look each other square in the face, and

not snicker and not be ashamed of themselves. These editors, doctors, lawyers and politicians meet, and what is it, in the main? Congregations of men who have little private axes to grind. They are congregations of men who claim to be representative men of the state. How are they representative men? By the action of the caucus or some unworthy means; and they claim to represent you and everybody. You are the representative men, if you understand it. You are the men that make these men. You are the men that produce the wealth of the state. And are you to sit here in a cringing, humble position, as if you were the serfs of old Roman times? Look at the agricultural college with six students. I suppose at least half of the population of the state, or more, are farmers, probably six to eight hundred thousand. At least one hundred and fifty thousand of these must be heads of families, carrying on farms, and they have got these students studying the sciences, not the applied sciences, but the abstract sciences, and studying what was done two thousand years ago in Rome and in Greece. The farmers are content with six students, and two or three thousand dollars. The farming interest is the great interest of this country. We are entering upon a new career. The farming interest is not going to be an interest to sneer at.

Agricultural colleges are seeking out experts who are going to teach the men that are going to be the successful farmers; the others are going to be the serfs. Right in this room has been an exhibition of cane that has been worth $50,000 to the state. And I guarantee that that will be worth more to this state than all the legislatures that have met here for the last ten years. The new states around us are going ahead of us. They have given a hundred times as much for the promotion of the interests of agriculture as we have. We seem to be passed by, by the spirit of the age, and to be lurking in the rear. Ten years ago Wisconsin led the states of Michigan, Iowa, Minnesota and Kansas, but, in a very few years, as the thing is going now, every one of those states will be ahead of us. I can remember when Wisconsin produced more wheat than any state in the West. To-day Illinois produces twice as much as we do, and ten times as much corn,

and ten times as many cattle; and other things in proportion. They have probably got better cattle to-day than they have in the state of Kentucky. They are sending them out on the frontier and getting immense prices. Here we have six students in the agricultural college! I presume the farmers have got more sons than that in the state's prison. If not, they are in some doctor's office, or something of that kind. The farmers must organize, and they must understand what their interests are. They should have their regular system of representatives, and their best men coming here to meet, and confer; and they should stand right back of that agricultural college and insist that they have all they want. We repealed the Potter law. Now the time is coming when the whole tax of the state can be taken out of the railroads without oppressing them, and then we should not be contented with less than $50,000 a year for the agricultural college. They need a place for experimenting. They should have a model farm in every respect; and they should have a corps of eight or ten professors. I think it is time for us to respect ourselves and not take a little short-sighted policy. The little beggarly tax that we would pay would be repaid a hundred times. Suppose a man like Prof. Riley had found some method of heading off the chinch bug ten years ago; he would have saved this state $100,000,000. Suppose by scientific experiments you could find a way to cure the hog cholera; it would have saved millions of dollars. This is a practical advantage. We do not want science floating in the skies; we want to bring it down and hitch it to our plows. We must have steam plowing; if we are going to be up with this age of improvements, we have got to be along with it; and we ought to have two hundred young men here attending that college; and it is the fault of the farmers that they are not there. The opinion is common that anybody knows enough to be a farmer; but if he is going to measure out tobacco, or if he is going to sell molasses, he has got to have an education. The farmer must have an education to know about the chemistry of the soil. It will not do to say that the dull one in the family will do for that. You farmers must send your sons here to receive an education. We must have a corps of professors here; we must have buildings.

We must not look at this thing in a small way. I may be considered wild and enthusiastic, but I sincerely believe that events in the future will justify such liberal action.

Senator Anderson — I am very much pleased to have Mr. Ford take up our side of the question, and give us a good hard rap, as he has done, for our negligence; but I wish he had told us how to remedy this state of affairs. We all know that the fault exists, but the remedy is much harder to devise. We all preach this in our granges; we preach it everywhere. We know that the little building at the foot of the hill is only a tail to the big kite on top of the hill. I know of a young man that went there, and undertook to work on that farm, and was sneered at and smiled at. It will never be a success as long as it is there. There are only thirty acres in cultivation. It is got up for a drive for the citizens of Madison, more than anything else. The people of Madison have more influence than any other people in Dane county, and they got it placed there to suit them, not to suit the farmers. Now, how are the farmers going to proceed to get an agricultural college in the state of Wisconsin? I have often told farmers they would not stand by their friends, and they ought not to have any. I was told by a leading attorney once that railroads never went back on their friends, and the farmers never stand by theirs; and that is the reason why farmers had little influence in our state and national legislation. He said they never would have much as long as they were fools enough to be led by the nose by a few political wire-pullers. So long as you are led by a few leaders, you will have no influence whatever. What you want is, not to become partisans and take one side of a question, but be politicians, and take a part in the parties to which you belong. Do not undertake to organize a new party, because old parties have the means and the organization and the press, and can crush out any new party; but organize in your towns, and send delegates to represent you in your conventions. Send good men; it makes no difference whether a man is a republican or a democrat, so that he works for your interest or mine, when he gets into the state or national legislature. Perhaps it may be a little humiliating to think of, and I may be mistaken, but I am

not aware of the state of Wisconsin having a farmer in the national legislature for the last twenty years. It is rather humiliating that we have not a farmer in the state that had the capacity to represent us, or that we have chosen to represent us. If any interest of farmers comes up that professional men or professional politicians may think against their interests, and in favor of your interests, you are so green that you ought not to have a right to vote upon it. You are not capable of voting understandingly; they will sneer at you every time. There is no doubt that we would not get a dollar of appropriations, if it was not that they are expecting your votes to re-elect them to office again. I know how they went for me and Professor Henry, and how I had to work to get his appropriation passed; I had not much hope of it. I know that the State Agricultural Society went in to have the same rights as the State Historical Society, in regard to postage stamps and stationery, but it was voted down in the assembly by a two-thirds vote. I got some assistance and went in the next day, and got it reconsidered and passed; but it was hard work to get it passed, and many farmers voted against it. The farmers you send there do not represent you honestly and fairly. I think there are some lawyers and some politicians there that will work for our interest more than the farmers. Farmers come there with the idea that they must be very close-fisted in everything; but, before they are there very long, they find out that the close-fistedness is only on what we want. I suppose you have noticed in the papers recently statements that the laws that give a bounty on wild animals should be repealed. The papers published it, and a great many greenhorns believe that wolves are bred more profitably than sheep. We pay, as duties on imports, one or two million dollars a year; we are paying two or three dollars a thousand for lumber more than we ought to, to prevent lumber coming from Canada; and we, as farmers, ought to be protected. Yet they begrudge us fifteen or twenty thousand dollars a year to protect our sheep from wolves. If I had the power to organize a farmers' alliance in every town in the state, I would have every farmer join it, and pledge himself to use his influence

in the party to which he belongs to send men who would represent our interest in the legislature.

Mr. Ford — If there is any lower depth to which farmers can sink below what they have, it is to go into politics. To encourage the farmers to go into politics, I think is the wrong way. I admit that it is a difficult thing to counteract the impression that is abroad in regard to the farming class. But, it seems to me, there are methods that the farmers may take which may counteract them. In the first place, I think the farmer's home is one cause of it; he makes life a mere drudgery; he has no society; his boys are not treated properly, and they go off as soon as they can. I think there has been a movement forward in these Grange associations, where they have met for useful discussion, and even when they have met for nothing but society. One of the remedies for the existing condition of things is to make farmers' homes pleasanter and more cleanly; another means is by associations among the farmers; a third is by inventions which are going to make farming more of a gentleman's occupation. In England, the sentiment for hundreds of years has been in favor of the country. And gentlemen in London, as soon as they get through their sessions of parliament or other business, all rush to the country; and, if any man is getting up in the world, the first thing to do is to buy a country residence. That is the right sentiment. I think our inventions are working that way, so as to make farming a more honorable calling. If we send our sons to the agricultural college and make them intelligent, they will be worthy of respect, and they will have it.

Mr. Geo. A. Austin — Realizing the importance of the State Agricultural School, and the necessity of filling it with scholars, it is the duty of every farmer to recommend young men to go to that school and get an agricultural education. The experiments on the agricultural farm are valuable to the farmers, and I believe it is our duty to sustain the professor of agriculture in these experiments, and furnish him what he requires to make them. It is absolutely necessary that the results of those experiments should be brought to the notice of the farmers at the earliest possible moment. I would suggest that the experimental farm should be

used for the trial of new varieties of all kinds of products; and that as fast as a product has been proved, so that the professor can recommend it, he should distribute it to the farmers in the state, and ask each one to send him the result of the seed sown in his locality, so that the experimental farm may do something like the work which is done by the experimental farm at Washington. The report of these experiments should be put into pamphlet form, and the professor should have means to print and send out those pamphlets once a month, or once in three months at least; in time for planting in the spring, and in time for harvest, and in the summer and fall; so that they may come before the farmers in time to give them useful information in regard to the work which is before them. The seed produced on the farm should be distributed, not in a meager quantity, but by the half bushel. If he could not send out to all, he could send out to one man in a county, and not distribute it through the legislature, but through the members of this convention. When seed is distributed through the legislature, it goes to their political friends. We want it to go to those who will use it. Seed will grow in one part of the state that will not in another. This is a young state. Where we have one acre in cultivation, there ought to be several hundred; and in opening a new country it is important to start in the right direction. The experimental farm can save hundreds of thousands of dollars to the farmers by sending them the proper seeds and proper directions about planting it. It will be more important to us as we rely upon it; and it is necessary to have the seeds disseminated and planted in different parts of the state. You have all heard of the hulless oats that was tried on the experimental farm and proved a failure. Eight months after that the reports of the Agricultural Society were distributed. In the meantime, in Clark county alone, a thousand bushels of oats were bought at $10 per bushel; and ten thousand dollars was paid in that county alone for those oats — about twice as much as we ask for carrying on the experimental farm for the whole state.

In regard to our respecting ourselves, I have respect for my calling; I revere it above all other callings; I have tried most all of them, and I say that farming is the highest and noblest calling

that man is called to. All we have to do is to make up our minds and agree upon what we want, and ask the legislature for it, and they will give it to us. The trouble is, we cannot agree upon what we want. Let us agree upon the same thing and the legislature will give it to us; if they do not give it to us, we will demand it and get it.

Mr. Arnold — I think what Mr. Ford said was most excellent; however, brother Anderson might think it theoretical, and he indicated what he would do to create a proper sentiment, so that we might have a sufficient number of students at the university; it was by organizing. Afterwards he says, it is not right to organize; that the farmers should not know anything about politics. If it is better for the farmers not to be politicians, it is better for lawyers not to be. There is no American citizen but what should understand politics; if he does not, he had better move out of this country. Let us try and keep up our present status. How are you going to have a sufficient number of students at the university farm? You may not have them through the Grange. A great many men will not allow their sons to join a secret society; but you may have farmers' clubs and farmers' alliances. Every question that interests a farmer may come up in the alliance. There politics is the principal question to be discussed; not from a partisan standpoint, but in its true sense, what the people of the United States want. If you have heard the discussion at the university by the boys about what is the proper form of government, a party or cabinet government, you will be proud of the manner in which the boys discussed the question. That is the kind of politics that we want to educate our people in, as to what is for the interest of the whole people. I would hate to be so bigoted as to think that no man is fit for office unless he is a farmer. Many men of other professions have broader ideas than we have. In New York representatives from the Anti-Monopoly League, the Granges and the Farmers' Alliances met in convention at Syracuse. There were eighteen senators in the state whose action, in the last winter's session, they did not like. They said among themselves: "We will see to it that those men are not returned. We are democrats and republicans, and

of all parties; you republicans nominate republicans, and you democrats nominate democrats that will be satisfactory to you. If your party nominates a man that is objected to, you will agree to support the other man, and *vice versa.*" Out of eighteen only six were returned. When we understand politics sufficiently to elect a man, not on what he has done, not on what the party has done, but on what we want him to do, to accomplish a certain purpose and serve a certain end, then we can expect to accomplish something politically, and then we will make our power felt. Organization is the only way by which we can expect to have our way in legislation, and the only way we can expect to control public sentiment. Power has something to do with public sentiment. It don't make much difference whether the people of Wisconsin love us or fear us; but I would like to have them do one or the other.

Mr. Ford — I suppose I ought to apologize to brother Arnold and brother Anderson for speaking in the disparaging way I did of politicians. I didn't know they had the misfortune to be in politics; they are too good farmers to be spoiled by it. It seems to me that association should be for the specific business of agricultural education and social improvement. The child is educated in politics from his mother's breast, by the newspaper and by the school and university. The greatest thing that is neglected, I think, is our education in the science of farming, and as soon as we get the farmers thoroughly educated, they will have their places everywhere, and you cannot prevent it.

Mr. Broughton — Is the agricultural farm a good selection for the purposes intended?

Prof. Henry — If the citizens of Madison will keep their fingers off the farm, I can make a pretty good experimental farm out of it; but when I am hampered and told that I must reserve a certain piece of woods on the best part of the farm because people want it to shade a certain drive, and when I have got large trees growing within two feet of where I must plant my experimental wheat or anything else, and am told that I cannot remove those trees because it will spoil the beauty of the scenery, and that I must have only thirty-two acres of plow land on the farm,

then I feel sometimes like kicking. I have been told that certain of the regents were blamed severely because they allowed me to remove as much timber as I have. When I went there, the farm was woods, and the regents allowed me to remove timber from several acres; most of it has been made into pasture land, but the best of the land is still in the woods, and I suppose it will be forty years from now, and the citizens of Madison will whirl around those drives and enjoy the shade as the people of Madison do enjoy such things. It can be made a good experimental farm; but it is a pretty poor experimental farm the way it is now.

Mr. Broughton — We must profit by such examples as this. That you may be prepared to take action on this resolution, I will read it again: "WHEREAS, It appearing that the department of agriculture, as connected with the State University, is overshadowed and dwarfed in its usefulness by such connection, therefore, *Resolved the farmers of this convention now assembled*, That such connection be dissolved, and a separate agricultural college be established that will be untrammeled in its usefulness."

Mr. Ford — I think it is very mischievous to introduce that kind of question here; the agricultural college is weak enough as it is, and, if we raise questions of this kind right on the start, we are going to strangle it. Instead of such a resolution, I should say we had better endow it with more money and give it more land. There is good enough land around there; but the university and the corps of professors in the scientific departments are of great use to the agricultural college, if we see fit to have it so. Dane county has already given $40,000 for the agricultural college. How many of your counties would give that? When you have put your hands in your pockets and given $10,000, you can begin to talk about its being a poor location. The location is good enough, but you have not land enough. You have a good corps of professors as far as they go; but you have got to double that corps. You have got fifteen or twenty thousand dollars that can be used for this agricultural college. Go on and build up from the old root and not tear down and try experiments somewhere else; as sure as you do, you will kill it.

Mr. Brown — I second the resolution. With respect to the loca-

tion of this farm for a school, I perhaps know something about it, whether it is in the right position or whether it ought to be changed. As you all know, there have been until this year but very few students in the agricultural college, and why? I will tell you. In the first place you farmers are all to blame. Every farmer in this room, or in the state of Wisconsin, is to blame for this thing. There are the advantages there, and why don't they accept them? I will tell you. A great many of you will get up in the morning at four o'clock. "Hurry up, boys! Get out of that!" It is "hurry up, hurry up!" until noon; then, "hurry, boys, we have got this to do. We have got to go at our work." At sundown, perhaps, or perhaps half an hour after, they will go home and have their supper and do the chores. That is the way farmers have done. I know something about it, though I never had to do it myself. My father never asked us to work that way. Is it any wonder boys don't want to stay on the farm? I cannot see any reasonable excuse for them to stay. As soon as they get old enough they say, "Father, I want to go to school." "What do you want to be?" "I want to get out of this drudgery business. I can't stand it, and won't stand it." And away they go. A farmer may want his boys to be on the farm, and he may think that his boy will make a good farmer and may like the business. He sends the boy up here with the idea that the first two years' course in the agricultural college is identical with the course in general science.

Senator Anderson — Just tell us whether it is a good farm or not.

Mr. Brown — I am about to come to that. Do you mean the location of the farm?

Senator Anderson — Take the quality of the soil and the location.

Mr. Brown — The location with respect to the farm or with respect to the other departments of the university?

Senator Anderson — Take the soil, whether it is fit for an experimental farm.

Mr. Brown — As far as that is concerned, I can see no reason why that farm would not be as good as any other farm of the

same size. One thing is, we have got to have so much land to experiment on. That soil is one particular soil. Perhaps that particular soil may be found in a hundred different places in the state, and all the rest of the state may be of a different character of soil. We cannot tell anything about that. The soil there, as far as I have been able to judge of it,— not examining it very closely,— would be an average soil in the state. Further than that I cannot say.

Senator Anderson — I am tired of this way of abusing farmers for the way they raise their boys. My boys are as well raised as he was. I know what the soil is on that farm. I live in Dane county and come to Madison almost all the time. I don't think it ever was fit for the business. I don't think you could select, perhaps, a poorer farm than that anywhere in the state of Wisconsin. We cannot select any very good farms around close to the city of Madison. I think it would be better if it was off some distance, and, just as long as that farm is located there as it is, and under the influence of the university boys, and every boy that goes to work on that farm is ridiculed and abused by those on the top of the hill, so long it will be a failure. You may depend on that; and that has been the fact before Mr. Henry came there; I don't know how it is now; I was told so by the students themselves.

Prof. Henry — I don't think our students are ridiculed at all. Our students work upon the farm. We have paid one young man, I think, fully a hundred dollars for his work, and he has almost supported himself at college upon the farm. I have talked with the students and have asked them if they were annoyed by the other students, and I never found that they were. When I had only only one student I said to him, "You must look out; they always laugh at one student." Boys always laugh at something. Where I graduated, at Cornell, the agricultural students were few in numbers, but we were not laughed at; although some of us were so poor we hardly knew where our meals would come from, yet there were boys in our class that could buy out almost any boys in the university. A Japanese prince sat taking notes beside a son of one of the professors; an Englishman's son was

there, who was told by his father, "You can take two thousand pounds after you have been there two years, and if you can handle that, you can have it." I have received word since I have been here there are some English gentlemen on their way who talk of entering our agricultural college. Agriculture is not looked upon as it was a few years ago. Agricultural students have gone into the university at Cornell with but very poor clothes on, and have not been sneered at. As long as a boy is bright and tends to his own work, he is not laughed at. If he is a doughhead he is laughed at. The students always poke fun at somebody, but they don't laugh at a farmer's boy because he is a student of agriculture. I feel pretty positive on the subject, because I went there to college, and I had to work my way at a shilling an hour part of the time. I don't think you ought to consider separation. I think you ought to say, let us try right where it is; we don't know yet whether we had better drive that institution away. It is going to involve legislation and a number of questions of law, and a great many troubles will arise. You have not tried it yet.

That experimental farm is not visited in some months by two farmers a month. You don't take any interest in it. In the first place, let us all do something for it, and after we have tried the experiment let us think it over and talk it over. If I go away feeling there is such a sentiment as that, I cannot work well this year. You know how it is when you talk of selling your farm. If you think of quitting the farm and going into something else, you are not as good a farmer as you would be if you stuck right to business. Now I want to go back feeling that there is a place to work, and that the farmers are behind me and are going to stand by me.

There is some land in the woods that I want to get hold of, because it is level. I had to throw out some experiments of Prof. Daniells', that had been running two years, because there was a little wash. That land is good enough land. There is land that I put fertilizers on, last year, and it produced as good crops as I ever saw grown. This year the farm produced forty-five bushels an acre, and it was a poor year.

Senator Anderson — I am not in favor of the passage of this

resolution at present, but the time will come that we will have to have a better farm, and we will have to have it away from that hill; away from the influence of that college.

Mr. Ames — It seems to me as if this should be managed by the agricultural department. It should not be in the interest of a driving park for the city of Madison. Prof. Henry says that it seems to be under the controlling influence of the city of Madison. I think that he should have the privilege of going to work and carrying out his best judgment, and, if the city of Madison wants a driving park, let them get one.

Mr. Chester Hazen — If I were to hire a man, and put him on a farm to take charge of it for a certain purpose, and he was competent to do it, like Prof. Henry is, I would ask him what he wanted done, and what he wanted on the farm so he could make it a success. In this case, I would suggest that we say to Prof. Henry to make out a statement of what he wants, and what course he wants to pursue to make that a success, and present it to us, and we will back him up if we have got any control over it. The people of the state have, and we will back Prof. Henry up in what he wants. If the city of Madison controls that, and he cannot control it to his satisfaction, buy some land somewhere else, and put him onto that.

The following resolution was then offered and adopted: "*Resolved*, That we have full confidence in the ability of Prof. Henry to do what will be for the best interests of the state, in making experiments upon the experimental farm, and in heading the professorship of agriculture in the State University."

Prof. Henry — In thanking you for the resolution you have adopted, I will ask you to remember that I live on the farm and will be glad to see you any time, and when we come together next year let us see what advance we have made. Last year I came here asking for some money to try sugar. This year I brought you the sugar. Next year I hope to disseminate the seeds for sugar-making among the farmers of the state. I wish that this convention would help me to secure it. The regents seem willing; the president seems willing, but if you would help them I think it would give me confidence. I want a professor of

agricultural chemistry who shall make analyses of the products of the farm. I want a professor of horticulture and botany.

Mr. Arnold — If we want to do anything on a great scale we must start on a broader basis. If I had a son to send to an agricultural college I would not send him here. Let us introduce a bill next winter appropriating thirty, fifty, a hundred, or a hundred and fifty thousand dollars for the purpose of buying and endowing an agricultural farm so we can have a variety of stock, two or three breeds of cattle, and keep the breeds distinct. If we had six picked cattle of Short-horn breed, six of Jerseys, six of Ayrshires, six of Herefords and six of Devons, that would be of value. The experiments now are of no benefit whatever because they are on so small a scale. We are doing what we can, but if we think we need these things to educate our sons as we wish, let us think it over for this year and then come up here next year and state what we want, and if that is the public sentiment of the state, I will guarantee that the legislature will indorse it.

Senator Anderson — We should keep the farm for several years until we get a better one, but I approve the idea of getting a better one.

Professor Henry offered the following resolution: "*Resolved*, That this convention urge upon the Regents of the State University to enlarge the agricultural department by adding thereto professorships of botany, horticulture and agricultural chemistry."

Mr. Arnold — I don't believe you would do any good by asking any such thing. There is no fund to pay them, and what is the use of asking for more professors for six students. If you can work those professors in and have it understood they are professors in the agricultural department, and have them work in the other schools, it is all right.

Prof. Henry — They will do that. The difficulty is this: Suppose I had graduated in the law, and was looking for business, but should say, "I won't open a law office until I get some business;" I cannot do that; I have got to go and hire an office, and hang up my sign and wait. Now, a young man wants to study agriculture, and he says, "If I go to Professor Henry, and he teaches me agriculture, and he has the experimental farm to

attend to and is his own foreman, and has his other business to attend to, I guess we will get all the ideas out of him in a short time; I had rather go to Michigan or to Iowa, where they have got enough men that will keep giving me new facts every day I am there;" and he will leave us. It is a matter of considerable importance to get enough talent together here to draw, and the matter of college education is like the mercantile business — the man who has the best store will get the custom.

Mr. Ford — I think that is entirely proper, that we have got to have our college before the students will come to it. We have got to have a course of lectures before the students hear the lectures. But I think all these farmers ought to have a little more faith in this agricultural education. I think they ought to send their sons here. They don't believe in it, that is the trouble. They don't believe it is practical. It is eminently practical, and if the farmers take it upon them to see that their sons have this kind of an education, and send them here, then they will have the benefit of this course; but as long as this course is down there behind the university, with no outfit, they cannot get the students. They must have a competent corps of professors first, and then the farmers must act as recruiters for this university to send students there. They must have the confidence in this institution to send their own sons there instead of sending them to some classical college.

The resolution offered by Prof. Henry was then adopted.

Mr. Hiram Smith, Sheboygan — I think the members of this association have great reason to congratulate themselves that we have met under such favorable auspices; that two hundred men or thereabouts,— representative, intelligent men, from the various parts of the state, have come up here to inquire, not "what shall we do to be saved," but what is of much greater importance to the rising generation, "what shall we do to save the fertility of the soil?" and, at the same time, furnish remunerative compensation for the brain and muscle work necessary to produce crops which we ought to produce; and, if we may gather information, during this convention, that will cut off such a large class of deadbeat farmers from sapping the fertility of the soil without rendering

any equivalent, we shall do a very good thing. It is just as demoralizing and as immoral to be a deadbeat farmer as it is to cheat the hotels out of the cost of living; for if we continually sap the soil without returning an equivalent, we take what does not belong to us. I hold that every man has a right to the produce of the soil, but he has no right to rob it; he must keep it in as good a condition as he found it; we may gather ideas from these valuable addresses full of suggestions which we may contemplate in the future. I think it a very happy suggestion made by President Fratt, and also valuable information which was given us by our secretary, Mr. Bryant, the importance of gathering statistics; there is a money interest in it besides being up with the times. Now, in regard to the proper method of gathering these statistics, we need not criticise the plan marked out by the president. Of course, in a short paper of this kind, he did not attempt to go into all the details, but he has given the suggestions, and we may figure it out as best we can. In regard to the fisheries, I would not detract anything from the benefits which that appropriation furnishes the state; the men in favor of that have had the confidence to ask for what they wanted. Now, all we have to do, is know what we want, and ask for it, and we have no reason to believe that the legislature will disregard our request. Therefore, if we formulate some plan — make it proper, as we easily can — and its importance is shown to the legislature, I have no sort of doubt but what we shall get all we need to carry out this very happy suggestion.

John S. Harris, La Crescent, Minn.— Mr. President and Gentlemen of the Agricultural and Horticultural Societies: As many of you know, I hail from the North Star State, Minnesota. I have been very much edified in the course the convention has taken. I am a member of the State Board of Agriculture, or rather of the executive committee of a kind of agricultural society in the state of Minnesota. I have taken a great deal of interest in this meeting. They sent me from Minnesota here to learn something. I did not come here to teach you anything; but they say "the light comes from the east;" they have pointed my face over this way, and told me to get light and bring it back to them. I could not help, while Mr. Smith was reading his

paper to you, thinking of some things of the past. He spoke of market gardening. I commenced market gardening in the city of La Crosse, on that sand bank on the Mississippi river, twenty-nine years ago this coming spring. After two years, I found that I could carry all to market that I could sell on a wheelbarrow, and, consequently, I got rid of pasturing a horse through the summer and feeding him through the winter. The business steadily increased until I found that I must keep a a team. I went over to Minnesota, and have lived there twenty-five years, and made La Crosse my place of business — almost my residence. The market gardening business has increased in the proportion Mr. Smith tells you. There are hundreds and hundreds of loads of market gardening produce brought into the market at La Crosse — more than they can consume. Some of it goes down to St. Louis; a good deal goes over the Mississippi river again; a good deal comes from that state and returns on the railroad trains, and goes into the territory of Dakota. The market garden business is considerable of a business. The business of gardeners and horticulturists, while it may not be quite as important as agriculture, furnishes an occupation for a multitude of men. It affords occupation for a class of men that have a taste a little different from some others. One man has a taste for a fine looking horse; another for a Jersey cow; and another for a Short-horn; and Mr. Smith and myself and some others, have a taste another way; we like to see the orchards breaking down with fruit. We like to see the well kept lawns about the house, the evergreens dotting them over; the annual and perennial flowers; we like to see the conservatories, and we like to see every man's home with well kept flower plants in the window in winter, showing the people that pass by that peace, comfort and happiness prevail within. So that the occupation of gardening gives a diversity, and is a good thing.

Mr. Smith was speaking of strawberries. Although there are, perhaps, a thousand quarts of strawberries raised now where there was one twenty-five years ago, yet, he said, in those days they were not within the means of everybody. If you have any knowledge of the gardens in those days, I think you will say that a strawberry crop now brings more per quart than it did twenty-

five or thirty years ago. I can recollect when I first commenced the garden business in Cleveland, Ohio. I should think it was nearly forty years ago. Strawberries would commence selling in the market for one York shilling a quart, but, in the course of five or six days they would come down to six cents. They would peddle strawberries around the streets of the little village, as it was then, for sixpence a quart; and frequently throw the garden open, and tell people to come in and pick for themselves. Now we raise strawberries and take them into the same market of Cleveland, and if they are a first-class article, they bring thirty cents a quart, and seldom run down as low as six cents a quart; so that, although the quantity produced is greatly increased, for some reason or other, the remuneration received from them has also increased. And if we raise first-class produce, both upon the farm and in the garden, we cannot raise too much; we live in a wide world, and there are millions to feed, and they will purchase of us who grow it that which is first-class; but, if we produce an inferior article, they will go starving, and not remunerate us for our labor.

Mr. Kellogg — I think our horticultural president is a little lame in regard to the amount of apples grown twenty-five years ago in Wisconsin. I will state that I know that in Rock, Walworth, Racine and Kenosha counties there were trees, more than twenty-five years ago, that bore thirty bushels of apples to the tree. The first tree that I planted in Wisconsin was set in 1838; that is in what is Kenosha county now. But the facts he has stated, in regard to our advancement for the last twenty-five years, are all true, and it might be painted in brighter colors. It is almost astonishing to know what amount of small fruits is consumed in the fruit season in Madison, or Janesville, or Milwaukee. In Milwaukee, they eat everything that is fruit, and they have the poorest taste of any city I know of in the state; you can sell anything there that is colored, if it is only lard. I presume a thousand bushels would not keep Janesville in strawberries one season, and I presume it so in every city of its size.

Mr. John S. Dore — I understand from the paper of the president of the Horticultural Society that in the temperate region,

when pine was removed, that the first berry that made its appearance was the red raspberry, and then the black cap, and, finally, the blackberry. I will ask how he accounts for this.

Mr. James M. Smith — I cannot account for it at all; I do not attempt to; it may not be true in part of the country, but that has been my observation wherever I have seen it in this state, that in the course of two or three years after the heavy timber is cut out, the wild red raspberry comes in. That lasts three or four or five years, and is succeeded by the wild black cap, and that lasts four or five years, or three or four, and then the wild blackberry comes in, and that usually remains until we begin to clear up the land.

Mr. Dore — In my observation in the northern part of the state, in Clark county, in our pine choppings, all three of these varieties spring up very soon after the timber is removed, and they continue to flourish until the fires, which run through those choppings occasionally, destroy them; and then they spring up again. I have never discovered this change that you have spoken of, although it may exist. We have constantly new fields that are being cleared of pine, and likely I would not notice it.

Mr. J. M. Smith — I think if you will watch them carefully, you will find that the rule is, that the red raspberries come in first.

Mr. Dore — One thing that I have tried, and so far have made a failure of, is to raise any tame blackberries. There is an abundance of wild blackberries when we have favorable seasons and the fires have not run over the blackberry grounds; there is then an abundance all around within a few miles of my home. But I have planted several varieties of tame blackberries, and have never been able to raise them; they kill down every winter.

Mr. Smith — You would raise them if you give them sufficient protection.

Mr. Dore — The wild berries are not protected, and they seemingly never kill down by winter killing.

Mr. Harris — The fact of the raspberries and blackberries coming in where we clear off these forests, is easily accounted for. The birds continually carry these seeds into the forest; they go out

and feed, and then, through the heat of the day, go into the forests and remain there; and whenever the forest is chopped away you let the sun and light in there, and these seeds spring up. If the red raspberry does come first — which I am not positive about — it is because the seed germinates quicker after you let the light in; it requires less dryness and heat.

Mr. Arnold — I suppose you have all read Judge Knapp's theory of the change of climate, whereby one plant becomes extinct and another takes its place. Judge Knapp gave a good deal of information to this society, and used to be a valuable member; I do not know whether he is living or not.

Mr. Fratt — He lives in Florida.

Mr. Arnold — His idea was that there were cycles, in which plants and animals flourished. We know that there are many animals that have become extinct, and that we now have animals that were not in existence at that time. Another thing, we cannot raise wheat as we used to; we cannot any of us tell why, but we know that in some countries where they once raised wheat, it became almost extinct, and would have become entirely extinct if the farmers had continued raising it. After desisting from the production of wheat for a few years, the seasons or the climate, or the soil, or something, was restored, so that they could raise it. Some one said to-day in the agricultural rooms, that when we got a hardy variety of wheat, we would raise it again as we used to. I do not believe we can do it unless we have the right climate, the right air and the right soil. I think the reason why you have raspberries first and then black caps, and then the blackberries, is a change in the conditions of soil and climate necessary to their growth, which agriculturists and chemists have not fully explained. We say that chemists can tell what properties are necessary, in the soil, in order to produce certain crops; but with all the science and all the investigation, from Liebig down, they have been unable to tell us the exact condition necessary to raise any particular crop. If we can once arrive at that knowledge, we will have made a grand stride in agriculture; but we never have done it; it is a sort of hap-hazard business after all, because a piece of land, with the same mode of cultivation,

will very often produce very different results; we cannot account for it. Perhaps Professor Henry could give us more light on this point than any one else, but I do not believe he will be able to tell exactly what he can do with certain manures on a certain soil, every time.

Mr. J. C. Ford, Madison — I do not accept the theory of the gentleman last up, in regard to the climate, at all. I have traveled in this pine country that Mr. Dore lives in. I remember very well traveling over a country where the pine forests had been swept over with fires which had killed the pine, and immediately it was succeeded by a forest of oak; I have seen that repeatedly. One class of wood succeeds another immediately. In the case of our wheat fields, we will raise wheat for twenty years, and the wheat plant is gone; the material which produced it is exhausted. The climate is not changed in the case of the timber, the soil is changed. The pine has exhausted certain elements in the soil, and, when a fire has swept over it, it has left conditions favorable to the deciduous trees, and they come up in succession — different orders and different successions, as the soil and climate are prepared for them. I think the gentleman from Minnesota gave the correct theory in regard to the planting of the seeds by birds carrying them; they are buried there and preserved where the sun and the atmosphere does not get at them. When the right conditions come, when the sun is let in and the fires burn over that country, and leave the right conditions of soil, then the red raspberry or the black raspberry, or whatever it may be, springs up. I do not believe in spontaneous generation. I do not believe anybody here has ever seen or found anything of the kind. I think the seeds are planted there by birds, and when the sun is let in there the plant comes up. So I believe the quality of the soil is what gives us the succession of crops and timber everywhere. If you go all over this state, you go into a little swale or low place and you will find a given order of vegetation there. If you go a rod from there and get a little elevation, you will find a different kind of grass. You may go into the smallest lagoon in the state, and the most remote, and you will find a brother of the same plant in the largest lagoon or marsh. And you may go into

the uplands with the same quality of soil and you will find precisely the same vegetation. You go out on the white clay lands in this country, and you will find the white oak tree; you go on the prairie soil, and you will find the burr oak; and you go on to sandy soil, and you will find the black oak. Every different kind of vegetation has its own peculiar habitat. The climate, of course, has its relations to any particular vegetation; but in subdivisions, I am satisfied, it all depends upon the peculiar character of the soil.

Mr. D. T. Newton, Dakota — How do you account for the second growth of black oak timber that has sprung up all over the country in the last thirty years? As I understand it, thirty years ago the burr oak had possession of what is now termed our burr oak openings; we know that timber was cut off without there being trees enough to seed the country with black oak acorns. The timber that is now growing is almost exclusively black oak; there are very few burr oaks or white oaks in clay land.

Mr. Ford — The conditions of the soil no doubt had changed. I think the gentleman has stated the case more generally than the facts will bear him out. But where the black oak comes, there is certainly some change in the quality of the soil by which it succeeds the burr oak, whether caused by the light being kept out or not.

Mr. Broughton — If the gentleman condemns spontaneous generation, where does the seed come from?

Mr. Ford — It used to be supposed there was such a being as a Creator, who started the process; others might accept the doctrine of evolution; I do not propose to decide for this great convention on that question.

Mr. B. F. Adams, Madison — I do not pretend to be able to answer why the black oak comes up in place of the burr oak, but I have read in regard to that, that the squirrels and other wild animals scatter the seeds the same way that birds do.

Mr. J. N. Ames, Oregon, Dane County — I would like to ask how the poplar tree springs up. When I came here there was not such a thing as a poplar tree, and now they occupy the greater part of our forests.

Mr. Ford — I think these trees have means of disseminating their seeds. The cottonwood and other soft trees that grow on the Mississippi river have seeds that are carried by the wind very easily. They may be very fine seeds, and they find their way into the soil and germinate. When the soil was not broken it was very hard for these seeds to spring up, but after the soil was broken you would then see those trees spring up where there had not been a tree growing before for years.

Mr. Kellogg — My observation in regard to scattering of acorns is that the bluejay will carry the acorn further than any other living bird or beast, and plant it, and it will grow; that is a fact of my own observation.

Mr. Ames — How do the seeds of the black oak stand the forest fires that sweep over them?

Mr. Ford — They are planted by the squirrel or the bluejay, as the gentleman says. When the fire sweeps over, it goes very rapidly, and there is no time to kill the germ which is buried.

Mr. Harris — There are places in Minnesota, where, when they come to break, they cut off the root of the red, black or white oak; if you keep the fires off there for five or six years, you will have a grove started. I know of a piece of ground that was used for meadow, five or six years ago; it was put to pasture, and no fire allowed to run over it. In the course of a year or so, some of the hazel brush got up perhaps a foot high, and the bluejays scattered those nuts and brought in red oak acorns, and in three or four years the oak sprouts began to stand over that piece, and it finally got so thick it was almost worthless for pasture. And there are trees there now, thirty feet high, I believe, of red oak, that were first planted there by the bluejays and different kinds of squirrels, who carried in hickory nuts and other species of nuts into the same ground. The majority of the timber is red oak, but there is burr oak and white oak and other kinds. The soil is adapted to red oak, and that predominates. I know of another piece, not far from that, where the timber is black oak or Spanish oak, and the soil is quite sandy. I believe the birds plant a good deal of these forests, and a variety of seeds, and whichever the soil is best adapted for will get the predominance, and finally root the others out.

Mr. Arnold — I think that Mr. Ford misapprehended what I meant to say. It makes no difference whether it is spontaneous generation or production from a seed, or what may be the starting point. What I meant to say was this: that there was a certain condition of soil which must produce certain results. This working in cycles has produced this change in plants, as it has in the animal kingdom; we raise poplars where poplars never grew before; and we are raising black oaks where we raised burr oaks; we are unable to raise wheat where we did. In a few years we will raise wheat where we cannot raise it now, and simply for the reason that there is a condition of soil and atmosphere necessary to produce these results. And whenever the right condition may come, we will raise it again. So, I suppose, in regard to raspberries and blackberries, there was a certain condition of soil and climate or moisture necessary to produce germination, which with the raspberries was produced first, and with the blackberries last. It makes no difference what is the starting point, whether it is spontaneous or from the seed, the fact remains the same, which is all we need to know, that it requires a certain condition of soil and climate to produce certain results. If we can get at what that is, then we will have made a great advance in agriculture.

Mr. Ford — One practical suggestion. As far as affects the farming class, if they are going to depend on the climate and think that the climate has not come, I think they are very much mistaken. If they will simply depend on the condition of the soil and watch that and its adaptations, I think they need wait no longer.

Mr. Arnold — The fact is, that, on an average, vegetables take only four per cent. of their substance from the soil. Now if ninety-six per cent. comes from the atmosphere, if we are to pay no attention to the climate and leave it all to the soil, when only four per cent. comes from the soil, it seems to me to be rather a singular thing to do. We have got to have an adaptation of the climate, that is the first necessity in order to bring about whatever we may want. We cannot raise oranges in this climate, they would freeze to death; that is an extreme case. They cannot raise wheat in New Jersey as well as they used to; there is a

change of atmosphere, no doubt. Here in Wisconsin it is decidedly different from what it used to be. The more vegetation we have, the more moisture in the atmosphere. The more it is cleared off, the dryer it is.

Mr. Ford — I would like to ask the gentleman, then, why they can raise thirty-five and forty bushels an acre of wheat, when ten years ago they could not raise it all, and twenty-five years ago they could raise it well. And so in New York, after a different cultivation of the soil and a rest of the soil, their ability to raise wheat has returned, and they raise it better than ever. The climate, I take it, has not changed. It don't change back and forth every ten or fifteen years to suit the people.

Mr. Arnold — The fact is that it has changed; they raise wheat when they did not ten years ago. They raise about the same amount of wheat they raised twenty-five years ago. The fact is that in Ohio and western New York, about the time they raised wheat, they had large forests; they cut those forests off, and in a few years they could not raise wheat. Now, the cycle has come around again, when they can raise it. We cannot explain it. I do not know that anybody can, but that has been the case in Europe, and once in about twenty years will come around the greatest success in wheat growing. And that is the same with other crops, unless the variety becomes extinct.

Mr. J. M. Smith — Don't you suppose they could raise wheat if they had kept up the fertility of the soil?

Mr. Arnold — No, sir, no possibility.

Mr. Smith — Give it its natural food?

Mr. Arnold — No, sir.

Mr. Fratt — In answer to that I want to say that, if my reading is correct, the English farmers, by their rotation, have raised wheat for hundreds of years on the same land right along, and there have been no cycles of climate that have injured the wheat.

Mr. Arnold — I will answer that. On the British islands, where they have the sea breezes, they have a continuous climate, and the atmosphere the same; there is no material change; but you go into central Europe, and you will find the same rule obtains that does in this country; I have been told so by foreigners.

Mr. McDonald — Can you explain why a tree will blight setting next to a building?

Mr. Peffer — It is from the reflection of the heat. A tree don't blight until it gets a certain amount of heat, enough to blight the ends of the leaf. That is one kind of blight. There are several kinds of blight; but that is one kind.

Mr. McDonald — A neighbor of mine had a Transcendent tree growing at the end of his house (the house is a stone house), on the south side, so near that some of the limbs touch the building. That tree was loaded down for the last two seasons with Transcendents, all it would grow, and there was no blight on them; and mine, half a mile or three-quarters from there, were blighted. That tree was on the south side of a stone house, where it would be hot if there was any heat.

Mr. Peffer — Was the tree in sod?

Mr. McDonald — It was, and always had been.

Mr. Peffer — That shows that that tree grew slower; and probably there was more of an air current through there.

Mr. McDonald — I would think that was not the case. I thought probably that its being sheltered from the northwest winds, in winter, might have something to do with it.

Mr. Peffer — You will find that a tree that is sheltered, and is growing very fast, will blight sooner than one that stands on a hill where there is plenty else growing at the time, although it may have the same heat. I have a grove of evergreens, and there is a pear tree, right in those evergreens, that always blights, while others, of the same variety, that are on the outside, do not. I think that is because no air can get in there. The sun beats right in and heats it up to that pitch that it will blight; it fairly cooks the leaves.

Rust on grain is caused by dew or rain, and that always comes when we have a very hot day or a hot time, and rain or heavy dew falling. Where we have sowed salt on wheat or barley, or plaster on clover, those things, which tend to cool the surface, appear to be a preventative of rust. Anything that will prevent an excessive heat, so that the water is evaporated, so that it will not get up to ninety-two or ninety-four degrees, is a preventative of that blight.

Mr. Kellogg — Have you ever known blight on the north side of a house, or in the shade?

Mr. Peffer — Often there. Sometimes fire blight will come, but not this rust. You will find invariably that on the north side of a building or fence you have your best strawberries and your best apples, or anything that will grow there. And your grain on the north side of a fence is always safe. I know mine is, and I guess other folks are the same.

Mr. Kellogg — Why did we have no blight for fifteen years after 1848?

Mr. Peffer — Because the temperature did not get up in June or July to the necessary pitch.

Mr. J. H. Smith — It was up to one hundred at my place inside of fifteen years.

Mr. Peffer — You will have to ask older heads than I am, for I cannot remember so long ago.

Mr. Kellogg — There was a long series of years that we were not troubled with blight as we are since.

Mr. Peffer — I think our climate is hotter than it used to be. I know our apples that we now call fall apples, used to be winter apples. We must have had cooler seasons.

Mr. R. P. Speer — I consider this subject of blight, rust and mildew one of the most important questions that can come before an horticultural or agricultural society. By close observation for many years, I found that rust, mildew and blight were diseases that exist at precisely the same time, in the same atmospheric conditions, and, by means of the microscope, it has been determined that fungi is the cause of mildew, and is the cause of rust on wheat, and other cereals and grasses. I came to the conclusion that fungi must be the cause of blight on our fruit trees; and I have given the matter more attention, perhaps, than any other question, for a good many years; and in order that the farmers who have given but little attention to this question may understand the matter, a few words in regard to the fungi, perhaps, would be necessary, so that it might be thoroughly understood. We hear men talk about fungoid growths and fungi generally. Plants are divided into two classes. In the first place, the trees and vegetables in our gardens, and the cereals,

and everything that has green leaves, belong to one class of plants. It contains chlorophyl, and, by means of that, it has the power to appropriate the food taken up by the roots for nourishment. The roots take up carbonic acid and nitrogen and other organic and inorganic substances from the soil, and in the leaf these substances are distilled so as to furnish the tree with nourishment. Now, there is another class of plants, about as numerous as the higher order of plants to which I have referred, which we call fungi. These plants do not possess chlorophyl; they have not the power of assimilating food; they cannot exist except on food which is prepared for their use. If you could live only on wheat bread, and upon nothing else, you would be just as different from the rest of us as the fungi are from the higher order of plants; you would have to have that bread or you would die; and so do the fungi. Most of these plants are obscure, and so exceedingly minute as only to be distinguished by means of the microscope. In order that you may understand more plainly what I have reference to, when you take a loaf of old bread you will find it mildewed; that is one kind of fungi. You take the bark of an old log and you find fibrous roots running along there; that is another kind of fungi. You come to the wheat and you find it rusted; with the microscope you see little roots running along there, and that is another kind of fungi. And so it goes. And, generally, these different kinds of fungi live and flourish in the dark, under boards in the cellars, or places where there is a high temperature and moisture. These plants must have their food prepared for their existence or they cannot live; they cannot germinate in clear water; they can only germinate in the food which is prepared for their use, and live upon it. In order that I may go through the matter in a little less time than usual, I will read a paper on the subject that I prepared three or four years ago, that is more condensed than I can give you my ideas otherwise. The paper is as follows:

"CAUSES OF BLIGHT, MILDEW, RUST, ETC.

"BY HON. R. P. SPEER, CEDAR FALLS.

"Our losses by blight, mildew and rust on fruit trees, vines, the cereals, etc., have become so great and numerous, that I deter-

mined, during the past summer, to ascertain, if possible, their causes, and will state the result of my investigation as briefly as possible. Many fruit-growers believe that fruit tree blight is caused by severe cold weather, or sudden and frequent changes in the temperature of the atmosphere in winter. If atmospheric conditions in winter cause it, then the Transcendent crab, the English Golden Russet, etc., which ripen their wood early and are known to be hardy, would be less subject to it than certain tender varieties which do not ripen their wood at the proper season, and which are scarcely ever, or never, attacked by it. If it resulted from low temperature, then its attacks would be confined to orchards in northern latitudes; but it has proved very destructive to fruit trees in localities where the mercury has never touched zero. When trees have been much injured by cold or other causes, a sickly growth has been the result; while blight has always been preceded by an unusual growth.

"I have never known fruit trees to blight seriously except after remarkably warm, damp weather, and it is only after such spells of weather that attacks have been made on wheat and oats by rust, on grape vines by mildew, and on potatoes by rot. Rust and potato rot are forms of blight, but they could not have been caused by cold, because the rusted stalks of wheat and oats, and the potato vines affected by rot, were not in existence during the previous winter. If mildew is the result of cold, is it not strange that vines which were thoroughly covered with earth during winter have frequently suffered as much by it as others of the same variety which remained on the trellis? We could give other reasons which would make the fact more clear that blight, mildew, etc., do not result from any derangement of the cell structures of trees and plants by cold in winter, but consider it unnecessary. Botanists and microscopists have decided that fungi cause the diseased appearance of trees and plants attacked by blight or mildew; but they disagree as to whether fungi are the primary or only a secondary cause of the disease, and also upon the question: how is the attack made? Fungi are plants of a low order, such as mould, mildew, etc. Most people know but little about them, because many of them are too small to be seen or examined by the naked eye. The germs or seeds from which

they grow are called spores. A high temperature and considerable moisture favor their germination and growth. 'All fungi require for their nourishment the previous formation of an organic substance; they do not possess the capacity of assimilating food materials, *i. e.*, of transforming them into substances which will directly support life. Many of them are, therefore, saprophytes growing only on dead organic substances; others are parasites, growing on living animals or plants.' The important questions to which no satisfactory answers have yet been given are: On what particular part of a tree or plant attacked by fungi did the spores which produced them germinate? and how did they begin to grow?

"Because the spores of fungi exist in stagnant water and in undrained soils, some botanists believe that they are absorbed by the roots of plants and trees, and germinate under their bark; but there is no foundation for such belief, because the roots of plants absorb from the soil only substances which are in a state of solution, and no organism could become soluble and retain life. The elective power which plants possess of absorbing only such substances from the soil as are adapted to their wants, is unfavorable to the theory just advanced. By careful experiments the fact has been determined that the spores of yeast cannot pass through a fine filter of earthernware, or through cotton wool; is it probable, then, that spores of parasitic fungi can be absorbed by plants through the delicately formed pores of their roots?

"Some writers tell us that 'the young parasitic fungi, after germinating, attach themselves to the orifices of the stomata (pores) of trees and plants, and quickly multiply there, causing injurious and frequently fatal diseases.' The statement just quoted is not false, but very unsatisfactory, as we are not told whether the spores germinated in water which was on the bark or leaves of the plants attacked, or in sap which had been forced by some means through their stomata. As this is the important point to be decided, I will offer the following proposition, and my reasons for believing it true: Blight, rust, mildew, etc., are caused by parasitic fungi which germinate in sap that has been forced through either the stomata of plants and trees, or

wounds made in their bark or leaves, by insects, etc., by the pressure of sap circulation. As we said before, fungi cannot assimilate food materials, but depend for their nourishment upon that which has already been assimilated, and specially adapted to their wants. For this reason, the potato fungus cannot subsist upon the juices of the grape vine, nor can the grape vine fungus live upon the juices of an apple tree. If from a single vine a thousand others should be produced from cuttings, all of them would be constructed alike and contain the same kind of sap.

"Then if spores can germinate in a drop of dew or rain on a leaf, and have the power to extend their mycelium (roots) through the stomata of the leaf to the sap within, why do we find occasionally in a row of grape vines, of the same variety and surrounded by the same atmospheric conditions, only one or two vines badly mildewed, and all of the others in a healthy condition? Also, if the young fungi, after germinating, can obtain sufficient nourishment from a drop of water to enable them to force their mycelium through the epidermis of bark or leaves to the juices within, then why do they invariably attack plants growing on ground to which large quantities of nitrogenous manures have been applied, in preference to others of the same variety growing on new ground or clover sod? If the power which plants possess and use in forcing sap from their roots to their leaves was more thoroughly understood, it would be less difficult to answer such questions.

"In two carefully conducted experiments, made for the purpose of ascertaining the force of the sap in growing plants, the result was as follows, to wit: In the first experiment, by Dr. Hales, the force of the sap was found to be equal to thirty-eight inches of mercury, or seven times greater than the force of the blood in the artery of a dog. In the second experiment, by Burcke, it was found that the force of the spring sap in a vine was equal to the weight of fourteen and one-half inches of mercury, and therefore exerted a force equal to that of a column of water one hundred and ninety-five feet high. While making these and other similar experiments, it was found that the pressure of the sap was much affected by the atmospheric pressure. All close observing fruit-

growers know that severe attacks of blight, mildew, etc., have always followed spells of extremely hot, damp weather, which were accompanied by low atmospheric pressure. At such times plants make an extraordinary growth, and it is not unusual to hear farmers' boys say they 'can almost see the corn grow,' and their fathers declare that 'if such weather continues much longer the wheat will certainly rust.' When low atmospheric pressure and very high sap pressure in plants and trees occur together for several days, more crude sap will be forced into the leaves than they can assimilate. During such times an enormous pressure within plants meets with but feeble resistance from pressure without, and it would be strange if no part of their juices should be forced through the pores of the bark or leaves of the extremely tender shoots. We have less reason to doubt that sap is forced through the stomata of tender plants, than we have to doubt that blood was ever forced through the pores of the skin of persons who had climbed to the summits of high mountains, where the atmospheric pressure was low; because we know that the pressure of sap circulation in plants is many times greater than that of blood circulation in animals. During spells of weather which favor blight, there is sufficient moisture in the atmosphere to prevent the particles of sap which have been forced through the stomata (pores) of tender leaves or bark from drying, until after the spores of fungi have had time to germinate in it and extend their mycelium to the sap or juices within.

"That juices are forced through the stomata of plants, is proved by the presence of what is called honey-dew on leaves, which show under the microscope no signs of having been attacked by aphides or other insects. To enable fungi to attack a plant or tree, it is not necessary that sap should exude through the epidermis of its bark or leaves in quantities sufficient to be visible to the naked eye, because the spores of many forms of fungi under a powerful microscope appear to be only insignificant points. All varieties of the apple contain sap in which the apple tree fungus will thrive, and all grape vines contain sap which is adapted to the wants of the grape vine fungus; but all apple trees do not blight, and all grape vines are not subject to mildew. The prin-

cipal reason why all varieties of a species of trees or plants are not affected alike by blight, is because some varieties are so constituted as to require the absorption of a smaller quantity of liquid food materials from the soil than others, and consequently the pressure of sap circulation in each variety will be in proportion to the quantity of liquid matter absorbed.

"To prevent any doubts in regard to this difference in the absorbing power of trees of different varieties, I will illustrate the matter more fully. If we should plant Duchess of Oldenburg and Tetofsky trees, which had been grafted upon seedling roots, the trees will make a slow growth, and after becoming thoroughly established, they will make many sprouts from the seedling roots upon which they were grafted. If such sprouts should be removed others will take their places. But if we should put Gros Pomier tops on them, the sprouting at the collars will cease and the trees will make a rapid growth, because the tops will require and take all the food materials which the roots can furnish. Certain varieties of trees and plants are more subject to attacks of blight, mildew, etc., than others, because they are more sensitive to the effects of heat. For instance, the buds of the Transcendent and other varieties of the crab are opened into leaf every spring by an amount of heat which does not perceptibly affect Rawle's Janet.

"Therefore, during spells of weather which are unusually favorable to growth, the pressure of sap circulation will be much greater in varieties which are very sensitive to the effects of heat than in others which are not. Also, the difference between the size of the stomata (pores) of different varieties of trees, and the construction of the epidermis of their bark and leaves, will affect their liability to blight. A surplus or deficiency of water or food materials in the soil will also affect the circulation, and tend to promote blight or prevent it. The root-pruning plan adopted by Dr. Hull, of Alton, to prevent blight, was in the right direction, because by shortening the roots of the trees he lowered the pressure of sap circulation.

"A few years ago William Saunders placed boards over a row of grape vines in a vineyard, near Baltimore, in such a manner as

to prevent their leaves and tender branches from being wet by dews or rain. The object which he had in view in making the experiment was to determine whether the frequent wetting of the leaves by dews and rain was favorable to attacks of mildew or not. During the summer the covered vines remained in a healthy condition, and in an adjoining row of the same variety which was unprotected, all the vines were badly mildewed. In A. D. 1868, Judge King, of Dubuque, reported to the Iowa State Horticultural Society similar experiments with like results. In such instances the protected vines were not injured by mildew, because the particles which were forced through the stomata (pores) of their leaves became dry before the spores of the grape fungi had time to germinate in them and make a successful attack. All the stomata of grape leaves are on their under side.

"Then, if the spores of fungi can germinate only in, and derive sufficient nourishment from, sap which has been forced through the stomata of grape leaves to cause mildew, such attacks will be made only on their under side. But if they can germinate in and obtain sufficient nourishment from a drop of water to cause mildew, such attacks may be made on either or both sides of the leaves.

"But attacks of mildew are invariably made on the under side of the leaves. Therefore the spores of fungi cannot germinate in or obtain sufficient nourishment from water to cause mildew. The leaves of the Cottonwood and other kinds of forest trees are frequently attacked by mildew, but in most of such instances it will be found that the epidermis of their leaves have been injured by mites or aphides. And when such injuries have been inflicted, only ordinary pressure by sap circulation is necessary to supply fungi with an abundance of food. It is probable that the spores of some forms of fungi may exist only in certain localities; as the European grape vine fungus was unknown until A. D. 1845, when it was observed in a hot-house in England. In six years it spread through France, Spain and Italy. Then, if the spores of fungi are more numerous in some places than others, it is not difficult to understand why trees standing in the vicinity of another which was suffering from blight have been more frequently attacked by

it than others which were more remote, because the spores detached from the fungi on the first tree attacked were more numerous near to than at a considerable distance from it. If unusual sap pressure, caused by the excited growth of trees during spells of damp, hot weather, causes blight, mildew, etc., especially when there is a low atmospheric pressure, how can such diseases be prevented? We cannot control the temperature, moisture, or pressure of the atmosphere, therefore we cannot prevent them, except by discarding the varieties of plants and trees which have proved most liable to their attacks, or by adopting methods of culture which will enable us to control the temperature of the soil, and the quantity and qualities of the plant food which it contains. By draining, deep plowing, and growing clover, a soil can be made more porous, more accessible to atmospheric moisture, will retain a more even temperature and produce a more constant growth in plants than one which has been plowed to the depth of only a few inches. By sowing buckwheat early in the spring in an orchard the temperature of the soil will be much lower and more even during the hottest part of the summer than where corn or potatoes have been planted. Whitewashing trees with lime is unfavorable to blight, because the white color of the lime will reflect the heat of the sun more than the dark color of their bark.

"The popular practice of severely cutting back the branches of grape vines annually has a tendency to cause mildew; because (at the time when the disease usually makes its appearance) the roots are making an extraordinary effort to replace the parts cut off with branches which are unusually tender and succulent, and the pressure of sap circulation is confined to narrower limits than though less pruning had been done.

"When the average yield of wheat in Iowa, for a term of years, has not exceeded nine bushels per acre, being less than one-third of the average yield of California and certain other localities, it would be useless to argue that the soils and climate of Iowa are adapted to wheat culture. Our soils contain too much decomposed vegetable matter, and too little of the inorganic mineral substances which wheat requires. We get a great growth of soft, porous straw, and a part of the growth is frequently made during

spells of extremely hot, damp weather, which causes the blades and stalks of wheat to become so gorged with sap that rust necessarily follows. If farmers have determined to continue raising wheat, they would undoubtedly be more successful if they would prepare the ground on which they intend to sow it in a different manner from that which is now practiced. When preparing ground for wheat, if farmers would use at least three strong horses and let their plows down to twice the present average depth, they would be troubled much less with rust. During spells of hot, damp weather the roots of wheat, in ground which has been plowed ten inches deep, will absorb a less, but more constant, quantity of liquid food materials, and of much lower temperature, than in a soil which has been plowed only five inches deep. Consequently, in the first instance, the danger of furnishing food for fungi by the pressure of sap circulation will be less than in the latter."

Now, there are two classes of fungi. The higher class have these little fibrous roots that you notice crawling out under the barks of trees. Then there is a lower class of fungous plants, which have no roots; they are simply cells, sometimes connected together similarly to the strings of frogs' eggs you will notice in frog ponds. These strings of eggs break up and each one has the power to form a frog. The lower order of fungi consist only of single cells. One of these classes of fungi is the cause of hog cholera; at least that is supposed by prominent microscopists; another species of that class of fungi is the cause of diphtheria; another is the cause of Asiatic cholera; another is the cause of typhoid fever; and so it goes through all the contagious diseases. But in that class is another kind, called bacteria. Bacteria are the sole and only cause of putrefaction. The other class of fungi may attack living animals or living plants, but the object and intention and use of the class of fungi called bacteria is to produce putrefaction, and destroy dead animals and take them out of the way. It is laid down as a principle that it is not generally found in vegetable organisms. We find it in the cabbage, when decaying, and in certain other substances which contain large quantities of nitrogen. But, from the peculiar odor that arises from the decomposing cabbage, we know that it is putrefy-

ing. From the odor that arises from the blighted limb, we know that that is also putrefying. There is no doubt that bacteria are present in a blighted limb. Any man who has ever examined and smelled a blighted limb knows that putrefaction is taking place, and bacteria are the sole and only cause of putrefaction.

I will say, in conclusion, in proof of what I have asserted, that in 1880 I had about twenty-five crab apple trees in a row, standing about four feet apart; a part of them I cut off to one-third of the top and grafted; the others I did not cut at all. Every tree I cut to a third of the top blighted almost to death. Those I did not cut did not blight at all. I have tied ligatures of wires around limbs of trees that blighted. They did not blight where I put ligatures of wire on, and the other limbs were blighted severely. In the same season, a neighbor of mine top-grafted five crabs and took all the limbs off. They blighted severely, while others that he did not touch at all did not blight. On the trees where I had all the limbs removed, the grafts started to grow nicely, and they did not blight at all, because the growth and circulation was entirely stopped, and the time for blighting was bridged over, with no sap in the tree to blight. Why did my trees blight? Because I threw the circulation upward, and forced the sap of the tree through the spores of the bark.

DISCUSSION.

Mr. I. C. Sloan — Are fungi generated in the soil or the air?

Mr. Speer — In both.

Mr. Sloan — If it is generated in the air, there is no remedy, is there?

Mr. Speer — There is no danger of your wheat being rusted, or your fruit trees blighted, provided you can keep the temperature of the soil down so as to keep a constant growth there. When your ground is poor and it becomes very dry from evaporation and from heat, then when the heavy rains come, and extraordinary growth must take place in your trees, then there is danger of blight.

Mr. Sloan — So far as generated in the soil, is there any antidote for it?

Mr. Speer — None, only to keep down growth; and that is to keep the ground cool. I can always prevent blight by sowing heavy crops of buckwheat.

Prof. Henry — I hardly feel like taking up your time at this part of your session, but I want to call the attention of as many of the horticulturists as I can for a minute. In the class at which I graduated at Cornell University, there was a young man of exceedingly rare merit, as recognized by the professors in the institution. He seemed to be *the* man among the eighty of us who took our diplomas. That young man is now doing his second year's work at Harvard University, under Prof. Farlow. His future seems to lie right in the direction of the study of fungi. In fact, he has been a close student of fungi for something like three years, and this is his second year of study of that branch with Dr. Farlow, of Harvard, who is the only professor of cryptogamic botany in the United States. In coming here to the university to try to have an agricultural department, I felt that my work must necessarily be limited. I had made a study of fungi, in college, and had helped teach that branch at Cornell University, while yet a student. This young man has been most favorably situated and has done some pretty good work. His writings you do not see, because they appear in scientific papers that we do not generally read. That young man has been employed to teach botany in the university at the spring term. He taught it in our State University last spring, and will teach it next year, and I think the regents feel disposed in the main to continue him in that department, with the possibility of making a professorship of botany and horticulture. If such a measure should be carried through, you would then have a man who could bring rare scientific training into your Horticultural Society. Six years in college with such professors as Prof. Prentiss, at Cornell, Farlow and Goodale, of Harvard, would give you a rare man. He is quite a student of insects, and while in college was in government employment, and was sent through the Southern States by the Department of Agriculture at Washington, to study the cotton worm and other insects at the south; and his knowledge of insects is quite remarkable, and yet not so large as his knowl-

edge of the lower plants. He has never undertaken any practical work in horticulture, but I think if the horticulturists of our state should get interested in him and fix him here, we would have great benefits. We want a man that will help you in that direction. If we can get him, and the agriculturists will stand by him and put him right through, I guarantee that in Mr. Trelease you would have a man that would do an immense amount of work. I never saw a man who could do so many hours work in a day as he, and do it faithfully; and I hope if he comes you will give him a kindly welcome.

Mr. Ford — We have had a most interesting and instructive meeting so far. It has been so to me, and I consider that I have spent perhaps the most profitable week that I have in years, in these discussions. In regard to the suggestion of Prof. Henry, I wish to say a word more. I do not know that there is any necessity for any action on the part of this body, but I am satisfied that whatever this association chooses to demand of the state legislature they will have. It is too respectable a body altogether, and there is too much special knowledge here, led by this university farm, and scientific men there, to take any secondary position. This is the true representative body of this state. This is the body that compels, and can compel, any secondary body like the state legislature to defer to its wishes, and anything that the judgment of this body demands in the way of new professors in the agricultural department, it will have, if they ask for it. They have only to determine upon it and it is theirs, I have no sort of doubt.

Mr. J. M. Smith — I have no doubt you are correct. Let me say that I have seen some members of our legislature since I have been here, those that I am acquainted with, in regard to the new building. I said to them, "We must have more room, we cannot get along with the room we have; you must either make arrangements to give us more room in the capitol or give us room in the new building you are going to build." Without exception they said to me, "You must have what you want." One of them said, "I am in a great hurry, but tell me what you agricultural men want, and you shall have it, no matter what it is; so far as I am concerned, I will do everything I can that you ask for."

Mr. Broughton offered the following resolution: "*Resolved*, That the Farmers' Convention now assembled favor the passage of assembly bill number 182, in reference to changing the time of holding town meetings from April to the same time in March."

Mr. Broughton — The principle is the same as it was in New York. It is to accommodate the farmers, in view of their liability to have very much farm work to do in April, which would not be the case in March, and they could attend to the primaries and political matters; while as it is now, they are likely to have sowing or the like to do, and cannot attend without neglecting an important part of their business. There are various other reasons that might be given. It is primarily for the accommodation of the farmers in economizing their time, and in using their time for this purpose when it is not necessary to use it on the farm.

The resolution was adopted.

Mr. Broughton offered the following resolution: "WHEREAS, As agriculturists, we claim to have the right to accept favor equal to the most favored in all positions of authority, honor or emolument, in proportion to numbers and taxation imposed; and since the above rule seems to be ignored or avoided as regards the appointment of the Board of Regents for the University of Wisconsin, therefore, *Resolved by the farmers of Wisconsin now assembled*, That in the appointment of such regents the rights of the agriculturists of the state of Wisconsin be recognized by appointing a just proportion of farmers in accordance with the above rule, to wit: numbers and taxation imposed."

Mr. J. M. Smith — There is a little incident in connection with this which is known, I suppose, to most, if not all, of you. Years ago we had no farmers at all upon the Board of Regents of the State University. It was found out at one of our conventions that we had no representative whatever, and a resolution was drawn something similar to this, and presented and passed. At the next vacancy, Hiram Smith of Sheboygan was appointed on the board. There has been one vacancy since that, but the Board of Regents, or their friends, claimed that they ought to have a graduate of the university, and Mr. Sale of Green Bay was appointed to fill that vacancy.

Dr. Ford — I think as much of the farmers and their rights as any man, but when we come to demand places on the Board of Regents simply as farmers, I think we are quite out of our place. The university is a place for education in science, in letters and art. Only as men are experts in those different departments are they capable of instructing, or, to some extent, are they qualified to be regents. Now there are a great many different professorships. I do not think a farmer is any more qualified as a regent to judge of a professor of Greek than is a mechanic or a lawyer. I do not think we, as farmers, have any interest there aside from the agricultural department, and there our interest lies in getting thorough experts in the different departments. Now as long as we can secure that we are represented as farmers, just the same as others in the departments that require special knowledge and training in other directions. I do not see, therefore, that we, as farmers, need more representation than we have. Mr. Smith is an able and representative farmer, and there may be other farmers on the board, but they are not appointed, I think, or should not be appointed any more because they are farmers than because they might be republicans or democrats. I do not think those considerations ought to enter into it at all. The simple question is, are they men qualified to judge of what the university should have.

Mr. Broughton — In behalf of the resolution I will read as to who the regents now are. It is a notorious truth that clannishness begets clannishness. Since the lawyers become clannish, and seem to play into each other's hands, and the railroad men get clannish and play into each other's hands, why should not the farmers get a little clannish and strive together to get their rights? The fact is the farmer has no cheek; but see the immense cheek that the lawyers and the railroad men have! Notwithstanding that fact, we perhaps need lawyers, and we need railroads, and we are all in favor of them. Here is the Board of Regents: Life members, C. C. Washburn, lumberman; State at large, George H. Paul, business man, what kind of business we can hardly tell; E. W. Keyes, Madison, lawyer; J. M. Bingham, Chippewa Falls, lawyer; J. G. McMynn, Racine, teacher; W. E. Carter, Platteville, lawyer; L. B. Sale, Green Bay, lawyer; John C. Spooner, in place of

Charles D. Parker, lawyer; Hiram Smith, Sheboygan Falls, *farmer;* William F. Vilas, a very great lawyer; George Koeppen, Milwaukee, editor. So we have seven lawyers out of the eleven, and only one farmer. Is not that presumptiousness, or what is it? Christ often said, "Woe unto thee lawyers," and if he had preached in this day and age it would have been more than that. Here is the executive committtee of the board: E. W. Keyes, lawyer; W. F. Vilas, a lawyer of high degree, and W. E. Carter, a lawyer. Lawyers to execute all their wills and wishes, and perhaps rule the whole thing. You see the status of this thing, and you see in this thing, as in other things, lawyers are like these fungi. They are the kings over us, as they claim, by divine right. How shall we get rid of these bacteria?

The resolution was then adopted.

MISCELLANEOUS.

FARM BOOK-KEEPING.

By I. M. Pilcher.

The utility of farm book-keeping is often undervalued by our rural brothers. A great many deem it impracticable because of the time it might take to keep a systematic record of the farm business. Hence a great majority of our farmers depend solely upon their memory, which often proves treacherous, leading them into difficulty and causing an expense and inconvenience many times greater than the cost and trouble of keeping accounts.

A record may be very easily kept. It would require but ten or fifteen minutes' time each evening. This record would be a valuable reference and diary, while at the same time it would exhibit at a glance the gain or loss on any article or commodity in which the farmer deals. To illustrate what we deem a method peculiarly adapted to the farmer, take the following:

We purchase, March 1, twenty-five head of hogs at $2 per head of M. W. Cummings. Paid him cash $50. Built for them a pen costing $5. Set aside four hundred bushels of corn worth thirty cents — $125.

In July we kill one for family use; weight, one hundred and twenty-five pounds, pork being worth at that time five cents — $6.25.

August 1, sell two to neighbor Jones for $12.

August 15, reserve two for stock hogs, valued at $8 each — $16.

October 10, butcher and sell the remaining twenty. Total weight of hogs, five thousand pounds; average, two hundred and fifty pounds. Pork worth six cents. Paid for help to J. Jones, $3; to J. George, $2.50. We estimate bran and shorts consumed by hogs since March 1, $15. Labor for taking care of same, $20.

Now we can tell the whole story with half the words, and show up the result as follows:

HOG ACCOUNT.

	Dr.		Cr.
March 1, for cash 25 head at $2, from M. W. Cummings.	$50 00	July 1, for family use, one; weight 125, at 5c	$6 25
March 1, for cash lumber, $4, nails, $1, bought at Grimes'	5 00	Aug. 1, for cash, two to Jones for	12 00
March 1, for corn, 400 bus., worth 30c.....	120 00	Aug. 15, for stock hogs reserve, two worth $8	16 00
Oct. 10, cash paid Jones and Wing for help two days at $1.25 each...	5 00	Oct. 10, for cash, butchered 10	
Bran and shorts consumed since March 1, estimate ..	15 00	Oct. 22, for cash, butchered 10 wt. of.....	
Labor in taking care of.....	20 00	20, 5,000 lbs. sold to M. & H. for 6c.....	300 00
Total cost.....	$215 00	Total proceeds.....	$334 25
Gain on hogs	119 25		
	$334 25		$334 25

Thus we have a record of every detail, dates, names, weight, worth, etc.; in fact, everything necessary to be known in regard to time and place and cost. We have used but little space, and it has taken but a moment's time. Such a record is valuable to every farmer, and should each one adopt a similar record, there might be saved to the farm hundreds of dollars annually.

"Figures cannot lie," and the man can tell at a glance whether he gains or loses on a certain property. A record of cash receipts and disbursements should be kept, and thus a lesson of economy might be learned from the books, as they exhibit all the little expenses that might be avoided.

HOOD FOR BULLS AND HORSES.

A correspondent of the *Country Gentleman* answers a query in that journal as follows:

"In reply to a request for a device that will prevent a bull from becoming dangerous, and also keep him at home, I will say that such a remedy can be made very cheaply, and after ten years' trial with big and little bulls, I find it very effectual. I take a stout, tough, one and one-half by two inch oak strip,

fifteen inches in length, and bore two three-fourths inch holes in it, so that a hole will come just outside of the base of the horn. Then to this I nail, with a small wrought nail, an old saddle skirt, or, if the bull is simply unruly, a couple of leather boot legs will do. To one side I attach a strap just below the eyes, and on the opposite side a buckle. Then I slip a buckled strap through the holes of the cross-piece, cross them behind his horns, then bring them forward between them and around the strap in front; then buckle securely. The other strap is buckled under his chin, which brings the blinder back sufficiently to prevent his seeing in any way except backward, and yet gives plenty of air and light. By crossing the strap between the horns, the blinder is prevented from being drawn to one side, so as to give free range to one of his eyes. Cheap, safe and durable, it completely hoodwinks him, and he at once gives in and acknowledges his defeat by giving the ground on all occasions.

"In driving a single animal, such a hood is worth all the 'tyings down' with ropes that were ever invented. Within a few rods, they will allow you to drive them and select the best path in the highway, rather than to step into ditches and pitfalls along the fence corners. I have a hood always hanging in the barn, and when I want to drive a bull, or any animal, I can put it on in a moment, and then my running and racing is over.

"It is useful in managing balky horses. A family horse of many caresses and favors concluded this summer that she would work when she felt like it. When she did not feel like it, strings were tied around her ears, sand put in her mouth, oats held temptingly before her, and a twenty-five cent carriage whip shook menacingly before her; but to no avail, and the habit continually grew worse. In a time of great perplexity to get some millet into the barn before an approaching shower, work came to a standstill, and the load of hay stood with it. I thought of a 'blinder,' and taking a heavy woolen cloth, about twelve inches square, tied a cord to each corner, and, drawing it closely over her eyes, secured the four corners to the bridle. The cure was magical. I left it on all day, and no more trouble ensued. The little hood was rolled up in as small a compass as possible, and tied to the

harness; and when 'Kit' is disposed to rest too frequently, it is quickly put in place, and the 'work goes on.' Soon she came to know what it was for, and if she thought preparations were being made to adorn her, she would draw, and for weeks has labored faithfully without it."

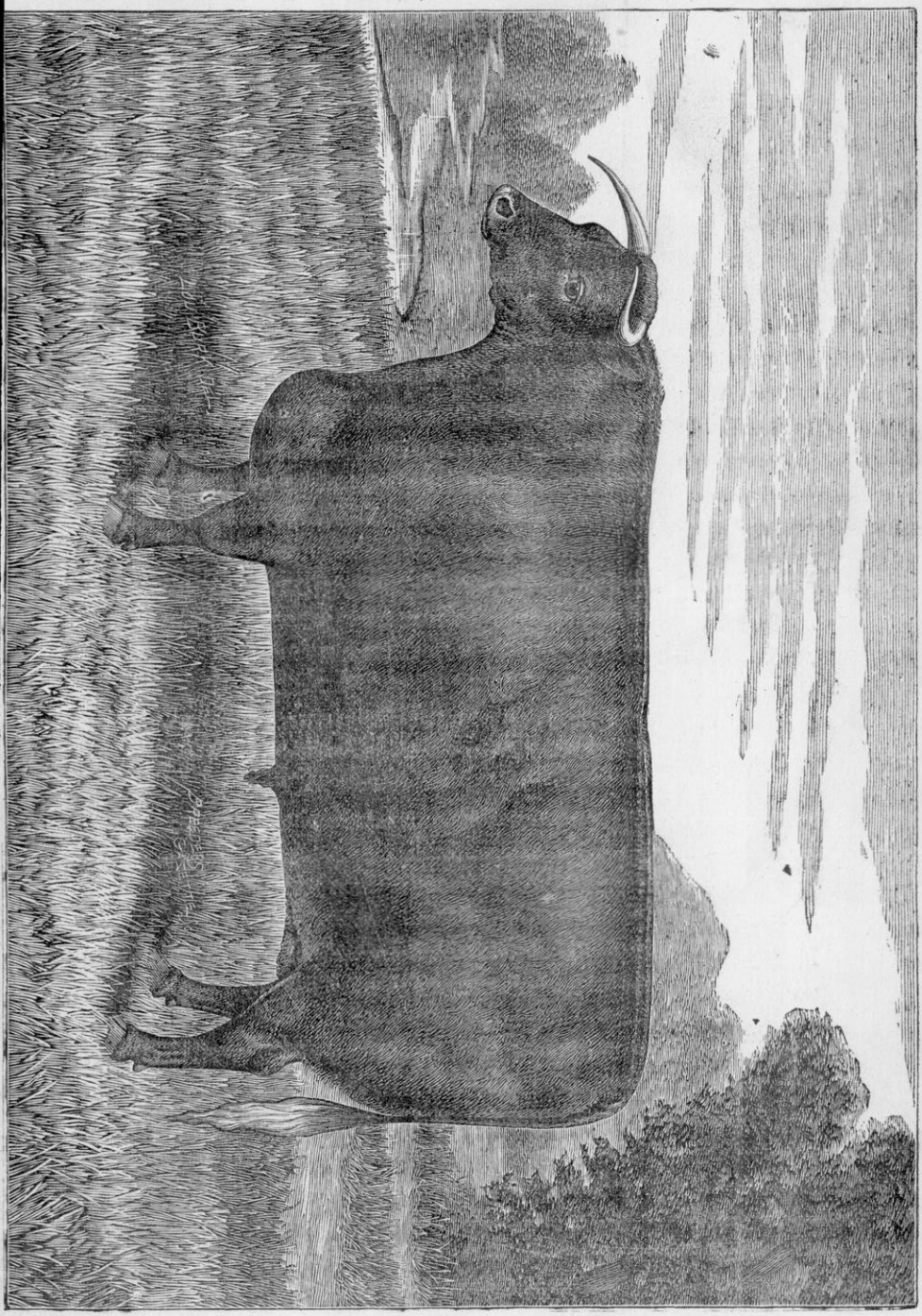
HOW TO RAISE POTATOES FROM THE POTATO BALL.

Take good ripe potato balls, cut them in two crosswise, press the seed out in a cup, put them into a cloth, press out the juice, then spread them on heavy brown paper and let them dry. In the spring, when the weather is sufficiently warm to plant potatoes, plant the seed in drills about one inch deep and mark the ends of the rows, so as to know where your plants will grow. If the plants are too thick in the row, thin them out and keep your bed of plants clean and the ground loose, and hoe them a little when large enough. The first year the potatoes will be as large as hazel-nuts, up to the size of walnuts, and of many different varieties. In the spring, at planting time, you can sort them by the color and look of the sprout at the eye. Plant again, and in the fall you can select the smooth ones from those you do not like on account of too many eyes, etc., then plant again. Your third crop is the one to know what you have got under favorable cultivation.

SHORT-HORN STEER "McMULLEN."

We are indebted to T. H. Glenn, editor of that most excellent paper the *Prairie Farmer*, published in Chicago, for the life-like picture of the grade Short-horn steer "McMullen," winner of the grand sweepstakes prizes at fat stock show in Chicago, in 1881 and 1882, as the best beast of any age or breed.

The steer was the property of John D. Gillett, of Elkhart City, Logan county, Ill., a man who, during the past twenty years, has been recognized as the best feeder of heavy beef cattle in America. At the show of 1881, Mr. Gillett also won the same prize with the



same animal, which is the second instance in the history of the show, that the same beast has carried off the highest honor two years in succession, the other case being that of the famous Kentucky roan steer "Nicholas," owned by Mr. Graves, of Chilesburg, in that state.

McMullen was calved June 5, 1878, and was bred by a neighbor of Mr. Gillett. When a yearling he was purchased by his present owner, and has since fed upon the pastures of the great Logan county farm.

When weighed at the show of 1882, he tipped the beam at two thousand five hundred and sixty-five pounds, having increased four hundred and seventy pounds since the exhibition of the year before. Fault was found with the animal, on the ground that he was too "leggy," standing too high from the ground; that he was rather light in the flanks and thighs, yet in other points he was so wonderfully developed as to call for the unqualified admiration of all who saw him, and the unanimous verdict of the judges in awarding him the grand sweepstakes prize, is sufficient evidence of their appreciation of him as a beef animal.

Some idea can be formed of his massive proportions from the fact that across the loin he measured two and one-half feet. Since last year his heart girth has increased five and one-quarter inches, flank girth eleven and one-half inches, middle girth nine and one-half inches, and width of loin three inches. His height at shoulder has increased two and one-half inches, and at hip two and one-quarter inches, while his height from ground to fore-flank and flank is substantially as it was one year ago.

Mr. Gillett exhibited McMullen as a product of his own peculiar manner of feeding; in this particular his treatment has been the same at all times as that pursued by his owner with all his cattle. He has never been stall fed or housed, and the only feed he has had has been pasture grass and corn. The *Prairie Farmer* commends the show made by Mr. Gillett, and congratulates him upon the success which attended him this year, which is but a repetition of former victories. The special prize by the publishers of that paper was awarded to the owner of McMullen.

THE BERKSHIRE HOG.

BY PHIL. M. SPRINGER.

The subject of this paper is "The Berkshire Hog," an animal which has been bred with a view to improvement for a far greater length of time than any other known breed of swine, and which is to-day acknowledged by all to be the most popular animal of its kind in the world.

Each class of domestic animals are kept for a specific purpose. Horses for motive power; cattle for beef and dairy products; sheep for wool and mutton; hogs for lard, hams and bacon; and the lesser animals each for the profit it may be made to yield in dollars and cents, or the contribution it may bring to the general store of pleasure, making homes more attractive, or affording recreation from the severe toils of life. The more perfectly each class of animals can be made to subserve the purpose for which it is kept, the more profitable and popular does it become. Herein we find an explanation for the high esteem in which the Berkshire hog is held in almost every part of the civilized world.

The improved Berkshires of the present day are a well-defined breed, possessing in an eminent degree definite and valuable qualities, and may be described as follows: Body color, black, with smooth, pliable, plum-colored skin; hair rather fine, soft and thick; feet and tip of tail white, with dash of white in face, and not unfrequently the nose white, and also some white on jowl; forehead and face broad, the latter dished, with eyes rather large, and very clear, and snout short; ears of medium size, thin and very soft, and carried rather upright; neck short, broad on top, with jowl large and full; shoulders broad on top, and deep through the chest; back broad; side deep, and nearly straight on bottom lines; hams large, reaching well forward on back, and well down on hock, well rounded, and deep through, causing the legs to stand well apart; these, as well as the forelegs, short and strong, and standing well on the toes; tail tapering and rather fine, and set well up. In general form, a modern, well-bred Berkshire, in good condition, is symmetrical throughout, attractive in appearance, and recognized at once as an animal of more than

ordinary worth. His average weight at six months of age is one hundred and sixty pounds; at nine months, two hundred and thirty-six pounds; at twelve months, three hundred and twenty-two pounds; at eighteen months, four hundred and thirteen pounds; at twenty-four months, four hundred and ninety-five pounds.

The improved Berkshire is further characterized by the superior quality and proportionate quantity of its flesh, which is tender and juicy, the hams and shoulders being nicely marbled with fat and lean meat, while the sides are also noted for their excellence in these respects, making them especially desirable for curing as bacon. A large, coarse, fat ham is not the kind usually sought after, when people have once tried the fine-grained, rich and well marbled hams produced from the Berkshire hog. Neither is the clear fat side of bacon any longer prized by those who have learned to know the superiority of the Berkshire side, when cured as bacon and brought on the table.

It may be truly said, that in no other animal is there comparatively so little waste as in a well-fattened Berkshire. From the fattening yard until he has passed through the slaughter house, his shrinkage and offal are less than that of any other breed; and after the product has gone through the curing process, and reached the consumer, there is but a small percentage of that waste which usually occurs in the product from other hogs; as, for example, loss arising from excess of bone, disproportion of fat and lean, or coarseness and ill-flavor of the meat — rendering it unpalatable, and therefore not wholly eaten.

In hardiness and endurance the Berkshire may safely be said to excel every other breed of swine; simply because he possesses much higher vital powers. This is no unwarranted assertion, but has been repeatedly affirmed by the best informed authorities in such matters. The National Convention of Swine Breeders, at Indianapolis, in 1872, gave utterance to a similar declaration. But we have later and more positive evidence than this. In 1877 the secretary of the State Board of Agriculture issued a circular to swine breeders requesting information on the subject of the prevailing diseases among hogs. A careful analysis of the replies

received shows that "of one hundred lots of each kind attacked, there died, of the mixed breeds, forty per cent.; of the Poland-Chinas, twenty-eight per cent., and of the Berkshires, only twenty-three per cent."

Berkshire swine are also noted for their docility and prolificacy; the sows usually producing large litters, and proving themselves gentle mothers and good sucklers. The pigs come strong and healthy, and are soon able to care for themselves. The Berkshire also breeds more true to type than any other; hence the pigs are generally very uniform in size and appearance, and grow rapidly and evenly to maturity, and can be made ready for market at an early age. This last is no small advantage in their favor. The successful work of the world in general is conducted on the principle that, in whatever pursuit we engage, or whatever we undertake to do, we make the most of our opportunities and the material we have in hand. Successful hog raising and pork making find no exemption here, where, as in most other operations, quick returns are requisite. No wonder, then, that in this age when "time is money," and men "travel by express, write by telegraph, and print by steam," that a food-producing animal, so profitable as the improved Berkshire, should have become such an universal favorite.

For the purpose of improving the common swine of the country no other hog can be used to better advantage, or with greater certainty of good results, than the Berkshire. Having descended from so long a line of pure-bred ancestors, he possesses in an unrivalled degree the power to stamp upon his progeny his own excellence of form and feeding capacity, as well as vigor of constitution and ability to resist the encroachments of disease. Hence he is in almost constant use for the improvement of common hogs, and has contributed largely toward the "make-up" of some of the more recently introduced breeds of swine. The truth is, the best blood that courses in the veins of most other hogs is Berkshire blood.

As a profitable grazing hog the Berkshire is unexcelled; such is the common testimony of all who have given him a fair trial in this respect. He will thrive and grow fat on a good pasture during the summer months with little or no grain, when other

hogs would have to be liberally and regularly fed to keep them in creditable condition.

As distinguished as Short-horns are among the various breeds of cattle, so have the Berkshires become among swine. The high reputation to which, upon their merits, these have attained, is notably shown by the care with which many breeders have in consequence been led to preserve the pedigrees of their stock. While it is doubtless true that the great value of the breed has of itself been the prime cause of special care in the respect mentioned, it is nevertheless also true that systematic and intelligent breeding, with pedigree in mind, has aided very materially in improving and giving stability of character to the Berkshire hog of modern times. There is no question but that the American fine stock breeders are far in advance of their English cousins in the matter of pedigree breeding. The foremost men in the business in England have already observed this, and some have taken occasion to cite the example of Americans in this advance move as worthy of emulation.

It is well known that numerous representatives of the best strains of English Berkshires have been brought to this country. Owing to change of climate, as well as to difference in handling and feeding, the descendants of these imported animals are, in a few generations, somewhat changed in character from that of their English-bred ancestors. The variation, however, is only such as make them all the better suited for breeding back to the parent stock. Since the establishment of a public record of Berkshire swine, English breeders have found it practicable to secure from America animals well calculated to keep their own herds up to the requirements of the day, without having to encounter the evil results of too close relationship in breeding. The shipment of pure-bred Berkshires to Europe is a reaction worthy of note, foreshadowing, as it certainly does, a bright future to our breeders; for we now find the most intelligent breeders on both sides of the Atlantic mutually interested in the perpetuity of this matchless breed of swine, which, for more than a century past, has been known in England, and for nearly half a century has engaged attention in this country.

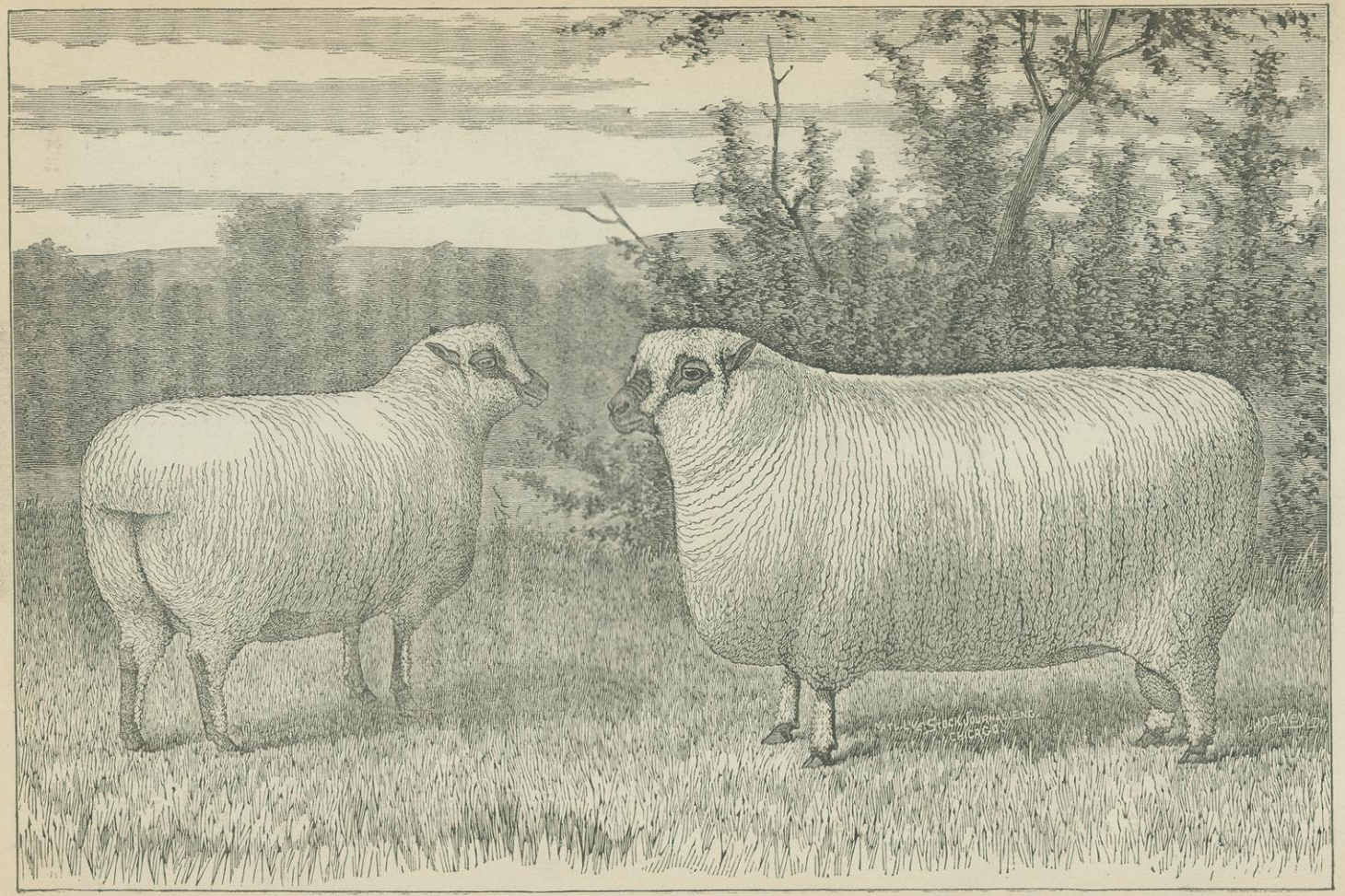
To England must always be given the honor of having been the original home of the Berkshire; but America, with its great natural advantages in soil and climate, may soon become the most noted portion of the world for the production of Berkshires of the highest type of excellence.

While we are pleased to see the Berkshire so universally disseminated and highly esteemed, we may also rejoice in the encouragement given to the culture of other breeds of swine. Some of these have special characteristics which render them well adapted to special uses, or to the particular necessities of certain localities. In nearly every case, however, the admirers of these newer breeds measure and weigh the excellencies of their favorites by the Berkshire pattern of perfection; another evidence is of the acknowledged superiority of the improved Berkshire to all others, and that its name will long retain a place of honor in the list of our domestic animals.

One breed may rise, another fall,
The Berkshire hog survives them all.

SOUTHDOWN SHEEP.

The cut of these beautiful animals, so artistically engraved, was contributed from the extensive printing establishment of Gen. David Atwood, editor and proprietor of *The Wisconsin State Journal.* The animals represented are the property of Mr. A. O. Fox, of Oregon, Dane county, Wisconsin, and they have taken the first prize at all of the great fairs of the northwestern states. Their admirers are to be counted by thousands. Mr. Fox makes the breeding of Downs a specialty, and spares neither time, pains nor money in obtaining the best importations from Europe. Thus he is enabled to keep his flock bred up tothe highest standard of excellence. Wisconsin is the sixth state in the Union in numbers of sheep, and, as *The Prairie Farmer* most truly says, in the line of animal husbandry, there is nothing which presents more attractions than that of raising and breeding sheep. In Texas and Colorado this industry has assumed proportions which are astonishing. In the former state there are now over six



SOUTHDOWN SHEEP.

million sheep, and the improvement in quality is as marked in the flocks as in the great cattle herds, where there has been a yearly decrease in the number of long-horned, coarse-meated native stock. Within the past two years many enterprising herdsmen have disposed of their cattle, and are now going into the business of raising sheep, and recent importations of fine-wooled rams indicate that the business is yet in its infancy. Northern breeders of good sheep cannot supply the demand for the best bred stock, and the time cannot be far distant when this immense growth in number and quality will have its effect upon the importation of European wool.

In conversation with a gentleman well known as a breeder of fine-wool sheep, a representative of *The Prairie Farmer* obtained interesting data in regard to this industry. From reliable information the gentleman gave it as his judgment, that the sheep industry of the entire country would within ten years largely exceed both in numbers and the quality of its yield, both in wool and mutton, that of the whole world, excepting perhaps Australia. In his opinion the time was not far distant when American wool would be as good as that of any country in the world, and the introduction of more of the best mutton sheep would at the same time produce mutton equal in quality and flavor to the famous Southdowns of England.

Of course issue will at once be taken to this prediction, upon the ground that the climatic changes in this country are such as to preclude any such result; and whilst there may be more or less virtue in this assertion, yet the careful breeding and improved methods of American breeders may bring about the results predicted.

STATEMENT OF THE PRINCIPAL FARM PRODUCTS GROWING IN THE SEVERAL COUNTIES AT THE TIME OF MAKING ANNUAL ASSESSMENT FOR 1882.

COUNTIES.	NUMBER OF ACRES.							
	Wheat.	Corn.	Oats.	Barley.	Rye.	Potatoes.	Root crops.	Cranberries.
Adams	3,003	12,155	7,305	135	12,908	1,132	67	102
Ashland	1	27	75	18	21	147	54	.....
Barron	7,669	1,926	7,613	459	130	521	28	14
Bayfield	10	4	20	.....	.....	60	10	.....
Brown	14,007	2,251	14,413	3,793	2,686	1,710	98	.....
Buffalo	40,453	14,362	19,125	6,729	1,953	1,520	48	1
Burnett	1,778	251	991	68	187	133	45	509
Calumet	22,153	6,113	12,083	15,462	2,652	1,156	36	.....
Chippewa	18,929	5,679	14,196	2,856	146	1,926	85	.....
Clark	1,780	2,290	5,450	449	364	805	97	.....
Columbia	33,180	49,833	29,599	15,059	6,432	2,935	101	35
Crawford	12,376	17,179	16,893	1,725	2,022	1,158	4	.....
Dane	28,918	98,936	74,520	34,125	10,412	3,840	70	.....
Dodge	73,571	34,252	32,365	37,238	7,399	3,265	92	.....
Door	9,888	277	6,524	801	826	950	238	12
Douglas	35	25	45	.....	.....	75	12	.....
Dunn	27,834	15,186	22,924	1,613	1,536	1,211	54	.....
Eau Claire	34,357	10,502	17,514	999	573	1,626	87	.....
Fond du Lac	49,465	25,642	29,701	18,832	5,879	3,585	396	.....
Grant	13,997	92,373	72,061	2,142	7,385	3,659	13	.....
Green	4,666	57,725	38,802	507	3,880	1,575	2	.....
Green Lake	21,448	19,945	11,542	3,719	4,843	990	24	13
Iowa	13,047	48,863	43,358	2,510	2,190	1,713	21	.....
Jackson	13,809	10,174	16,201	5,716	1,819	727	15	1,301
Jefferson	19,342	27,412	17,363	14,721	5,783	2,132	70	.....
Juneau	6,265	13,081	19,386	976	3,819	2,255	111	2,739
Kenosha	2,408	13,684	14,315	1,276	462	983	37	.....
Kewaunee	21,735	4,408	10,303	2,499	2,470	2,502	108	.....
La Crosse	17,875	18,973	16,868	5,379	7,356	1,254	36	.....

La Fayette	5,549	78,525	57,145	1,636	2,179	1,490	13	.....
Langlade	117	99	195	34	94	86	40	.....
Lincoln	352	18	910	20	7	149	32	.....
Manitowoc	33,961	1,745	22,154	10,384	7,721	2,275	93	6
Marathon	5,739	262	7,484	676	780	946	219	.....
Marinette	1,009	141	1,198	76	182	441	15	.....
Marquette	6,371	15,123	6,665	103	22,010	1,305	58	228
Milwaukee	6,282	6,374	12,177	8,824	3,419	3,593	263	.....
Monroe	25,963	16,362	21,343	3,657	3,892	2,035	83	477
Oconto	2,586	1,212	2,990	378	360	836	159	.....
Outagamie	22,775	9,525	16,971	6,936	1,801	1,881	78	50
Ozaukee	16,404	3,613	11,470	10,098	4,619	1,700	142	.....
Pepin	11,316	6,327	5,214	1,037	1,537	454	6	.....
Pierce	53,518	11,046	14,101	5,428	454	938	47	.....
Polk	21,157	3,151	7,658	520	262	758	285	61
Portage	13,352	10,419	11,207	1,531	11,723	4,213	114	133
Price	3	8	69	6	.....	721	401	.....
Racine	7,409	14,678	18,230	2,428	1,786	1,676	50	.....
Richland	14,691	26,368	13,511	204	1,039	1,191	5	.....
Rock	10,438	78,369	53,407	26,240	8,334	2,920	44	.....
St. Croix	85,936	9,129	20,542	2,564	816	1,420	47	2
Sauk	17,637	34,503	29,128	4,539	8,141	3,681	87	2
Shawano	10,388	3,130	8,257	1,790	1,584	1,031	277	41
Sheboygan	21,673	9,257	20,767	15,602	9,168	2,782	303	20
Taylor	35	52	271	10	17	207	89	40
Trempealeau	34,023	20,293	27,509	11,625	4,951	12,117	56	.....
Vernon	23,580	30,243	33,480	6,545	1,966	1,831	33	.....
Walworth	14,200	47,100	28,850	13,655	2,349	1,810	37	10
Washington	39,099	12,141	15,949	16,219	9,087	2,269	62	6
Waukesha	29,379	24,312	21,467	16,541	7,456	3,958	265	31
Waupaca	11,394	9,806	12,243	3,033	7,329	4,486	47	93
Waushara	10,806	15,965	10,657	449	15,710	2,362	71	724
Winnebago	29,867	18,344	18,213	4,024	1,118	2,199	51	19
Wood	455	874	1,525	95	860	425	125	421
Total	1,101,463	1,122,022	1,104,512	356,713	238,884	115,731	5,756	7,090

STATEMENT OF PRINCIPAL FARM PRODUCTS GROWING IN 1882—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	188	6,800	2	262	4	2,088	28,331	2,996	$44,243
Ashland	8	.....	.....	.....	1	525	576,000	101	2,644
Barron	51	1,389	.....	10	.....	5,692	31,497	1,724	22,753
Bayfield	3	150	.....	.....	.....	315	[1]944,640	35	1,000
Brown	251	9,020	12	.....	2	18,469	15,652	5,615	74,216
Buffalo	202	10,202	3	.....	7	15,908	28,727	6,178	83,979
Burnett	.....	131	.....	.....	.....	257	66	767	5,892
Calumet	604	20,555	.....	17	.....	13,480	41,725	6,782	134,297
Chippewa	37	4,762	.....	.....	.....	9,983	107,945	2,973	38,101
Clark	248	5,736	.....	.....	.....	16,154	[1]128,647	2,399	39,727
Columbia	1,774	66,370	5	147	84	44,114	77,492	1,199	212,738
Crawford	961	32,944	1	1	12	16,160	59,416	4,540	67,820
Dane	3,213	118,701	39	40	7,728	59,536	105,870	20,557	374,285
Dodge	2,773	98,304	16	14	12	33,988	42,354	17,396	322,848
Door	179	3,487	1	.....	.....	9,869	26,698	2,524	36,234
Douglas	6	125	.....	.....	.....	100	225,000	130	3,250
Dunn	176	7,556	.....	26	.....	15,563	[1]90,261	5,174	73,615
Eau Claire	283	8,223	.....	.....	.....	6,633	9,079	3,795	65,350
Fond du Lac	2,645	89,098	106	36	10	49,539	48,590	14,272	287,712
Grant	3,206	137,621	3,133	36	22	56,845	126,468	15,523	279,023
Green	1,970	83,202	31	5	135	50,688	54,111	17,430	434,092
Green Lake	1,222	48,024	174	17	16	9,380	26,335	5,175	87,986
Iowa	1,079	50,162	524	4	8	29,484	57,374	11,040	192,585
Jackson	214	6,463	4	50	5	12,003	40,910	3,805	58,467
Jefferson	2,943	102,565	.....	312	380	20,176	29,917	16,052	346,962
Juneau	457	15,613	1	338	.....	10,254	24,901	3,898	61,077
Kenosha	2,028	60,738	3,559	.....	.....	21,826	14,033	5,451	126,458
Kewaunee	208	10,021	3	2	11	10,569	28,750	5,635	81,173
La Crosse	429	16,963	.....	122	5	20,918	50,807	5,557	96,493
La Fayette	1,438	58,447	1,296	.....	.....	40,849	34,866	12,641	245,723

Langlade	.....	.....	.....	.....	.....	385	[1] 96,286	168	2,995
Lincoln	.....	.....	.....	.....	.....	1,090	530,000	253	2,289
Manitowoc	855	26,579	2	.....	7	29,897	53,957	12,850	217,612
Marathon	23	1,051	.....	.....	.....	9,386	477,753	3,980	37,035
Marinette	.....	.....	.....	.....	.....	2,592	[1] 275,000	622	10,763
Marquette	546	13,035	12	23	17	6,903	55,728	3,566	53,557
Milwaukee	2,228	69,053	51	30	.....	17,675	14,752	7,327	162,920
Monroe	639	19,340	.....	78	2	23,153	44,609	6,757	94,188
Oconto	200	3,772	2	1	5	4,566	[1] 95,001	1,430	25,492
Outagamie	758	22,160	12	4	1	23,085	82,603	7,450	119,207
Ozaukee	1,179	40,315	5	.....	2	14,863	18,390	7,095	127,817
Pepin	53	2,443	.....	.....	.....	3,872	6,147	1,830	25,068
Pierce	316	8,379	.....	2	1	18,417	116,050	5,190	86,984
Polk	48	2,292	2	.....	.....	2,397	160,135	2,839	42,738
Portage	173	2,416	.....	203	.....	11,195	34,373	3,820	54,133
Price	.....	.....	.....	.....	.....	808	194,100	86	2,128
Racine	2,330	85,165	5,032	.....	.....	16,821	15,222	6,341	141,488
Richland	1,010	35,015	2	10	16	29,443	121,027	6,760	127,928
Rock	3,648	134,518	37	.....	6,232	63,520	50,324	15,253	358,018
St. Croix	184	8,877	.....	.....	1	21,474	83,287	4,761	103,440
Sauk	1,656	61,891	4	388	22	29,962	92,571	10,590	191,821
Shawano	303	11,741	.....	.....	3	75,571	22,262	2,854	40,428
Sheboygan	2,484	90,301	.....	21	1	41,323	59,340	18,982	355,460
Taylor	11	89	2	6	10	1,746	613,564	436	10,482
Trempealeau	272	10,895	10	9	12	18,813	32,241	6,124	94,577
Vernon	1,121	44,156	226	31	100	30,986	105,882	8,282	139,501
Walworth	3,495	118,623	128	4	16	46,894	46,609	12,632	327,513
Washington	2,108	64,474	.....	4	.....	18,309	47,821	10,249	153,887
Waukesha	3,475	112,494	29	91	3	36,579	83,745	10,890	230,185
Waupaca	346	14,745	.....	361	.....	21,648	63,593	6,152	85,544
Waushara	226	10,665	.....	58	13	7,917	51,174	5,500	90,402
Winnebago	1,312	71,279	1	18	18	24,879	17,314	9,154	192,835
Wood	89	1,998	.....	11	.....	3,125	39,550	990	13,912
Totals	59,884	2,161,133	14.467	2,792	14,924	1,260,639	6,876,872	411,477	$7,623,090

[1] From last report.

STATEMENT OF PRINCIPAL FARM PRODUCTS GROWN IN THE SEVERAL COUNTIES IN 1881.

COUNTIES.	NUMBER OF BUSHELS.								
	Wheat.	Corn.	Oats.	Barley.	Rye.	Potatoes.	Root crops.	Cranberries.	Apples.
Adams	27,462	263,353	131,324	1,602	73,671	73,534	8,674	366	825
Ashland	25	260	1,791	365	495	13,503	4,266	.....	.....
Barron	101,548	40,463	170,811	12,116	1,325	32,902	11,357	137	601
Bayfield	150	200	2,000	.....	.....	8,000	1,000	.....	400
Brown	183,219	63,644	353,180	51,927	42,310	120,125	21,716	.....	2,342
Buffalo	484,846	322,561	426,918	61,106	9,828	98,128	5,299	.....	2,419
Burnett	24,974	6,873	22,903	1,155	2,557	8,119	4,155	6,453	39
Calumet	316,798	182,858	430,317	328,760	35,670	63,104	4,696	.....	573
Chippewa	336,605	139,441	436,181	22,389	2,563	87,644	18,263	.....	1,145
Clark	25,043	77,066	133,434	5,618	7,673	57,081	8,428	115	1,669
Columbia	360,339	1,251,356	76,766	238,346	36,561	189,636	7,512	177	3,478
Crawford	115,616	454,451	310,566	19,213	14,886	95,043	977	.....	4,578
Dane	302,123	2,502,338	1,818,982	526,708	114,120	231,550	6,442	48	7,449
Dodge	962,477	935,239	1,263,245	653,472	37,946	247,093	27,676	.....	24,452
Door	151,337	10,728	146,784	15,512	8,886	65,351	32,834	2	340
Douglas	150	175	300	.....	.....	2,000	300	.....	.....
Dunn	394,515	327,605	555,998	28,307	11,697	87,275	18,055	.....	3,948
Eau Claire	437,649	273,890	436,374	22,821	5,272	81,042	20,038	7	1,850
Fond du Lac	666,704	683,308	909,231	354,548	42,494	231,338	13,305	.....	5,958
Grant	133,945	2,758,239	1,512,043	32,120	37,216	254,038	666	.....	17,731
Green	33,455	1,719,580	1,073,185	8,125	24,934	86,520	682	.....	11,048
Green Lake	230,019	557,241	306,640	53,399	30,535	69,360	4,247	71	5,013
Iowa	142,091	1,336,696	1,083,737	37,433	12,844	114,228	444	.....	7,269
Jackson	200,903	245,839	442,881	81,969	12,758	58,670	5,786	7,010	1,023
Jefferson	226,278	931,088	454,499	298,881	51,402	156,713	8,765	30	11,615
Juneau	66,110	246,745	308,217	15,574	29,488	155,186	9,284	19,970	1,198
Kenosha	16,402	568,303	427,870	19,736	3,916	46,899	1,550	.....	34,247
Kewaunee	260,597	32,774	222,211	38,030	35,477	85,934	6,286	.....	535
La Crosse	201,442	467,513	432,397	79,588	44,268	102,997	7,370	103	1,296

La Fayette	58,036	1,958,326	1,321,817	24,093	10,821	97,574	470	.....	2,593
Langlade	1,656	2,611	3,807	165	1,677	12,022	10,166	40	.....
Lincoln	5,573	310	23,621	204	165	6,045	720	.....	.....
Manitowoc	484,847	42,733	676,527	218,788	117,702	152,283	15,000	65	5,500
Marathon	69,843	9,535	160,474	10,589	17,428	56,874	26,449	2,275	412
Marinette	16,047	2,511	28,700	1,682	3,745	34,198	1,800	.. ....	.....
Marquette	53,818	364,865	142,686	14,009	83,969	78,519	5,036	425	2,963
Milwaukee	98,721	279,097	407,016	167,196	44,925	284,668	36,321	.....	38,114
Monroe	334,284	370,090	510,340	60,270	26,857	141,097	9,418	15,331	1,607
Oconto	34,005	35,774	74,885	6,956	7,107	45,302	16,353	10	2,066
Outagamie	351,296	308,965	618,625	137,519	27,752	157,106	26,908	130	1,844
Ozaukee	229,006	89,439	357,650	185,070	45,753	148,867	22,456	... ...	5,200
Pepin	128,667	131,780	119,697	8,462	13,546	35,831	7,080	20	1,152
Pierce	680,073	280,416	369,379	79,759	3,738	100,536	3,941	.....	4,508
Polk	310,782	74,368	189,593	9,419	2,966	67,335	38,040	2,674	1,075
Portage	156,338	247,587	269,707	20,818	89,503	250,149	13,684	2,060	310
Price	5	....	1,784	35	10	40,550	29,155	.....	.....
Racine	71,555	477,786	526,701	33,189	18,739	123,693	12,918	.....	30,260
Richland	185,432	797,825	290,459	3,264	8,307	115,444	1,590	.....	12,601
Rock	107,717	1,916,913	1,294,546	511,446	77,092	162,500	13,018	.....	19,252
St. Croix	1,180,524	219,470	537,807	35,657	6,954	107,991	26,504	380	3,954
Sauk	185,270	980,849	834,407	68,739	48,248	230,758	6,693	1	9,428
Shawano	161,900	61,145	175,234	19,521	27,497	57,942	10,962	111	824
Sheboygan	352,370	261,453	700,102	313,739	118,959	192,899	61,733	150	8,617
Taylor	414	474	4,782	165	623	11,164	3,280	215	11
Trempealeau	537,656	441,371	723,100	154,875	26,141	78,080	4,687	2	1,850
Vernon	288,011	680,916	806,049	80,506	13,725	146,729	6,192	.....	6,688
Walworth	125,001	1,503,464	732,422	209,571	15,882	105,510	4,327	3	28,008
Washington	495,720	417,498	5 8,574	310,719	95,248	173,926	14,396	6	11,886
Waukesha	345,174	716,200	618 897	313,390	49,869	291,743	36,148	50	30,894
Waupaca	150,210	255,747	338,578	51,938	62,583	254,892	7,353	2,369	3,646
Waushara	99,338	406,325	260,186	5,283	93,645	123,664	7,287	3,762	2,296
Winnebago	465,850	613,190	630,327	67,740	13,406	152,742	20,864	486	2,517
Wood	4,880	10,961	23,876	638	3,151	19,541	6,010	6,380	307
Total	14,172,841	30,359,821	28,183,140	6,134,234	1,909,525	6,982,087	757,032	71,434	393,424

STATEMENT OF THE PRINCIPAL FARM PRODUCTS GROWN IN 1881—continued.

COUNTIES.	No. of Bushels		No of Acres Harvested for Seed.		No. of Pounds.					
	Clover seed.	Timothy seed	Clover.	Timothy.	Flax.	Hops.	Tobacco.	Grasses, tons.	Butter.	Cheese.
Adams	3,297	232	2,105	135	.....	84,980	1,789	4,158	207,555	3,100
Ashland	4	4	.....	.....	.....	.....	.....	418	655	195
Barron	20	73	25	10	1	6,410	565	6,422	89,952	320
Bayfield	.....	.....	.....	.....	.....	.....	.....	500	900	.....
Brown	604	5	341	26	1	.....	413	15,764	244,557	118,620
Buffalo	1,322	283	1,056	147	35	102	2,244	16,796	24,841	26,080
Burnett	.....	.....	3	.....	.....	.....	.....	257	140,591	762
Calumet	5,939	27	3,064	16	356	6,612	.....	15,296	407,326	412,488
Chippewa	84	161	19	8	.....	.....	65	10,576	157,008	175
Clark	656	129	269	4	.....	.....	713	20,677	190,461	20,831
Columbia	3,621	12,759	3,718	2,459	812	41,405	33,758	37,195	887,904	300,778
Crawford	448	60	417	35	1,547	208	29,806	13,783	241,955	.....
Dane	4,552	2,332	4,891	608	36,477	8,959	6,176,344	68,404	1,697,575	495,505
Dodge	3,519	3,814	4,659	1,310	16,000	5,235	9,600	37,469	935,862	1,057,135
Door	280	13	106	.....	.....	.....	.....	54	10,030	147,225
Douglas	.....	4	.....	.....	.....	.....	.....	150	2,000	.....
Dunn	123	191	36	64	.....	11,017	.....	12,785	351,188	375
Eau Claire	1,061	371	724	102	.....	.....	.....	10,836	311,363	64,477
Fond du Lac	3,207	7,518	3,038	1,328	38,714	16,772	1,475	64,979	688,841	801,843
Grant	6,044	1,911	7,674	592	2,073,742	3,800	16,855	44,596	886,197	76,216
Green	3,805	4,100	3,654	882	12,426	1,000	105,045	45,705	963,897	2,474,631
Green Lake	1,625	22,029	1,421	4,394	5,739	7,550	4,425	11,465	260,775	75,982
Iowa	2,422	708	1,597	239	308,700	280	2,100	28,942	778,078	4,125
Jackson	1,746	364	1,037	100	.....	25,130	8,019	15,178	202,937	6,509
Jefferson	3,708	103	3,262	108	.....	178,535	274,941	29,966	677,596	4,023,577
Juneau	1,400	289	1,146	77	60	115,832	.....	8,090	231,159	20,072
Kenosha	1,690	1,058	1,816	316	1,330,119	.....	.....	22,891	476,311	210,712
Kewaunee	1,298	135	692	52	80	176	8,061	11,390	150,458	97,249
La Crosse	1,400	142	1,345	32	.....	27,412	7,895	18,477	396,424	56,220

La Fayette	2,578	1,654	3,096	555	324,512	.....	5,300	29,003	986,763	19,300
Langlade	2	2	.....	.....	.....	.....	40	255	4,929	.....
Lincoln	.....	.....	.....	.....	.....	.....	.....	.....	2,505	.....
Manitowoc	7,809	296	2,824	657	300	.....	317	28,598	375,715	1,159,137
Marathon	5	27	2	3	.....	11	264	12,535	79,746	.....
Marinette	.....	.....	.....	.....	.....	.....	.....	2,429	.....	.....
Marquette	3,023	567	2,572	201	65	5,717	1,612	4,798	218,591	11,780
Milwaukee	583	115	359	.....	46,344	7,000	.....	25,757	567,238	48,290
Monroe	4,110	809	3,565	413	25	40,990	3,600	24,697	379,746	16,830
Oconto	113	202	65	20	.....	5	2,215	7,048	96,918	8,188
Outagamie	3,737	183	2,094	208	192,000	2,410	382	25,988	463,111	191,336
Ozaukee	3,796	47	4,336	23	100	.....	660	19,170	299,502	293,895
Pepin	117	114	44	38	.....	130	.....	3,964	93,065	16,475
Pierce	1,201	140	679	53	.....	800	674	19,147	294,207	2,275
Polk	7	15	15	3	1	.....	639	3,022	165,853	3,101
Portage	2,677	343	1,721	188	.....	86,156	377	13,425	227,796	670
Price	.....	.....	.....	.....	.....	.....	.....	341	682	1,350
Racine	1,863	304	1,662	158	2,217,874	19	100	20,813	494,600	19,950
Richland	,096	151	802	142	10	4,074	7,415	24,151	496,252	368,000
Rock	4,097	8,002	5,925	1,773	20,440	.....	4,566,851	47,001	1,383,303	755,386
St. Croix	1,107	1,023	855	292	6,483	.....	2,618	15,770	376,405	109,203
Sauk	3,379	1,755	4,016	505	614	125,892	15,230	38,511	612,814	543,807
Shawano	472	37	129	152	.....	.....	2,547	7,822	90,159	400
Sheboygan	7,922	438	6,103	159	.....	5,630	397	38,020	438,648	5,648,780
Taylor	.....	2	.....	.....	.....	.....	40	1,568	29,858	120
Trempealeau	2,107	1,704	1,654	486	105	2,174	14,150	24,988	395,276	8,456
Vernon	1,972	486	1,712	246	205,250	9,123	120,735	26,820	496,827	22,755
Walworth	5,940	14,862	6,718	2,059	65,470	1,070	12,250	50,567	970,139	1,192,396
Washington	8,078	80	7,755	23	7,201	1,000	663	23,052	456,003	373,988
Waukesha	4,561	291	5,589	84	16,256	41,599	1,655	37,689	895,942	467,652
Waupaca	5,210	592	3,306	144	16,500	22,256	1,416	20,896	366,807	88,827
Waushara	2,208	635	2,208	605	.....	17,043	1,560	7,503	232,854	86,920
Winnebago	2,240	249	2,213	112	31,080	8,260	9,285	33,681	625,463	509,790
Wood	.....	1,073	.....	.....	.....	.....	15	2,899	28,563	.....
Total	135,894	95,013	120,134	23,245	6,975,439	922,304	11,457,120	1,215,027	24,233,676	22,464,259

LIST OF OFFICERS OF AGRICULTURAL SOCIETIES FOR 1882, WITH THEIR P. O. ADDRESS AND PLACE AND DATE OF HOLDING FAIRS IN 1881.

COUNTIES.	Name of society, and place and date of holding fair of 1881.	Name and postoffice address of president.	Name and postoffice address of secretary.	Name and postoffice address of treasurer.
Adams.....	Adams County Agricultural Society, Friendship, Sept. 28–29.	L. W. Holmes, Roche-a-Cri.	W. R. Newton, Friendship.	A. F. Hill, Friendship.
Barron.....	Barron County Agricultural Society, Shetek, Sept. 15–17.	W. W. Flinn, Moose Ear.	Fred Telke, Barron.	R. L. Young, Rice Lake.
Brown.....	Brown County Horticultural & Agricult'l Soc., De Pere, Sept. 20–23.	John M. Smith, Green Bay.	Werden Reynolds, Green Bay.	Wilhelm Pamperin, Ft. Howard.
Buffalo.....	Buffalo County Agricultural Society, Alma, Oct. 5–7.	Thomas Shane, Modena.	Charles Schaettle, Jr., Alma.	Erik Alme, Alma.
Burnett.....	Burnett County Agricultural Society, Grantsburg, Sept. 28–30.	France Oscar Olson, Grantsburg.	John O. Newgard, Grantsburg.	Simon Thoreson, Grantsburg.
Calumet.....	Calumet County Agricultural Society, Chilton, Oct. 5–7.	John M. Nugent. Sherwood.	C. G. Cone, Chilton.	Wm. Paulson, Chilton.
Chippewa...	Chippewa County Agricultural Society, Chippewa Falls, Sept. 20–22.	E. D. Stanley, Chippewa Falls.	H. H. Todd, Chippewa Falls.	W. B. Bartlett, Chippewa Falls.
Columbia...	Columbia County Agricultural Society, Portage City, Sept. 13–15.	David Owens, Portage City.	Kennedy Scott, Rio.	John Foster, Fall River.
Columbia...	Lodi Union Agricultural Society, Lodi, Oct. 4–6.	A. A. Boyce, Lodi.	E. W. Gardner, Lodi.	Job Mills, Lodi.
Crawford...	Crawford County Agricultural Society, Seneca, Sept. 14–17.	D. W. Briggs, Mt. Sterling.	A. B. Withee, Seneca.	James Smith, Seneca.
Dane.....	Dane County Agricultural Society, Madison, Sept. 26–28.	Clement E. Warner, Windsor.	Geo. C. Russell, Madison.	Wm. T. McConnell, Madison.
Dodge.....	Dodge County Agricultural Society, Juneau, Oct. 4–7.	James B. Hayes, Horicon.	J. G. Allard, Juneau.	Eli Hawks, Juneau.
Door.....	Door County Agricultural Society, Sturgeon Bay, Sept. 23, 24	A. W. Lawrence, Sturgeon Bay.	C. M. Smith, Sturgeon Bay.	Chris. Leonhardt, Sturgeon Bay,
Grant.....	Grant County Agricultural Society, Lancaster, Sept. 21–23.	J. J. McKinzie, Lancaster.	L. J. Arthur, Lancaster.	J. H. Reed, Lancaster.

Grant.....	Boscobel Agricultural and Driving Park Asso'n, Boscobel, Oct 4-7.	Geo. F. Hildebrand, Boscobel.	T. J. Brooks, Boscobel.	Theo. Kronshage, Boscobel.
Green.....	Green County Agricultural Society, Monroe, Sept. 14-17.	F. W. Byers, M. D., Monroe.	A. S. Douglas, Monroe.	Willis Ludlow, Monroe.
Iowa.....	Southwestern Wis. Industrial Association, Mineral Point, Sept. 6-9.	Geo. G. Cox, Mineral Point.	C. W. McIlhon, Mineral Point.	Thos. Priestley, Mineral Point.
Iowa.....	Iowa County Agricultural Society, Dodgeville, Oct. 5-8.	Joel Whitman, Dodgeville.	Wm. H. Prideaux, Dodgeville.	Jas. J. Hoskins, Dodgeville.
Jackson.....	Jackson County Agricultural Society, Black River Falls, Sept. 27-29.	W. T. Murray, Black River Falls.	B. J. Castle, Black River Falls.	J. H. Mills, Black Riv. Falls.
Jefferson....	Jefferson County Agricultural Society, Jefferson, Sept. 13-16.	Mark Custis, Hebron.	D. G. Craig, Ft. Atkinson.	Yale Henry, Jefferson.
Jefferson....	Central Wis. Agricultural and Mechan'l Asso'n, Watertown, Sept. 19-23.	S. G. Roper, Watertown.	G. P. Brooks, Watertown.	Joseph Saliek, Watertown.
Juneau.....	Juneau County Agricultural Society, Mauston, Sept. 21-23.	C. W. Potter, Mauston.	J. C. Wetherby, Mauston.	M. Temple, Mauston.
Kenosha....	Kenosha County Agricultural Society, Kenosha, Sept. 20-22.	I. J. Clapp, Kenosha.	D. A. Mahoney, Salem.	Geo. Head, Kenosha.
Kewaunee...	Kewaunee County Agricultural Society, Kewaunee, Oct. 3-5.	Vayta Mashek, Kewaunee.	Jos. E. Darbelley, Kewaunee.	Wolfgang Seidl, Kewaunee.
La Crosse...	La Crosse County Agricultural Society, West Salem, Sept. 13-15.	Wm. Hartley, La Crosse	A. J. Phillips, West Salem.	Simon Mahlum, West Salem.
Manitowoc..	Manitowoc County Agricultural Society, Clark's Mills, Sept. 20-22.	R. S. O'Connell, Cato.	W. H. Nelson, Cato.	C. Larson, Oslo.
Marquette...	Marquette County Agricultural Society, Packwaukee, Sept. 21.	Wm. Johnson, Oxford.	W. W. Page, Douglas Center.	John Ellis, Moundville.
Monroe.....	Monroe County Agricultural Society, Sparta, Sept. 13-15.	A. H. Isham, Sparta.	B. E. McCoy, Sparta.	Ira A. Hill, Sparta.
Monroe.....	Eastern Monroe County Agricultural Society, Tomah, Sept. 14-16.	David Johns, Tomah.	Edwin L. Bolton, Tomah.	Wm. Y. Baker, Oakdale.
Outagamie..	Outagamie County Agricultural Society, Appleton, Sept. 7-9.	John Dey, Greenville.	F. W. Harriman, Appleton.	R. H. Randall, Appleton.
Ozaukee....	Ozaukee County Agricultural Society, Saukville, Oct. 4-5.	A. M. Alling, Saukville.	L. C. Larson, Port Washington.	Michael Dempsey, Saukville.
Pepin.....	Pepin County Agricultural Society, Durand, Aug. 31 - Sept. 2.	S. L. Plummer, Arkansaw.	Miletus Knight, Durand.	Geo. Tarrant, Durand.

LIST OF OFFICERS OF AGRICULTURAL SOCIETIES FOR 1882, WITH THEIR P. O. ADDRESS AND PLACE AND DATE OF HOLDING FAIRS IN 1881—continued.

COUNTIES.	Name of society, and place and date of holding fair of 1881.	Name and post office address of president.	Name and post office address of secretary.	Name and post office address of treasurer.
Pierce.....	Pierce County Agricultural Society, Preston, Sept. 22 23.	Geo. W. W. Murphy, Prescott.	Frank A. Ross, Prescott.	John A. Stinott. Prescott.
Portage	Portage County Agricultural Society, Amherst, Sept. 28–30, and Oct. 1.	G. F. De Voin, Blaine.	A. J. Smith, Amherst.	Edwin Grover, Amherst.
Racine	Racine County Agricultural Society, Burlington, Sept. 13–16.	T. G. Fish, Racine.	John Reynolds, Burlington.	F. J Ayres, Burlington.
Richland....	Richland County Agricultural Society, Richland Center, Sept. 21–23.	A. M. Crumbeiker, Richland Center.	D. E. Pease, Richland Center.	W. H. Pier, Richland Center.
Rock.....	Southern Wis. & Northern Ill. Industrial Ass'n, Beloit, Sept. 6–9.	E. W. Bruce, Shopiere.	Chas. Newburg, Beloit	G. A. Houston, Beloit.
Rock.....	Rock County Agricultural Society, Janesville, Sept. 13–16.	R. T. Pember, Johnston Center.	W. Van Kirk, Janesville.	S. L. James, Janesville.
St. Croix	St. Croix County Agricultural Society, Hudson, Sept. 14–16.	Geo. B. Kidder, Star Prairie.	J. A. Bunker, Hudson.	A. D. Richardson, Hudson.
Sauk.....	Sauk County Agricultural Society, Baraboo, Sept 19-21.	John M. True. Baraboo.	F. N. Peck. Baraboo.	J. C. Geisim, Prairie du Sac.
Sauk.....	Baraboo Valley Agricultural Society, Reedsburg, Oct. 5–7.	James Lake, Reedsburg.	A. F. Lawton, Reedsburg.	A. G. Ellenwood, Reedsburg.
Shawano	Shawano County Agricultural Society, Shawano, Oct. 4–7.	A. K. Rorter, Shawano.	W. N. Rogers, Shawano.	R. E. Wedgwood, Shawano.
Sheboygan ..	Sheboygan County Agricultural Society, Sheboygan Falls, Sept. 14–16.	C. H. Pape, Sheboygan.	N. F. Pierce, Sheboygan Falls.	E. P. Bryant, Sheboygan Falls
Sheboygan ..	Sheboygan Co. German Indust'l & Ag'l Society, Sheboygan, Oct. 4–6.	Chas. Wipperman, Mosel.	Jos. Bast, Sheboygan.	Chas. Reich, Sheboygan.
Trempealeau.	Trempealeau County Agricultural Society, Galesville, Sept. 14–17.	Joshua Rhodes, Trempealeau.	H. L. Bunn, Galesville.	Henry French, Galesville.
Vernon.....	Vernon County Agricultural Society, Viroqua, Sept. 20–23.	F. R. Van Wagoner, Viroqua.	O. B. Wyman, Viroqua.	Elijah Powell, Viroqua.

Walworth ...	Walworth County Agricultural Society, Elkhorn, Sept. 20–23.	Wm. A. Kuilaus, Delavan.	W. H. Morrison, Elkhorn.	Hollis Latham, Elkhorn.
Washington .	Washington County Agricultural Society, West Bend, Oct. 5–7.	Wm. P. Rix, West Bend.	Joseph Ott, West Bend.	Geo. W. Jones, West Bend.
Waukesha ..	Waukesha County Agricultural Society, Waukesha, Oct. 4–7.	Isaac Gale, Waukesha.	G. F. H. Barber, Waukesha.	Geo Laurence, jr. Waukesha.
Waupaca ...	Waupaca County Agricultural Society, Weyauwega, Sept. 21–23.	O. A. Rich, Weyauwega.	H. W. Potter, Weyauwega.	L. L. Post, Weyauwega.
Waushara ...	Waushara County Agricultural Society, Wautoma, Oct. 3–5.	J. N. P. Bird, Wautoma.	John Clark, Wautoma.	S. M. Olds, Wautoma.
Wood	Wood County Agricultural Society, Grand Rapids.	T. E Whitman, Grand Rapids.	T. J. Cooper, Centralia.	Seth Reeves, Grand Rapids.

SYNOPSIS OF THE ANNUAL REPORTS OF INDUSTRIAL AND COUNTY AGRICULTURAL SOCIETIES FOR THE YEAR 1881.

NAME OF SOCIETY.	RECEIPTS.							Cash on hand at last report.	Total.
	From state.	Membership	Admission fees.	Entries.	Subscriptions.	Other sources.	Total receipts.		
Adams County Agricultural Society....	$100	$1 00	$73 20	$32 10	$100 00	$427 35	$733 65	$62 78	$796 43
Barron County Agricultural Society....	100	55 00	.....	[1]89 85	7 25	134 36	386 46	133 75	520 21
Brown County Horti. and Agri. Society.	100	53 00	1,532 79	129 50	.....	487 58	2,302 87	40 78	2,343 65
Buffalo County Agricultural Society...	100	.....	70 80	76 00	.....	21 92	268 72	13 68	282 40
Burnett County Agricultural Society ...	100	11 75	27 63	.....	.....	77 03	2 6 41	2 25	218 66
Calumet County Agricultural Society...	100	79 00	97 65	.....	.....	64 62	341 27	3 76	345 03
Chippewa County Agricultural Society .	100	359 50	688 13	388 45	.....	783 97	2,320 05	.....	2,320 05
Columbia County Agricultural Society..	100	300 00	398 47	30 00	.....	104 00	932 47	.....	932 47
Lodi Union Agricultural Society	100	.....	661 00	64 83	.....	27 50	853 33	.....	853 33
Crawford County Agricultural Society..	100	126 00	100 75	71 45	.....	219 05	617 25	.....	617 25
Dane County Agricultural Society.....	.....	174 90	2,050 95	385 00	530 00	796 25	3,936 20	4 82	3,941 02
Dodge County Agricultural Society	100	[1]1,692 34	.....	56 00	.....	450,85	2,299 19	.....	2,299 19
Door County Agricultural Society.....	100	88 00	4 45	.....	13 75	5 00	211 20	13 37	224 57
Grant County Agricultural Society.....	100	70 00	265 70	95 00	.....	260 00	790 70	62 00	852 70
Boscobel Agri. and Driv. Park Assoc'n .	100	.....	1,563 99	573 00	.....	392 50	2,629 49	1,074 19	3,703 68
Green County Agricultural Society	100	[1]1,749 12	.....	118 70	.....	280 89	2,248 71	.....	2,248 71
Iowa County Agricultural Society.....	100	279 50	1,027 37	199 00	177 00	349 50	2,132 37	604 23	2,736 60
Southwestern Wis. Industr'l Association	100	461 00	1,322 54	360 00	20 00	807 61	3,071 15	132 11	3,203 26
Jackson County Agricultural Society...	100	.....	266 75	77 15	103 00	241 00	787 90	.....	787 90
Jefferson County Agricultural Society..	100	40 00	2,185 29	79 00	.....	1,574 57	3,978 86	39 24	4,018 10
Central Wis. Agri. and Mechan'l Assoc'n	100	.....	1,531 25	662 25	.....	854 50	3,148 00	.....	3,148 00
Juneau County Agricultural Society....	100	254 00	75 75	85 00	26 50	205 20	746 45	98 72	845 17
Kenosha County Agricultural Society ..	100	233 00	793 00	245 00	43 00	747 14	2,141 14	12	2,141 26
Kewaunee County Agricultural Society.	100	95 75	22 20	48 25	.....	74 05	340 25	.....	340 25
La Crosse County Agricultural Society .	100	421 50	120 75	5 00	.....	28 50	675 75	58 36	734 01
Manitowoc County Agricultural Society.	100	.....	498 00	.....	.....	35 50	633 50	99 23	732 73
Marquette County Agricultural Society .	100	70 00	11 45	11 40	8 15	.....	201 00	.....	201 00

Monroe County Agricultural Society....	100	97 50	168 35	.....	4 00	169 65	539 60	4 92	544 52
Eastern Monroe Co. Agricultural Soc...	100	25 00	234 55	.....	18 00	108 01	485 56	2 15	487 71
Outagamie Co. Agricultural Society	100	87 00	206 09	.....	.....	107 00	500 09	4 40	504 49
Ozaukee County Agricultural Society...	100	20 00	190 70	.....	.....	10 00	320 70	35 29	355 99
Pepin County Agricultural Society	100	318 00	209 00	106 00	.....	86 00	819 00	12 25	831 25
Pierce County Agricultural Society.....	100	98 00	26 30	.....	.....	52 55	276 85	71 59	348 44
Portage County Agricultural Society ...	100	2 50	139 80	.....	.....	38 25	280 55	8 72	289 27
Racine County Agricultural Society	100	675 00	1,187 00	115 50	15 00	710 74	2,803 24	.....	2,803 24
Richland County Agricultural Society..	100	35 00	725 57	141 00	.....	139 00	1,140 57	.....	1,140 57
Rock County Agricultural Society.....	.....	.....	1,407 42	.....	.....	911 39	2,318 81	.....	2,318 81
South. Wis. & North. Ill. Ind. Associat'n	100	50 00	1,782 40	276 25	.....	535 07	2,743 72	245 38	2,980 10
St. Croix County Agricultural Society ..	100	317 00	114 25	.....	100 00	251 21	882 46	38 50	920 96
Sauk County Agricultural Society.....	100	10 00	698 90	30 00	2 00	35 05	875 95	50 94	926 89
Baraboo Valley Agricultural Society ...	100	.....	372 52	30 00	338 48	32 50	883 50	.....	883 50
Shawano County Agricultural Society ..	100	150 44	45 00	60 25	13 57	.....	369 26	.....	369 26
Sheboygan County Agricultural Society.	100	334 00	56 60	21 00	75 25	81 94	668 79	.....	668 79
Sheboygan Co. Ger. Ind. & Agr. Society.	100	32 00	109 00	28 00	.....	74 50	343 50	6 49	349 99
Trempealeau County Agricultural Soc'y.	100	266 00	109 00	27 75	.....	76 85	519 60	122 36	641 96
Vernon County Agricultural Society....	100	1 00	640 10	117 89	.....	248 75	1,107 74	85 57	1,193 31
Walworth County Agricultural Society .	100	1,405 50	3,255 55	230 00	.....	1,412 58	6,403 63	1,088 29	7,491 92
Washington County Agricultural Society	100	10 00	226 10	77 50	.....	396 50	810 10	33	810 43
Waukesha County Agricultural Society.	100	.....	1,006 25	155 00	.....	155 00	1,417 25	228 28	1,645 53
Waupaca County Agricultural Society..	100	7 50	309 33	.....	.....	8 65	425 48	.....	425 48
Waushara County Agricultural Society .	100	5 00	621 33	.....	.....	225 00	951 33	.....	951 33
Wood County Agricultural Society	100	12 00	283 88	102 40	150 50	4 02	652 80	57 02	709 82
Totals.....	$5,000	$10,511 90	$29,514 85	$5,390 47	$1,745 45	$15,321 75	$67,484 42	$4,505 77	$71,990 19

[1] Including admission fees.

SYNOPSIS OF THE ANNUAL REPORTS OF INDUSTRIAL AND COUNTY AGRICULTURAL SOCIETIES FOR THE YEAR 1881—continued.

NAME OF SOCIETY.	DISBURSEMENTS.						Cash on hand.	Total.	Indebtedness.
	Premiums.	Fair expenses.	Secretary's office.	Improvements.	Other purposes.	Total disbursements.			
Adams Co. Agricultural Society	$89 50	$10 00	$10 00	$465 55	$100 28	$675 33	$121 10	$796 43	.....
Barron Co. Agricultural Society	137 05	200 33	.....	.....	8 95	346 33	173 88	520 21	.....
Brown Co. Hort. and Ag'l Society	752 48	1,121 59	88 41	232 54	25 00	2,220 02	123 63	2,343 65	.....
Buffalo Co. Agricultural Society	129 00	104 70	17 00	31 70	.....	282 40	.....	282 40	$21 92
Burnett Co. Agricultural Society	58 25	32 73	10 00	28 60	0 50	130 08	88 58	218 66	.....
Calumet Co. Agricultural Society	191 88	53 98	47 75	10 00	41 42	345 03	.....	345 03	.....
Chippewa Co. Agricultural Society	1,119 50	550 00	.....	650 55	.....	2,320 05	.....	2,320 05	558 97
Columbia Co. Agricultural Society	547 00	175 00	68 12	36 50	105 85	932 47	.....	932 47	.....
Lodi Union Agricultural Society	509 23	128 65	40 00	16 11	151 44	845 43	7 90	853 33	.....
Crawford Co. Agricultural Society	244 55	152 89	18 75	66 50	59 18	541 87	75 38	617 25	.....
Dane Co. Agricultural Society	1,843 84	862 99	406 30	327 76	311 00	3,751 89	189 13	3,941 02	.....
Dodge Co. Agricultural Society	240 00	806 02	[1]1,253 17	.....	.....	2,299 19	.....	2,299 19	.....
Door Co. Agricultural Society	112 00	77 39	.....	.....	.....	189 39	35 18	224 57	.....
Grant Co. Agricultural Society	268 45	172 00	31 40	74 85	263 00	809 70	43 00	852 70	100 00
Boscobel Ag'l and Driv'g Park Ass'n.	1,350 00	421 69	165 00	279 15	540 00	2,755 84	947 84	3,703 68	.....
Green Co. Agricultural Society	734 00	598 49	67 82	170 46	675 74	2,246 51	2 20	2,248 71	.....
Iowa Co. Agricultural Society	1,096 00	194 00	180 18	.....	104 03	1,574 21	1,162 39	2,736 60	.....
S. W. Wis. Industrial Association	1,818 00	879 13	120 00	.....	364 00	3,181 13	22 13	3,203 26	.....
Jackson Co. Agricultural Society	380 50	237 21	.....	.....	110 41	728 12	59 78	787 90	.....
Jefferson County Agricultural Society	1,553 94	1,039 98	68 50	200 00	1,115 30	3,977 72	40 38	4,018 10	.....
Central Wis. Ag'l and Mech. Ass'n	1,951 00	521 00	43 00	310 00	323 00	3,148 00	.....	3,148 00	2,235 72
Juneau Co. Agricultural Society	515 51	123 00	23 30	63 86	.....	725 67	119 50	845 17	.....
Kenosha Co. Agricultural Society	1,143 00	781 41	38 85	80 00	97 00	2,140 26	1 00	2,141 26	.....
Kewaunee Co. Agricultural Society	116 50	94 80	.....	16 20	112 75	340 25	.....	340 25	.....
La Crosse Co. Agricultural Society	499 73	159 25	10 00	20 00	.....	688 98	45 03	734 01	.....
Manitowoc Co. Agricultural Society	316 50	74 17	25 00	43 75	188 40	647 82	84 91	732 73	.....
Marquette Co. Agricultural Society	135 25	38 49	19 00	.....	8 15	191 80	9 20	201 00	.....
Monroe Co. Agricultural Society	50 00	161 48	21 32	57 06	170 02	459 88	84 86	544 52	.....

Eastern Monroe County Ag'l Society.	181 50	[1]194 64	.....	.....	111 57	487 71	.....	487 71	3 01
Outagamie County Agricu'l Society..	131 80	144 52	25 00	100 00	100 00	501 32	3 17	504 49	.....
Ozaukee County Agricultural Society	229 85	65 93	17 60	.....	37 00	350 38	5 61	355 99	.....
Pepin County Agricultural Society ..	450 00	150 00	79 00	70 00	32 76	781 76	49 49	831 25	.....
Pierce County Agricultural Society..	226 50	15 50	11 00	19 25	60 00	332 25	16 19	348 44	.....
Portage County Agricultural Society.	102 27	113 89	35 00	38 11	.....	289 27	.....	289 27	.....
Racine County Agricultural Society..	1,343 25	762 75	115 29	450 13	[1]131 82	2,803 24	.....	2,803 24	270 05
Richland County Agricultural Society	653 17	175 27	25 00	60 00	214 27	1,127 71	12 86	1,140 57	.....
Rock County Agricultural Society ...	408 25	.....	.....	300 00	1,610 26	2,318 81	.....	2,318 81	.....
S. Wis. & N. Ill. Industrial Associat'n	1,833 00	658 37	34 00	454 33	9 40	2,989 10	.....	2,989 10	.....
St. Croix County Agricultural Society	577 75	258 67	.....	.....	27 51	920 96	.....	920 96	145 38
Sauk County Agricultural Society....	493 45	115 32	2 33	10 00	278 31	899 41	27 48	926 89	.....
Baraboo Valley Agricultural Society.	413 50	129 50	32 00	98 50	210 00	883 50	.....	883 50	.....
Shawano County Agricultural Society	159 32	71 37	25 00	113 57	.....	369 26	.....	369 26	.....
Sheboygan County Agricultural Soc'y	396 52	191 47	17 20	34 44	30 16	668 79	.....	668 79	22 44
Sheboygan Co. German Ind. & Ag. S.	76 36	105 45	55 00	5 61	88 14	330 56	19 43	349 99	.....
Trempealeau Co. Agricultural Society	337 75	66 07	15 00	56 51	48 00	523 33	118 63	641 96	.....
Vernon County Agricultural Society .	373 00	175 00	35 00	95 00	470 23	1,148 23	45 08	1,193 31	.....
Walworth County Agricultural Soc'y.	2,781 00	1,766 88	296 00	765 92	378 78	6,088 58	1,403 34	7,491 92	.....
Washington Co. Agricultural Society.	296 25	395 38	8 00	37 56	161 25	808 44	1 99	810 43	.....
Waukesha Co. Agricultural Society..	930 24	.....	.....	512 08	.....	1,442 32	203 21	1,645 53	.....
Waupaca County Agricultural Society	293 94	52 75	15 25	53 65	.....	415 59	9 89	425 48	.....
Waushara County Agricultural Soci'ty	472 00	111 89	.....	115 00	218 64	917 53	33 80	951 33	.....
Wood County Agricultural Society...	346 59	149 20	50 00	72 34	91 69	709 82	.....	709 82	.....
Totals	$31,469 92	$15,579 10	$3,656 54	$6,642 14	$9,315 54	$66,603 24	$5,386 95	$71,990 19	$3,357 49

[1] Including improvements.

POPULATION OF WISCONSIN, CENSUS OF 1880.

COUNTIES.	Total.	Males.	Females.	Native.	Fore'gn.	White.	Colored
The State	1,315,480	680,106	635,374	910,063	405,417	1,309,622	5,858
Adams	6,741	3,549	3,192	5,461	1,280	6,714	27
Ashland	1,559	894	665	1,087	472	1,380	179
Barron	7,023	3,901	3,122	4,683	2,349	6,947	76
Bayfield	564	299	265	502	62	309	255
Brown	34,090	17,436	16,654	22,563	11,527	33,921	169
Buffalo	15,528	8,295	7,233	10,022	5,506	15,519	9
Burnett	3,140	1,184	1,256	1,529	1,611	2,874	266
Calumet	16,631	8,649	7,982	11,319	5,312	15,899	732
Chippewa	15,492	8,793	6,669	10,048	5,444	15,296	196
Clark	10,715	6,082	4,633	7,900	2,815	10,700	15
Columbia	28,065	14,234	13,831	20,503	7,562	28,028	37
Crawford	15,644	8,038	7,606	12,041	3,603	15,597	47
Dane	53,234	27,216	26,018	37,199	16,035	53,146	88
Dodge	45,928	23,388	22,540	30,507	15,421	45,807	121
Door	11,645	6,379	5,266	7,093	4,552	11,628	17
Douglas	655	353	302	464	191	612	43
Dunn	16,818	9,195	7,623	11,752	5,066	16,801	17
Eau Claire	19,992	10,989	9,003	13,501	6,491	19,967	25
Fond du Lac	46,855	23,470	23,385	33,823	13,032	46,632	223
Grant	37,852	19,230	18,622	29,691	8,161	37,761	81
Green	21,729	11,090	10,639	17,583	4,146	21,698	31
Green Lake	14,481	7,270	7,211	9,909	4,572	14,436	45
Iowa	23,628	11,953	11,675	16,748	6,880	23,589	39
Jackson	13,285	7,072	6,213	9,432	3,853	13,198	87
Jefferson	32,155	16,251	15,904	22,079	10,076	32,062	93
Juneau	15,580	8,094	7,486	12,038	3,542	15,478	102
Kenosha	13,550	6,875	6,675	9,766	3,774	13,527	23
Kewaunee	15,806	8,261	7,545	9,020	6,786	15,778	28

La Crosse	27,072	14,149	12,923	17,120	9,952	26,999	73
La Fayette	21,278	10,765	10,513	16,126	5,152	21,271	7
Langlade	685	439	246	487	198	650	35
Lincoln	2,011	1,181	830	1,364	647	1,921	90
Manitowoc	37,506	19,106	18,400	22,867	14,639	37,496	10
Marathon	17,121	9,623	7,498	10,670	6,451	17,011	110
Marinette	8,929	5,360	3,569	4,831	4,098	8,697	232
Marquette	8,907	4,526	4,381	6,118	2,789	8,884	23
Milwaukee	138,523	69,603	68,920	83,469	55,054	138,204	319
Monroe	21,606	11,084	10,522	16,174	5,432	21,548	58
Oconto	9,848	5,360	4,488	6,218	3,630	9,740	108
Outagamie	28,716	14,819	13,897	19,649	9,067	28,646	70
Ozaukee	15,462	7,891	7,571	10,063	5,399	15,462	.....
Pepin	6,226	3,297	2,929	4,403	1,823	6,225	1
Pierce	17,744	9,395	8,349	12,596	5,148	17,663	81
Polk	10,018	5,573	4,445	6,212	3,806	9,775	243
Portage	17,731	9,295	8,436	12,054	5,677	17,720	11
Price	785	510	275	415	370	777	8
Racine	30,921	15,752	15,169	20,313	10,608	30,762	159
Richland	18,174	9,362	8,812	16,293	1,881	18,143	31
Rock	38,823	19,589	19,234	31,270	7,553	38,609	214
St. Croix	18,956	10,197	8,759	13,130	5,826	18,925	31
Sauk	28,729	14,720	14,099	21,474	7,255	28,688	41
Shawano	10,371	5,629	4,742	6,354	4,017	10,079	292
Sheboygan	34,206	17,405	16,801	23,274	10,932	34,203	3
Taylor	2,311	1,348	963	1,564	747	2,296	15
Trempealeau	17,189	9,021	8,168	10,319	6,870	17,169	20
Vernon	23,235	12,149	11,086	17,515	5,720	23,107	128
Walworth	26,249	13,153	13,096	21,503	4,746	26,195	54
Washington	23,442	12,026	11,416	15,903	7,539	23,440	2
Waukesha	28,957	14,874	14,083	20,273	8,684	28,893	64
Waupaca	20,954	10,929	10,025	15,063	5,891	20,934	20
Waushara	12,688	6,515	6,173	9,907	2,781	12,656	32
Winnebago	42,741	21,499	21,242	30,453	12,288	42,559	182
Wood	8,981	4,822	4,159	6,346	2,635	8,961	20

[1] Including, in the State, 16 Chinese and 3,118 Indians and *Half*-Breeds: Indians in tribal relations not included.

ABSTRACT OF THE ASSESSMENT ROLLS OF THE SEVERAL COUNTIES IN THE STATE OF WISCONSIN FOR THE YEAR 1882.

COUNTIES.	HORSES.			NEAT CATTLE.			MULES AND ASSES.		
	Number.	Value.	Av. Val.	Number.	Value.	Av. Val.	Number.	Value.	Av. Val.
Adams	2,337	$74,621	$31 93	8,179	$86,222	$10 54	131	$5,579	$42 59
Ashland	138	7,990	57 90	364	7,195	19 77	2	60	30 00
Barron	1,473	56,915	38 64	5,439	73,378	13 49	157	7,795	49 65
Bayfield	60	5,300	88 33	67	2,445	36 49	4	200	50 00
Brown	5,304	204,149	38 49	12,157	152,151	12 52	9	295	32 78
Buffalo	5,489	216,552	39 45	15,366	136,598	8 89	198	8,880	44 85
Burnett	460	18,908	41 10	2,419	30,150	12 46	20	970	48 50
Calumet	5,293	251,152	47 45	14,797	203,199	13 73	41	1,967	47 98
Chippewa	3,944	173,388	43 96	9,415	119,252	12 67	160	6,939	43 37
Clark	2,576	97,395	37 81	8,890	116,242	13 08	94	3,895	41 44
Columbia	10,062	476,437	47 35	26,792	340,969	12 72	127	5,785	45 55
Crawford	5,377	189,829	35 30	14,033	145,599	10 37	92	2,651	28 82
Dane	19,510	897,876	46 02	51,794	630,971	12 18	204	9,999	49 01
Dodge	12,449	560,325	45 01	35,249	445,619	12 64	143	6,243	43 66
Door	2,504	95,120	37 99	6,186	76,306	12 34	102	4,337	42 52
Douglas	120	6,815	56 79	145	4,065	28 03	...	...	...
Dunn	5,191	216,419	41 88	14,097	153,860	10 91	403	23,751	58 94
Eau Claire	4,903	328,482	66 00	10,025	121,012	12 07	141	9,185	65 14
Florence	145	4,630	31 93	58	1,061	18 29	25	1,335	53 40
Fond du Lac	11,917	585,850	49 16	34,870	500,175	14 34	113	5,565	49 25
Grant	14,845	515,081	34 70	48,243	543,804	11 27	368	14,429	39 21
Green	9,873	580,357	58 78	40,203	720,108	17 91	165	11,010	66 73
Green Lake	5,093	206,089	40 47	12,024	130,905	10 89	50	1,985	39 70
Iowa	8,914	353,535	39 66	36,067	445,932	12 36	126	6,051	48 02
Jackson	3,785	182,616	48 25	10,762	127,102	11 81	112	5,115	45 67
Jefferson	8,458	350,071	41 39	28,556	412,356	14 41	132	5,223	39 57
Juneau	4,281	152,817	35 69	10,472	98,093	9 37	76	2,815	37 04
Kenosha	4,379	212,176	48 45	14,404	227,414	15 79	58	2,945	50 78
Kewaunee	4,020	171,067	42 55	13,133	147,712	11 25	84	3,460	41 19

La Crosse	5,507	262,984	47 76	13,638	139,997	10 27	128	6,900	53 91
La Fayette	9,602	360,569	37 55	40,247	491,831	12 22	184	7,293	39 64
Langlade	142	7,843	55 23	758	16,018	21 13	6	555	92 50
Lincoln	473	19,313	40 83	1,134	12,030	10 61	7	215	30 71
Manitowoc	9,218	462,197	43 63	27,692	345,371	12 47	41	1,425	34 76
Marathon	2,820	120,716	42 45	10,852	114,924	10 59	49	1,840	37 55
Marinette	1,092	25,968	23 78	1,854	17,248	9 30	108	2,122	19 65
Marquette	3,226	118,973	36 88	9,751	96,117	9 86	58	2,268	39 10
Milwaukee	11,689	644,896	55 17	12,943	252,280	19 49	425	25,185	59 26
Monroe	6,938	217,781	31 39	17,256	147,021	8 52	156	5,150	33 01
Oconto	1,714	74,249	43 32	4,685	61,473	13 12	32	1,698	53 06
Outagamie	6,836	254,974	37 30	18,893	188,742	9 99	92	3,438	37 37
Ozaukee	4,459	210,644	47 24	11,506	164,584	14 30	32	1,503	46 97
Pepin	1,855	72,289	38 97	4,599	44,888	9 76	145	5,545	38 24
Pierce	5,560	299,769	53 92	14,661	189,351	12 92	288	17,210	59 76
Polk	2,578	145,742	56 53	7,444	102,003	13 70	156	9,136	58 57
Portage	3,510	149,570	42 61	10,677	117,653	11 02	116	4,652	40 10
Price	106	6,580	62 08	749	24,486	32 69			
Racine	6,912	305,672	44 22	14,388	231,261	16 07	81	4,235	52 28
Richland	6,610	240,282	36 35	18,824	201,833	10 72	196	7,482	38 17
Rock	14,865	760,591	51 16	35,751	556,275	15 56	244	12,415	50 88
St. Croix	6,576	339,652	51 65	11,535	137,441	11 92	335	16,175	48 28
Sauk	9,518	407,026	42 76	25,266	296,103	11 72	205	8,704	42 46
Shawano	2,400	121,324	50 55	8,584	98,597	11 49	39	1,942	49 79
Sheboygan	9,003	378,416	42 03	34,651	473,163	13 66	118	4,487	38 02
Taylor	253	14,227	56 23	906	21,036	22 97	3	120	40 00
Trempealeau	2,942	275,854	93 76	18,262	183,495	10 05	252	12,250	48 61
Vernon	8,655	300,853	34 76	20,455	202,633	9 91	123	4,350	35 37
Walworth	10,226	562,391	54 99	28,235	496,569	17 59	75	3,425	45 67
Washington	7,742	323,043	41 73	19,442	240,540	12 37	104	3,912	37 62
Waukesha	10,118	503,308	49 74	20,770	348,032	16 76	127	6,810	53 62
Waupaca	5,311	207,094	38 99	14,222	161,798	11 38	86	3,629	42 20
Waushara	4,756	167,395	35 18	14,055	144,668	10 29	114	3,935	34 52
Winnebago	8,382	447,487	53 39	20,353	282,837	13 90	83	3,471	41 82
Wood	1,407	51,520	36 62	4,810	56,455	11 74	29	1,260	43 45
Totals	355,901	$15,994,148	$44 94	1,004,064	$12,858,648	$12 81	7,574	$353,201	$46 63

ABSTRACT OF THE ASSESSMENT ROLLS OF THE SEVERAL COUNTIES — continued.

COUNTIES.	SHEEP AND LAMBS.			SWINE.		
	Number.	Value.	Av. value	Number.	Value.	Av. value
Adams	3,748	$4,511	$1 20	4,543	$10,109	$2 23
Ashland	8	22	2 75	38	136	3 58
Barron	1,996	2,668	1 34	1,766	4,182	2 37
Bayfield	.....	.....	.....	.....	.....	.....
Brown	7,635	9,030	1 18	5,190	7,818	1 51
Buffalo	9,613	11,322	1 18	10,934	21,454	1 96
Burnett	645	474	73	348	532	1 53
Calumet	9,422	15,733	1 67	7,377	16,038	2 17
Chippewa	3,312	4,915	1 48	3,831	8,926	2 33
Clark	6,710	9,500	1 42	2,565	5,532	2 16
Columbia	68,868	117,913	1 71	29,126	109,462	3 76
Crawford	9,534	12,723	1 33	11,238	22,547	2 01
Dane	77,947	144,918	1 86	64,223	231,799	3 61
Dodge	60,238	87,712	1 46	24,103	66,866	2 77
Door	3,174	3,579	1 13	3,303	6,578	1 99
Douglas	50	75	1 50	.....	.....	.....
Dunn	8,453	12,161	1 44	7,503	19,697	2 62
Eau Claire	3,739	6,136	1 64	4,935	15,808	3 20
Florence	.....	.....	.....	2	7	3 50
Fond du Lac	83,692	156,933	1 88	20,696	71,987	3 48
Grant	24,871	46,697	1 88	67,127	177,122	2 64
Green	41,078	101,622	2 47	33,111	178,537	5 39
Green Lake	44,745	77,596	1 73	14,936	35,707	2 39
Iowa	17,717	39,089	2 21	36,018	120,037	3 33
Jackson	6,160	10,426	1 69	5,462	17,066	3 12
Jefferson	40,339	68,668	1 70	19,767	63,823	3 23
Juneau	9,564	11,565	1 21	9,312	16,111	1 73
Kenosha	60,605	115,866	1 91	8,583	28,425	3 31
Kewaunee	5,692	6,527	1 15	5,726	9,382	1 64
La Crosse	10,165	15,452	1 52	10,447	28,448	2 72
La Fayette	19,725	40,227	2 04	45,140	138,646	3 07
Langlade	27	37	1 37	134	456	3 40
Lincoln	409	413	1 01	260	318	1 22
Manitowoc	14,517	17,089	1 18	9,132	19,044	2 09
Marathon	5,934	6,078	1 02	3,548	4,433	1 25
Marinette	600	593	99	394	436	1 10
Marquette	12,923	16,695	1 29	7,856	17,728	2 25
Milwaukee	3,989	8,346	2 09	50,046	16,712	3 31
Monroe	16,864	20,025	1 19	13,711	25,953	1 89
Oconto	1,590	2,217	1 39	1,395	2,914	2 09
Outagamie	19,713	23,935	1 21	9,019	19,788	2 19
Ozaukee	4,469	9,131	2 04	4,713	13,854	2 83
Pepin	3,046	4,134	1 36	3,099	6,982	2 25
Pierce	12,162	19,310	1 59	7,333	18,190	2 48
Polk	3,262	6,753	2 07	3,263	5,515	1 69
Portage	9,927	12,117	1 22	6,302	13,074	2 07
Price	1	2	2 00	30	87	2 90
Racine	39,613	76,886	1 94	8,905	31,326	3 52
Richland	35,469	62,480	1 76	22,889	55,425	2 42
Rock	51,181	103,771	2 03	42,698	207,431	4 86
St. Croix	4,457	6,689	1 50	4,444	12,998	2 92

ABSTRACT OF THE ASSESSMENT ROLLS OF THE SEVERAL COUNTIES — continued.

COUNTIES.	SHEEP AND LAMBS.			SWINE.		
	Number.	Value.	Av. value.	Number.	Value.	Av. value.
Sauk	31,284	$52,713	$1 68	29,477	$88,949	$3 02
Shawano	6,057	7,976	1 32	4,329	7,054	1 63
Sheboygan	19,836	38,702	1 95	11,465	29,757	2 60
Taylor	54	54	1 00	57	144	2 53
Trempealeau	13,736	19,515	1 42	10,575	33,311	3 15
Vernon	28,226	39,701	1 41	27,282	54,467	2 00
Walworth	106,434	240,547	2 26	29,227	133,455	4 57
Washington	20,989	32,369	1 54	14,356	31,631	2 20
Waukesha	77,663	155,613	2 00	17,052	60,748	3 56
Waupaca	15,648	28,208	1 80	6,639	14,663	2 21
Waushara	17,350	22,642	1 31	8,506	18,573	2 18
Winnebago	39,396	64,953	1 67	10,532	41,294	3 92
Wood	1,860	1,651	89	1,599	2,927	1 83
Totals	1,258,131	$2,235,405	$1 78	782,617	$2,421,919	$3 09

ADDRESS OF COL. WM. F. VILAS,

OF

MADISON, WIS., AT THE STATE FAIR AT ROCHESTER, MINNESOTA, 1881.

Mr. President, Ladies and Gentlemen: — I recognize a representative assembly of the farmers of the most magnificent farm on earth; whose wide expanse stretching from the western bank of the Father of Waters receives the swift-running light of morning in glory unbroken until the Rocky Mountains intercept its brilliant race for day; on whose undulating surface the oceans pour, through clouds and wind, their fertilizing moisture; whose broad fields, teeming with the fatness of a fecund soil, can satisfy the desire for bread of all the hungry children of men.

Around us are gathered the abundant evidences of your material prosperity. The glory of your fields, the bounty of your dairies, the fruit of your trees and vines, the sweets of your blossoms lie on the well spread tables; the stalls display the excellent blood and culture of your flocks and herds; on every side the altars of the fruitful Pan and the bountiful Ceres are redolent with the incense most pleasing to the rural gods.

The scene suggests the theme to whom you choose for your spokesman. It is most natural to the hour to recall those distinctive features of the American farmer's character and relations to men which have brought him to the "happy state and condition" here represented.

Demagogues love to thrum our eardrums with their clamor of the wrongs the agriculturist suffers, and stir a spirit of unrest. Their regular outcries are doubtless proof of the healthy condition of our free political atmosphere; but sometimes this mark of salubrity seems a trifle too abundant. Calm wisdom, with a broader view, superior to the irritations of the passing moment, perceives the solid foundations for satisfaction in our present state, and sure hopes for a steady progress with advancing years.

Nor shall your speaker be justly charged with optimism, if he do but point to the characteristics which exalt his subject, and give little heed to the querulous cavils of detractors.

If it were a fault it should be pardoned to the occasion. I am only partly willing to believe that all the fruits of Minnesota are so rich, that all her cattle are so sleek and fat, as the exhibit on the platters over here, as the splendid creatures in the stalls yonder. It is right to bring out the best to the fair.

But there shall be no such fault. There is the noblest philosophy in that contentment which rises on a wise survey of great results accomplished, and co-exists with a high purpose to make enlighted progress beyond. It is in that spirit of confidence in his future advancement that I would dwell with pride and satisfaction on the present character and attainments of our typical American farmer.

Yet I venture the essay with a great regret that it must be so hurriedly and imperfectly done as to be but a hint of the true measure of the subject.

The farmer of America is a vastly different being from the kind who has for ages fretted the soil of the old world. Various and multiplied are these differences, but the chief of all, perhaps the producer of most of them, is the transformation which has come over his relations to his fellow men. He stands forth, first, in sharp contrast with his class in other lands, in the origin of his

title to, and the nature of his possession of, the soil he cultivates. He entered upon his fields not as the tenant or villein of some feudal lord, wearing the collar of servitude and yielding all the better portion of his produce in return for protection to him as a weakling laborer. He strode at the outset beyond the pale of ancient law and arbitrary usages. He bore in his hands the arms of a lord of the forest, the rifle and the ax. Self-reliant and self-dependent, he took from nature the lease of his estate, rent free and bondage free. Not, however, free of cost and without price; but the price he paid was the price manhood loves to render for the gains which do it honor. It was at the cost of that labor which builds up the man; with privations which strengthen rather than enervate; and facing perils which exalt the soul. With every trunk he lifted to its place in the cabin wall, a new layer of strength was added to his character; every rood of ground he subdued to cultivation gave new breadth to his views; every peril he surmounted, every conflict which he won, refined and sublimated the spirit of his life. And when, after such discipline of labor and trial, standing by the door of his castle of logs, he heard the sound of the contented housewife within and the voices of happy children round about, while his eyes swept the fruitful possessions he had wrought from the wilderness to their sufficient support and comfort, he realized the individual independence of free manhood, and, with unopened lips, his soul joined in the great hymn of liberty, raising a strain harmonious with the symphony of the stars, which heaven's ear might hear.

To such a man, those who wore crowns and titles were not superior in the elements of manhood; and he neither so acknowledged them, nor feared them. His thought exalted him to their level, and he dealt with them in spirit as their equal. His domain might not be so large, but it was just as much his own. His rights and powers might not be so extensive, but they were equally as sacred. His happiness lay more in contentment and less in splendor, but his privilege to pursue it he was as ready to defend as a king his kingdom. So, awarding to all like him the rights he claimed, he found in his union with his peers and co-workers the strength and ability to resist oppression, which,

all on a sudden, manifested the farm-workers of America to be a new element in the world. They had fought in the forlorn hope of civilization, and had carried the assault. In every added hour of life, their understandings, newly informed, came more clearly to see that the civilization whose banners they had carried in the front was not that of the old world institutions of feudal lord and tenant, of master and slave; but that the abodes they had wrought were the homesteads of freedom and independence.

To such men, the hour of labor was not an hour of sodden toil, whose burden was borne as the laden ass carries his pack; nor the hour of repose a period of brutish rest. They loved to pursue high meditations, and the problem of life, the rights of men, the methods of social order and happiness, were excogitated and understood. They were not the men to bear unlawful exaction, though a king and parliament put it on them; their manly pride resented the arrogance of power and the insolence of office; and they taught the aristocrats of England — who saw with mere scorn the rebellion of peasants — that they were not peasants who tilled the new world. The continental armies of the revolution were filled and sustained by the farmers of America, and the men who had set up their household gods in the clearings of the forest maintained in every hour of trial the spirit sprung from the teaching of their labor, and the discipline of their dangers. They appeared foremost in every assembly, whether for deliberation or for war. They manifested in various emergencies every noble gift of intellect and soul which the great object demanded.

From the broad acres of Mount Vernon came the loftiest soul of history, to lead to victory the armies of Liberty and establish her foundations secure forever. That defiant declaration — the pillar of cloud by day, of fire by night, before the hosts of freedom in their long years of trial — sprung from the inspired brain of the farmer of Monticello. It was farmer Putnam who dropped with eager joy the plow in the furrow to fight in his shirt sleeves the richly uniformed veterans of England, and roll them in blood down the slopes of Bunker Hill. Heaven gave to the farmer boys of the Hudson that incorruptible patriotism which defied the seduction of riches to deliver the nation in peril from the most successful treason of Arnold.

Oh, farmers of America! The story of the planting of your race is glorious! A new career was opened then for the tiller of the soil! Poets and philosophers have ever made honor of agriculture. But their honor was for the great nobles and wealthy owners, their patrons, who toiled not, yet reaped where others wrought. 'Twas but "to heap the shrine of luxury and pride with incense kindled at the Muse's flame." The real farmer, the laborer for their glory, shared neither profits nor glory. An hundred years ago that order was changed forever in the new world. Great as was the farmer's part in the achievements of that era, not less has been his share of their beneficent results.

From that time dominion of the soil has been his; and his tenure made secure. His labor has yielded its return to his own hands; to him his seed has borne its increase.

No steward descends upon his harvest fields to sweep the profits into the granary of his lord. No tithe collector snatches for the dignitaries of the church what the landlord has spared. He may lift his prayers direct to the God of Nature; and the bounty with which nature blesses his seed is all his own.

But not alone in the riches of his tillage has he realized the benefits of independence. Better advancement still has been his, in the social and political relations he enjoys. With ownership of the soil, has come that equality of caste which belongs to dominion. There is no lord or master above him. There is no rank or grade of social life which is his superior. I speak it with the full meaning of the words employed, and affirm again, that beyond the farmer there is no business, no avocation, no grade of social life, and no higher class of men in the states of America.

It is not meant that all farmers reach the full plane of their class. In the providence of God, there has been ordained an infinite variety of intellect, character and capability, among men. "One star differeth from another star in glory." Farmers are precisely as other men. They are not and cannot all be equal; neither in strength of muscle or fibre of brain. Among them, as with others, the gradations of intellect and power are almost infinite. Their achievements must vary accordingly. No laws of men, no institutions of society, can alter this ordination of heaven.

All that laws and constitutions, all that social opinions and usages can do, is to open the road, with equal access to all. This the farmers of America have accomplished for their class. The way is open. Many have already traveled it. They are examples to the race.

Do any doubt their social rank? Look about you here in Minnesota! Cannot you, any one here present, name at once, within your borders, numerous farmers, the social equals of the best in your commonwealth? I am but a stranger, yet am confident to challenge the test. On the fields of your neighboring Wisconsin, I claim the honor of friendship with scores who are the social and intellectual equals of the highest of other classes. In some, I know a pride of manhood and a degree of power, riches of intellect and integrity of character, which are the honor and adornment of humanity. Nor is the farmer's place less, or less important in political circles. His voice has ever been potent — his influence commanding in all affairs of state and nation. It could not be otherwise under the constitution of our political society. Where the majority of votes appoints the holders of every public trust, the wielders of that scepter of power must hold a sovereign influence. The farmer's class outnumbers any other; and, when you add those immediately dependent on it, perhaps all others. It is the great substratum and foundation rank of the republic. The farmer holds his place in every governing board and through all gradations of office, in town, county, state and nation. In most of the administrative subdivisions of government he is nearly supreme. Town and county boards are almost wholly controlled by him, and in every legislature his representatives outnumber those of any other order.

And, let it be remembered, these are the bodies which mainly rule the prosperity and welfare of the people in the ordinary affairs of life. Places of national trust have more of splendor and honor in appearance, as the scope of their authority is more extended.

But except in extraordinary emergencies their influence and effect on the business conditions and affairs of our citizens is far less. Two-thirds of our taxes are expended by our counties,

towns and local bodies. Substantially all our laws which define and sustain the rights of property and of persons, which adjust the social and domestic relations, which secure our peace, our liberty, our happiness, are of state authority alone. In national affairs, moreover, the farmer has always enjoyed a large, if not a full share. Presidents, senators and representatives have been often called from the farm, and oftener still from among the farmer's boys. I cannot dwell to recapitulate the proofs. Recall to mind the illustrious men who have honored our land, and you will name a majority who sprung from the farm. To sum it, to agriculture in America have been paid the genuine honors, which in other countries have but been sung to it. Our constitutions, laws and usages have opened wide the door to all to achieve whatever nature has given ability to attain. The farmer has been exalted to dominion of the soil, to social rank and political power equal to that of any other class or order.

Let any who would justly measure his great advancement and present condition cast his eye abroad! Let him read the history of rural labor, and view it as it is in other countries. Where is the land under the sun in which the tiller of the soil has so maintained himself against the greed and craft of men? Look to Great Britain. There, among more than thirty million, ownership of lands is absorbed by a few thousand, whose hands put no touch of labor to increase its product, but with relentless greed draw from the toilers on the fields the better portion in rents, by which alone can labor be allowed the privilege to earn subsistence. The farmer there must be a rent-payer; he can have no title but a lease. The farm laborer must be a hind; he is fed and sheltered. The father of one can have no inheritance but a rent charge; of the other, but the patrimony of the beasts of burden. The church shares the benefit and lends to this the sanction of her spiritual authority. Feudalism is gone, indeed, but it is not yet for Englishmen to own the lands they till, nor enjoy "the kindly fruits of the earth," which their hands gather from seed they sow — except in the litany.

Or consider the melancholy state of poor Ireland! There sit Irishmen, poverty-bound to the spot, whose fathers were robbed

of title to the rich vales and fertile meadows of that bright and beautiful isle. They still plant the seed upon its surface; they nurse its growth; from early morn to dewy eve they ply the implements of husbandry to nourish its increase; their eyes linger on the rich products which nature's lavish bounty abundantly bestows to their labor; themselves reaping the plentiful harvest, they must bear it to their master's ships to furnish out a replete luxury in a foreign land; and then return to the miserable cabin to hear their children cry for bread. Again and again the world has heard and pitied the wail of famished Ireland. Yet in every year when famine has swung the scythe of death among the toilers of that land, the lavish bounty of nature sacrificed to pampered greed has been abundant to have fed every Irishman, every starving wife and child. Ships laden with the succor of humanity met in their ports others bearing off the plenty of Irish fields.

For there, with all their cries of hunger, generous nature never failed of enough for Irishmen; she has only refused to satiate the avarice of the foreign land-holder.

Let him who repines in unreasoning discontent, in this happy land, but stop to think how, within a few months, the Irish husbandman has been forced to see the flesh dry up, the bones protrude and the eyes sink back in the starving faces, of his wife and babes, in his own beautiful and bountiful Ireland!

A more extended survey must still further enhance our comparative satisfaction. The master of the National Grange recently illustrated the social condition of the farmers of republican France by a significant anecdote of his own experience. He dined, on a recent visit there, with a farmer of reputation, a model of his class. The rich repast with which he was able to regale the distinguished commissioner of agriculture from the United States, consisted of soup and then stewed rabbits! Afterwards some lettuce, "to take the taste out" of his mouth. A few days later the compliment was returned by invitation of the farmer to the hotel; and lo! the manager wouldn't let him sit at the hotel table with ladies and gentlemen! With all their bluster, the Frenchman's liberty savors yet too much of royal garlic!

It must suffice to close this hasty view, to point to one ample

proof, embracing all. Stand for a week at Castle Garden! Behold descend from the great ships the thousands who have tempted the long and dreary waste of seas, mingling all the tongues of Europe, join in great throng to claim the happy homes and free air of America!

The conditions I have thus reviewed I rank of the greatest value, the highest in the farmer's honor. They go to his nobility of character, the exaltation of his manhood. They are the mainspring of all his advancement, the real source of his prosperity. Their influence and effect have been prodigious for his welfare. The material prosperity which has followed to their lead is marvelous to contemplate, even in this age of marvels. The American farmer is ascending to be, has almost now become, the supplier of the world. His cotton and sugar, his grains and corn, his butter and cheese, even his fresh meats, pour with magnificent currents into the markets of the old world, returning "golden showers of compensation." I shall not enter on the statistician's office, to amplify the splendid theme. I beg to turn the view to other results of these primal causes, which are themselves contributory causes of this prosperity, and merit an especial attention. Among these is the peculiar advantage derived from the variety and usefulness of labor-saving machinery. Here is a notable result and proof of value of the leading conditions already considered. The rents which the land tenants of other nations have contributed to the luxury of landlords, our farmers have accumulated for themselves. Thus they have become able to be liberal purchasers, and have focused the thought of inventors and manufacturers on the necessities of the farm and the amelioration of their labor. No other land possesses implements in aid of husbandry comparable to ours in extent and value. The agricultural operations of the old world have been mainly conducted by the laboring hand of man. The farm laborer and the ox have plodded in the yoke, day by day, together. The old methods, the old tools, in the rude simplicity of generations long gone, still remain in the hands of the peasantry there. We read occasionally, indeed, of some noble lord or rich landholder who has pleased his leisure by introducing some new-invented implement

to his fields. Among the toiling masses labor-saving machinery is little known. In truth, it is only where institutions of liberty develop and uplift the individual to intelligence and ability to demand aid for himself, that such amelioration comes. It is rarely furnished to the general, by the consideration of the higher few.

It has been the enterprise of our manufacturers, which has shown the startled laborer on European field that ingenious mechanism which sweeps down the waving grain by acres, binding it in convenient sheaves, while the ruler of the harvest rides triumphant over the scene. This honor truly belongs to the American farmer. He begot the American manufacturer. It is, in real fact, his moving influence and power which have put on the fields of Russia and the plains of Australia the harvester and the mower of America.

In this country the progress of the last generation has revolutionized the whole business of agriculture. It has introduced new forms and processes with new implements, and vastly enlarged the scope and extent of the pursuit. Recall to mind the farmer of fifty or sixty years ago. Behold him in his harvest season. He hurries through the neighborhood to collect labor for the task. His forces gathered, each weaponed with the crooked sickle, they attack the field of but a few acres, as the great undertaking of the year. The lark is startled by their early call, who must save every hour of light. They gather in the hand the berry-laden stalks, then sever them with the knife and tenderly lay them down. Inch by inch they crawl slowly on. Day after day the back-breaking toil advances before the field is won. Then the heavy wain, urged by the patient oxen, creeps painfully to the barn, where the sheaves are laid at rest. By and by, amid winter winds, for weary days, the farmer flings the heavy flail, to fill the moderate bin. Seize such an one in your fancy, advance the years by sudden turn upon him, to look on your broad waving fields, rich with the world's supply! Invite him to a ride on your harvester, while you toss off by the acre the well bound bundles! Then with him to the thresher, whose devouring mouth swallows the sheaves as the big stack falls, while at the spout the

rapid stream of golden berries runs! Could he believe you to be the child of his own loins, not in league with some genius of the fairy world? Or, bid him drop the hoe in the old corn-field, hung with strings and streamers and guarded by the bogus sentry against the crows, and by sudden transformation seat him on the sulky corn plow, to stir the earth with rapid step on your broad acres! Would he not laugh to hear you call that *working* in the corn? Such and so many are the devices which have relieved the man and woman from the drudgery of the farm that the imagination can hardly pause in the forecast of the future. They begin with the farmer's ploughing, they attend him in seed time, in cultivation, in the gathering of crops, in their storage, their reduction, even to the hour of marketing. They have lifted the husbandman beyond the level of mere toil. The farm is already a manufactory. Its labor is applied through ingenious mechanism with intelligent skill. Its laborers are mechanics. Its operations hum with the music of civilization. The ox and the ass have lost their character as beasts of burden. Steam has expelled them from the fields and works in the farmer's yoke. Who forbids that electricity shall next become a farm servant, and leave the noble horse but for the enjoyment of the highway and the track?

But the enormous producing power which these implements of husbandry have developed would have been no blessing, perhaps a curse, had invention ceased with them. The mill wheel cannot run unless the tail race delivers the flood which grants it power. It were folly to multiply production, if the product do but accumulate in hand. Coals are little worth to Newcastle for use, nor wheat to Minnesota. So heaven filled the inventor's brain with other cunning to meet the farmer's need. The wonderful highway of iron was bestowed in time. It is, also, the farmer's debtor; at least developed by his demands. Without him, it would be of comparatively small extent and value. Without its aid, where would be the farmer of the west?

Before railroads were devised, there was no extensive freight communication but by water. And that was valueless unless conveniently accessible. From this, the agriculture of past ages

gathered around the seas and lakes, or lined the river's margin. It girt the Mediterranean and made famous the valley of the Nile. The unwatered world of the interior was left to the wandering nomad or the forest barbarian. It was the unknown region full of mysterious terrors. The great Hercynian wood was the home of beasts, brute and human; the latter ever the impending peril, and finally the destroyer of the civilization of the world. The reserve corps of barbarism lay back on the plains of Russia and Tartary, which nourished the fierce savages who could live on equine flesh and carouse on the milk of mares. So, too, water communication was slow and tedious, even when accessible. That is true, especially of inland navigation. It is weeks by water from St. Paul to New York, though the aid of steam be invoked; and in northern climes that avenue is available for but half the year. Your magnificent wheat fields would mostly lie unbroken, farmers of Minnesota, had not the invention and enterprise of other men, stimulated by your demands, laid the double lined highway to carry the freight car, laden with your precious berry, to the sea; the Indian would still be master of the territories of the west. Your lands derive their value, your industry its reward, your homes the luxuries and many of the comforts they exhibit, from the well-abused railroads of the continent.

In the beautiful language of that noble lover of human liberty, once the pride and ornament of Wisconsin's supreme bench, the lamented Byron Paine, "Railroads are the great public highways of the world, along which its gigantic currents of trade and travel continually pour — highways compared with which the most magnificent highways of antiquity dwindle into insignificance. They are the most marvelous invention of modern times. They have done more to develop the wealth and resources, to stimulate the industry, reward the labor and promote the general comfort and prosperity of the country, than any other, perhaps than all other mere physical causes combined. There is probably not a man, woman or child, whose interest or comfort has not been in some degree subserved by them. They bring to our doors the productions of the earth. They enable us to anticipate and pro-

tract the seasons. They enable the inhabitants of each clime to enjoy the pleasures and luxuries of all. They scatter the productions of the press and literature broadcast through the country with amazing rapidity. There is scarcely a want, wish or aspiration of the human heart, which they do not in some measure help to gratify. They promote the pleasures of social life and of friendship; they bring the skilled physician swiftly from a distance to attend the sick and the wounded, and enable the absent friend to be present at the bedside of the dying. They have more than realized the fabulous conception of the eastern imagination, which pictured the genii as transporting inhabited palaces through the air. They take a train of inhabited palaces from the Atlantic coast, and, with a marvelous swiftness, deposit it on the shores that are washed by the Pacific seas. In war, they transport the armies and supplies of the government with the greatest celerity, and carry forward, as it were, on the wings of the wind, relief and comfort to those who are stretched bleeding and wounded on the field of battle."

But while we do them justice, let us not forget there are doubtless many faults to be corrected and abuses to be reformed in the administration of these highways. Corporate powers and corporate values have advanced with a more rapid step than the invention of our statesmen and law makers. The agency of the corporation is comparatively modern, and, like the agency of steam, is a mighty power. Unless subdued by proper appliances of law sufficient to control it, we are liable to disasters injurious to our welfare, as the accidents which sometimes befall the train are destructive of life.

But I must not protract this weary hour to discuss this problem foreign to my subject. Important as it is, we need not fear it. The railroad, rightly used, is the friend of the farmer and the whole people. It is the paramount interest of its owners that it should so remain. They dare not make it an enemy, and when we reflect that a single invention — the steel rail — has reduced the freight tariff forty per centum, we may trust somewhat to time and genius to relieve the inconveniences, and continue to enjoy its blessings with composure. All these considerations multiply

the necessity for the high education of farmers. The avocation has ever been one affording opportunity for meditation; and the higher types of manhood, broad thought and well fixed convictions have ever marked our American agriculturists. Yet the world has not been accustomed to admit the necessity of much education for the farmer's business. It can no longer be so regarded. The steady progress which the noble calling has made in methods and scope, has placed it fairly on a par with any other, in advance of many others, in the need of a broad mental cultivation and general information. It is still possible for the clumsy and brainless lout who works without appreciation and intelligence to gain subsistence from the bounty of nature. She is too lavish of her abundance to suffer even the blockhead to go unfed. But such is not the farmer of this country, though sometimes found in his company.

The true farmer is far more exalted. He is capable of great things. He brings science to his aid. He studies the laws of nature, manifested in the subtle essences of the soil, the organization and growth of the vegetable kingdom, even meteorological changes. He reaches out his inquiries over all the earth, seeking better plants and foods, improved breeds of animals, more enlightened processes. No business pursued by man opens more far-reaching avenues of research, because, being everywhere in some form pursued, subjects of inquiry multiply with every country.

So, on the other hand, the great facilities for interchange have made the world the farmer's market. You do not sell your grain to the wheat buyer at the station where you deliver it. He is a mere factor. He fixes no price on your commodity. That is done by his masters in Liverpool; and they, in turn, are but the barometer of the world's appetite.

When the children of men grow hungry, the golden kernels grow more golden, by some cents to the bushel. When they are fed you must sell for less, or wait till they are hungry again.

So, substantially, with your corn, your butter and cheese, your fat cattle, and all your money-bringing products, except that with them the varying markets add to the demands on the farmer's

intelligence. For, to skillfully conduct his negotiations, to understand the instructions of the world to its agent at the station in respect to price, to regulate with wise forecast the production of profitable crops, the farmer must be acquainted with the business of the world. He must be a reading man, of quick perception and comprehensive judgment.

The farmer's newspaper has been and continues his efficient and valuable coadjutor. It, too, has been the product and kept pace with the development of the age. Many of them rival the best general sheets in industry and value, and deserve the highest credit for their work. But the aggressive spirit born of the farmer's liberty and power has wrought a new institution, the agricultural college. This, too, may fairly be classed as a laurel in the chaplet of the American farmer. The refinement and value of studies, the world has never failed to acknowledge, but until modern times has regarded them almost exclusively the portion of the so-called learned professions. That the hand of labor should be guided by the intelligence of science, and the workman's brain refined by the discipline of study, the world denied until the principles of America taught the practical equality of humanity. Schools were for the priest to pore over the myriad tomes of religious controversy; for the lawyer to search the refinements of jurisprudence through "many a volume of forgotten lore;" for the doctor to trace back the story of the ills that flesh is heir to, and learn the prescriptions of Esculapius and his following line; for the scholar and the antiquary to hunt the changes in human speech, and read the history of dynasties and wars.

But a great change has come upon our institutions of learning. We do not deny the value of the old, but we realize the no less value of the new. These schools are yet but beginning, their power undeveloped. Their future is full of promise. The time shall come, and that I hope not long hence, when, to rise in his calling, the man who labors with the hand must have a well-trained and well-filled brain, as well as he who works by the pen; when the farmer's boy shall learn that science which discloses the laws of the soil, as well as to handle the plow which breaks it;

which teaches the germination and growth of the grain, as well as to drive the reaper which cuts it. But the farmer's education must go beyond his business. In his hands repose the progress and security of our institutions of liberty. All good citizens should be so informed, so upright and so wise, as rightly to discharge their high duties in this respect to their fellow men and future ages. But I think the duty rests with peculiar weight on the farmer and that it should be his highest pride to so regard it. First, because his class holds a greater share than any other of political power. He is therefore bound to rise beyond it to care for the state, or his race, and for posterity with a broad and manly philanthropy. And again, because his history and traditions demand it. The political wisdom which wrought our free institutions has ever been the possession of those who till the soil. There be many who fear the perpetuity and safety of our nation, because its increase of population and wealth diminish the influence of the rural classes. There is something about the open communion with nature which has always raised the loftiest spirits among men to profound reflection. It has been the purifier of the soul, restoring the strength of convictions and upright purposes. The possession of the broad acres, when nature, with recurring seasons, unfailingly bestows her bounty to man, enlarges the currents of the soul. He has, indeed, a sodden brain, who is not stirred to high purposes and a broad philanthropy in witnessing the wisdom and benevolence with which heaven informs the face of earth.

And where is the man with a heart big enough to love his fellow men, who can survey the magnificent territory of this Union, the millions multiplying on it, the unexampled prosperity and happiness which they enjoy under our constitution, and yet reflect on the history of past ages without poignant anxiety for the security and perpetuation of these blessings to posterity? How anxiously does he turn his eye over the wide expanse, seeking a safe anchorage for his ardent hope. To what special rank or class can he turn with a better reliance than to the owners and tillers of the republic's wide domain? Removed from the cankering vices of the cities, the false luxury, the feverish chase

for riches, the absorbing struggle for ephemeral ends, what offers such repose to hope as the rural homes? The altar and hearthstones of our American farmsides are sacred places. They have been the nurseries of the great men and great women of this country. In them have been laid the foundations of that purity, patriotism and power, which have been the glory of our public men. To these calm retreats our wisest and strongest have ever loved to retire, to shake off the vicious influences of crowded centers, to restore the brain, to purify the heart and invigorate the soul. There the sweetest pleasures of life have been found. There they have found rest and peace, when the storms of life have exhausted them with turbulence. And there they have gone to die. From the farmside came Washington to draw the sword for man, and to it he withdrew with joyful contentment when the great victory was won. Thence he came again to take the helm when our national voyage began, and there again retired when his high duty was done. And there he died! How holy is that soil of Mount Vernon! How wishfully did Webster, the great expounder of the constitution, ever turn his weary eye, in the meridian splendor of fame, to his sweet farm home of Marshfield! What moving pathos in that latest view of his life, when after a night of pain, he caused his herd of oxen to be driven before his window that he might look once more in their great, gentle eyes, and see them crop the grass. "It was his last enjoyment." Whose heartstrings have not been strained, whose eyes not moistened by the pitiful supplication from the wasted lips of the nation's great sufferer, to be carried back to the old farm house at Mentor? What now to him the splendors of ambition's highest goal, beside the dear old farm home of his heart? Who but profoundly feels that there he might be saved? How fervently rises the spontaneous and universal prayer in every heart that he yet may see the old roof tree, and be there restored to life, to strength, to happiness and power again. Heaven grant its perfect answer.

Yes, these homes of the republic are her safe-anchored foundations. Fountains of purity and strength, they will nourish and sustain the virtue and wisdom of her people. Upon the enlightened

integrity, the high patriotism, the devoted fidelity of men reared among such influences, she may securely repose. We may confidently fix our view upon the future and with composure go forward. We are riding on the grandest currents of the tide of time. The prosperity we have, is but the promise of the prosperity that is to be. Dare you look forward for one hundred years? Whose eye can rest unflinchingly on the advancing sun of our national glory? Who can picture to his fancy this continent after the second century of liberty? When two hundred millions, seated on every rood of the vast surface, with all the appliances by which progressive invention will supply increasing needs, shall enjoy the magnificent fruits of the highest human wisdom and liberty, and illustrate the noblest possibilities of humanity. Who shall, with mortal power, attempt the glorious forecast, but to cry with the poet seer:

"Oh! visions of glory, spare my aching sight!
Ye unborn ages, crowd not on my soul!"

ADDRESS OF THE MASTER, S. C. CARR,

AT THE

ANNUAL CONVENTION OF WISCONSIN STATE GRANGE, HELD IN THE SENATE CHAMBER OF THE CAPITOL.

Worthy Patrons of Wisconsin: — A great man who has lately passed from earth, who loved and wrote with almost an inspired pen, the poetry and prose of country life, said: "The glory of the farmer is that, in the diversion of labor, it is his part to create. All trade rests upon his activity.

"The first farmer was the first man, and all his historic nobility rests on the possession and use of land; the profession has in all ages its ancient charms, as standing nearest to God, its first cause." And then Mr. Emerson, who was as truly a sage in his generation as Socrates in his, did not say these fine things of farmers and farming just before elections, but at college and literary festivals, as if to gain the ear of other classes to his utterance of everlasting truths. Mr. Emerson goes on to show that the

farmer also stands nearest to man: "The farmer stands at the door of the bread room, and weighs to each his loaf. He is a constant benefactor; the well he has dug, the swamp he has converted into an orchard, the grove he has planted along the dusty highway, outlasts his life." This, brothers and sisters, we have said to ourselves a great many times, and as many times have asked ourselves, why this being, who stands nearest to God and man, who modifies climates and soils, feeds and clothes his fellow man, who has hitherto been powerless to protect himself against the selfish combinations of classes that are served by him, why is it that the wheels of trade and commerce, set in motion by his industry have become mighty enough to crush out the farmer's energy and independence? Why is it, that in the national councils there are never more than about thirteen farmers to two hundred lawyers, or that we have, in theory, a republican government, yet allow a handful of representatives, not so much of the people as a handful of powerful clients, to shape the policy and frame the laws which govern more than fifty millions of their countrymen?

The only answer is that up to the birthday of our order, American farmers as a class were ignorant of the first principles of association and confederation. In a few of the states farmers' unions had sprung up, and state and county agricultural societies had been useful in bringing farmers together to compare their products and to discuss improvements in culture. But these were but ripples on the surface; a close bond of association was needed. It was found, when on the evening of December 4, 1867, nine earnest and thoughtful men from different states organized the first grange in the office of William Saunders, of the department of agriculture in Washington; it was most fitting that an organization which was to become of national importance should have its birth place in the national capital, almost in sight of Mount Vernon, where the model American, "first in war, first in peace," ennobled the pursuits of husbandry by his example.

The "Declaration of Purposes," adopted at the meeting of the National Grange in St. Louis, in 1874, is like that which our forefathers signed in 1776. A document which will become a land-

mark in the history of the country, and in the development of true, just, social and political ideas.

The declaration of 1776 embodied the principles of human rights and equality of all mankind. The declaration of 1874 recognized "the abilities and sphere of woman," elevated her to membership and official position, and if there was no other reason why our order should be a permanent one, ever increasing in usefulness as years go on, it would be enough to say that in it, for the first time in human history, the moral worth and social power of womanhood has full scope. It is given to the Patrons of Husbandry to say, truly, we know no north, south, east or west; our hearts are as broad as the land our Heavenly Father gave us to till. We know no sectarianism, for we are alike his children; we know no partisanship, for we are patriots in the common love of our country and our homes. And in the service to which we are pledged to "develop a higher manhood and womanhood among ourselves; to enhance the comforts and attractions of our homes; to strengthen our attachments to our pursuits; and to relieve the distresses," there can be no distinction of sex. More than two millions of our people have come directly under the influence of the order. The numerical strength may not be as great at the present time. The additions of the last few years have been of the most substantial and serviceable plurality.

A membership is coming into the work, budded in grange principles and nourished by grange literature.

The healthful condition of the National Grange must depend upon the vitality of each subordinate to it. It is our duty, brothers and sisters, to see that no dead wood retards the growth of our State Grange. We wish to have it presented annually healthy and vigorous — fruitful in good works. We are happy to report the order in this state in a very healthy condition. While some have fallen out, others have stepped in, and we are marching on to victory. We have in the state forty grange halls, valued at $87,400; several of them have fine organs and good libraries. We also have fourteen grange stores, with $56,300 capital stock, and did a business in the year 1881 of $319,000. The business arm of our order can be greatly strengthened by making the

work of our grange agency better known and understood. Your agent, brother L. G. Kniffin, has done a business during eleven months of the year 1882, of $56,992.80.

I desire to call your attention to the important work of the coming year. How shall we spread the noble principles of the order, and, while rousing the dormant granges to new life, win new recruits from the multitude of farmers without the fold. We must do what every church, every temperance society, every benevolent organization is doing, viz.: Keep our apostles in the field. would recommend that the able and eloquent lecturers in the various subordinate granges should avail themselves of every public opportunity to expound the leading objects of our fraternity, and to magnify the social improvement which has resulted from the planting of granges in sparsely settled portions of the state. Our district lecturers and deputies should take the field, and canvass their territory thoroughly. Better schools, better neighborhoods, follow in the wake of a flourishing grange. Until we have funds to keep a state lecturer in the field, every strong grange must reach out a cherishing hand to the weaker neighbor. There are granges rich enough and public spirited enough to provide an occasional lecture to some weak grange, or to double their subscription list to the *Bulletin*, sending it to those who would otherwise go without it.

POMONA GRANGES.

In every county where there are three or more subordinate granges, a Pomona grange should be established. This organization is intended to strengthen all weak and younger granges, not to displace them. Let the influence of the Pomona grange radiate outward its warmth of fraternal feeling and light of intelligence, and we shall soon see our membership increase. Every member of the Pomona grange should feel set to a special work not less important than that of the officers of the State Grange.

THE GRANGE PAPER.

The grange paper (*Bulletin*) is the most important instrument for carrying on our work. In many of the states a weekly paper is well supported, and in the columns of these our exchanges we

see proofs without number of the advantage and necessity of maintaining an organ of our own. There are hundreds of men in the state legislatures whose only school of oratory has been the grange practice in debate, and confidence in presenting subjects clearly and briefly is gained by every live member; and there are other hundreds gaining confidence and facility as writers, who have taken up the pen from the laudable desire to contribute their mite to the success of our paper. All honor to such, and let it be remembered that there is no life so meager, no experience so worthless, that its record may not be useful to others. I cannot too strongly urge you to make our organ *your voice*, and to give full and free expression upon matters which will promote the good of the order. Nor should our efforts to extend the subscription list of the *Bulletin* be limited to patrons and their families. There are no better rural or family newspapers than those published under the auspices of the grange. You have been instructed in our ritual as to what a good patron does. I feel urged by a strong sense of what may be accomplished by unity of action in matters of business to say: A good patron places his business as far as possible in the hands of his fellow patrons, by co-operation *with* his fellow patrons in the hands of those whose interests are identical, or at least not inimical. Let me make my meaning plain. We know what burdens have been laid upon the producing class, by corners and combinations. The true principle of a division of labor is that, inasmuch as all produced values are the results of agriculture and manufactures, the right of commerce, *even* ought to take to itself whatever share is on an average a fair remuneration for its service, leaving in the hands of producers a balance which represents the value of their whole production, minus the reasonable expenses of transportation and exchange. Now modern improvements have actually diminished the reasonable cost of transportation and exchange in a greater degree than they have affected the average cost of production; yet, under the present complex industrial system, wealth, which is generally to be found in the commercial classes, or those engaged as common carriers, has discovered the machinery by which the results of labor is pretty much what it pleases. The trader and carrier in a

few brief years has amassed a collossal fortune; he is a capitalist; he is rich enough to buy the legislation he wants, the public opinion he wants, and the religion that fits his conscience. There is no check upon him but the competition of another capitalist. When two or more capitalists combine as against an uprising of public sentiment in the producing classes, it needs no prophet to forecast the result. But let the producing classes form co-operative associations, and we have the power of capital and the power of representation brought together in a way which, guided by intelligence, will restore the balance of power. The National Grange a few years ago recommended the Rockdale plan of co-operative societies as worthy the attention of patrons. The profits, or savings, of these societies have averaged thirty per cent. in England on the capital employed. There are now about eight hundred co-operative societies in England, representing a business capital of over fifty millions of dollars. Each one of these societies combines some of the features of our American grange stores and grange agencies. We do not assume to know more of commerce and trade than those who have devoted their lives to it, and it is very likely that lack of business training will cause loss and failure in some cases. But our modest efforts to emancipate ourselves from the grip of selfish and speculative traders have met with such a degree of success that we are encouraged to persevere.

AID SOCIETY.

Other organizations, some of ancient and many of quite recent origin, are held together by beneficiary inducements to membership. Our Patrons' Benevolent Aid Society, organized June 18, 1875, has about one thousand members. I cheerfully recommend it to your favorable consideration, and hope our district and other lecturers will make its objects and benefits more generally known.

EDUCATION.

In approaching the subject of education, which is the corner stone upon which we propose to build a structure which will outlast the conditions which called our order into existence, I feel great diffidence. The subject is vast as to its importance, com-

plicated as to variety of aspects and details, and while there is a great and growing dissatisfaction with the education of our times, there is a great diversity of opinion as to how these defects are to be remedied. A state superintendent, in a national meeting of teachers lately, said: "The fault of our public school system is, that it does not lead out into the industries, but up into the college." We must remember that an immense majority of the children of our public schools must labor with their hands for their daily bread. Why not find a way to educate hand and brain together? Why not make the exercises and illustrations of the school room tend to dignify the pursuits of home, shop and farm? Where is the seminary in Wisconsin which professes to make a good husbandman or housewife? I hear a great deal said of the benefits of "culture," of developing all the powers of mind so that every faculty will run like the one-horse shay. This is an ideal standard of education, viewed from the standpoint of the tax-payer. Give every child, at whatever cost, a training which will as far as any school training can secure him or her industrial independence — in other words, help them to get a livelihood. This, in general terms, is my idea of practical education.

AGRICULTURAL COLLEGE.

The United States donated to the state of Wisconsin, in the year 1862, two hundred and forty thousand acres of land for the benefit of agriculture and the mechanic arts. Nineteen thousand eight hundred and eighty-four acres of this land is yet unsold; the interest on $274,385.37, which amounts this year to $17,112.47, is paid directly into the university fund, and used for purposes entirely different from what the donation was intended. It ought to be available to make such educated farmers as the state of Michigan is making at her agricultural college, and such mechanics as the state of Massachusetts is making at her school of technology. I am told that at the centennial exposition foreign educators were more surprised at the exhibits from the Michigan agricultural college, and from that of Massachusetts, than at anything else which related to education in this country. Take the catalogue of our own university and note the proportion of

students pursuing the agricultural course — make all due allowance for age and other circumstances. Compare this showing with that of the Michigan — I mean the agricultural college, not the university of Michigan,— and then pardon me for saying in sight of the university, which as a university we are all proud of, that an agricultural college to be a success ought to be planted in an agricultural district, where there is nothing to draw students away into other pursuits. I speak plainly upon this subject because I believe that education is the lever which will raise our calling to the level of the professions. To the level, did I say? No, *above* the level, for the measure of greatness is and ought to be the measure of service to mankind. I do not depreciate the value of the so-called learned professions. Old Senator Mason said: "The law is essentially a profession for only ordinary minds. Its very terms exclude the possibility of high mental effort. The highest effort of the human mind is to create. The mere politician, low as he is, comparatively, is yet one step above the lawyer, who can only interpret and arrange."

As Patrons of Husbandry it is right for us to protest, not against the good work done by Prof. Henry for the benefit of agriculture, but against using any part of the national gift to make lawyers, literary men, or for any other purpose except the training of agriculturists and mechanics.

Within the past two years several state granges have passed resolutions favoring the erection of the agricultural department at Washington to an equal rank with the navy and war departments. The National Grange, during the session of 1880, resolved "that the commissioner of agriculture be made secretary of agriculture and a member of the president's cabinet, and with the same salary as secretaries of other departments; and this department be sustained and encouraged by appropriations commensurate with its importance."

The chairman of the congressional committee of agriculture strongly opposed the bill; but there was a noble *patron* on the committee, brother D. Wyatt Aiken, of South Carolina, who pressed it to a final vote; one hundred and sixty-two members

voted for and eighty-two against it. We hope to see the day when this will become a law of the land.

The chairman of the committee, a lawyer by profession, in a speech opposing the bill, declared that the real agriculturists of the country, the thoughtful and intelligent farmers, did not indorse this request; that there was no warrant in the constitution for the so-called elevation of the department of agriculture. The department of agriculture as it stands to-day, he said, is an illegitimate child of the government, deserving support only during its infancy, or while the act creating it remains unrepealed.

The interests of agricultural education have been fostered somewhat in this spirit. As illegitimate children, the institutions honestly devoting themselves to the education of farmers have been snubbed by the time-honored classical colleges, and frequent attempts have been made to gobble their inheritance. Whatever tends to strengthen them, to elevate the position of agriculture in the nation, is legitimate work for our order.

NATIONAL GRANGE.

The sixteenth annual session of the National Grange closed its labors on Thursday, November 23d, after an eight days' meeting in Indianapolis. Thirty-two states were represented by fifty-one votes, and enthusiasm prevailed. Two amendments to the constitution were agreed to and submitted for ratification to the State Granges.

In conclusion, I will say the State Grange of Wisconsin is laboring in no narrow or selfish spirit. We seek to lay the foundation of a true commonwealth, whose power is manhood and womanhood, whose conversation is education, whose objects are freedom of industry and of opinion, social order, economy in the home and in the administration of public affairs.

ADDRESS OF HON. GEO. B. LORING, U. S. COMMISSIONER OF AGRICULTURE,

UPON

ASSUMING THE CHAIR AT THE NATIONAL AGRICULTURAL CONVENTION AT WASHINGTON, D. C., JANUARY, 1882.

We all know that there is nothing so important in agricultural investigation in a country like ours as proper comparison and careful conference with regard to the important questions that come before the farming community. We have a large surface extending over many latitudes, every variety of soil, and nearly every variety of production, from the northern latitude down almost to the tropics; and it is absolutely necessary that a national convention of agriculturists should be composed of those who are interested in all the diverse agricultural interests that cover so much space and are inclosed in such a variety of climate.

I have thought it best, therefore, to divide this assembly into conventions among various branches of our agricultural industry. The first convention, which meets this morning, will be devoted to the discussion of agricultural education and the organization and purposes of agricultural societies, which I consider to be fully as important to the agricultural educational system of the country, in a practical way, as the colleges are in a scientific way. I have always been especially desirous that the practical and scientific in the agriculture of this country should go hand in hand. I know the value of scientific investigation as well as any man possibly can, and set as high a value upon it. I know perfectly well how the several branches of agriculture, with all their economies, have been systematized by the aid of scientists, and I am especially desirous that the same methods that have been adopted with so much success in other countries shall be adopted here. I desire that everything that can be done to increase our crops and economize our modes of living shall be done. And to this end this department will tender every encouragement as long as I have control of its affairs.

The value of practical information cannot be too highly esti-

mated. It is the practical men who have been the pioneers in this great industry. They have leveled our forests, built our towns and villages, and it is through their demands that agricultural machinery has been brought in this country to that degree of perfection which is of so much value to the farmer and the source of such infinite admiration to every observer. There are nowhere in the world finer exhibitions of agricultural machinery than can be found at our annual fairs, brought there, acre by acre, upon the demand of the successful farmers of every section of this country. It is the practical men who have brought this about. It is they who, led by Mr. Johnston, of New York, have instituted "thorough drainage." It is they who have introduced the best breeds of cattle, and have increased, by the introduction of animals adapted to our latitudes, the wealth of this republic to an extent which the superintendent of the census informs me is almost incalculable. Now, the work that the scientists and that which the practical men have done should go hand in hand, and I have endeavored to combine both sides of this agricultural investigation in such a way that its result shall be felt not only by colleges and schools, but also on the farms themselves. I thought that it would be well, therefore, to divide the work. The convention that follows this will be devoted to the animal industries of the country — horses, cattle, sheep, swine — during two days. Two days will then be devoted to the cereals — the best kinds of wheat, corn, oats, barley, etc., and to the discussion of methods relative to the management of these crops.

Following that will come the discussion of what is named in the circular as grape-growing and wine-making, including, however, horticulture of all descriptions; one of the most important branches that you can discuss, embracing the careful cultivation of new plants, methods, and processes, and of ornamental and useful trees. I desire especially that the debate should be confined within the limits indicated by the call, but I trust also they will be so extended as to include all valuable information upon the various points under discussion. The benefit which may arise from these conventions must be manifest. I think it was in 1872 that I was first called here to attend a convention similar to this,

although not organized in a similar way, the result of which was, I think, a great stimulus to the agricultural industry and ambition of the country. It is now nearly ten years since that was held, but in that time the increase of the agricultural wealth of this country has been enormous. The agricultural machinery of that day was by no means as perfect as it is now. The reapers and mowers of that time did not reach the state of high finish of the present. The introduction of economical fertilizers has been vastly increased, and man has learned that in many instances he has under his own hands almost as many natural fertilizers which he can use profitably if he will only apply them scientifically. We now know how to apply muck, clay, marl, all the various natural products lying within our own reach, economically and profitably.

The surprising growth of agriculture during this time has attracted great attention throughout the world. Ten years ago our crop of wheat was about two hundred and fifty million bushels; now it is more than four hundred and fifty million bushels. The crop of corn was then about seven hundred million bushels. In 1880 it was one billion seven hundred and fifty million bushels. The crop of oats was about two hundred and thirty million bushels in 1870. Year before last it was more than four hundred and fifty million bushels. Barley has doubled; rye has doubled; the whole grass crop has doubled. The great dairy industry of the Northwest has developed in the past ten years to an unparalleled extent. Now, the reason for this incalculable growth is that every man is engaged in his own industry, for his own good, responsible to his country and to the society in which he lives, and stimulated to the laudable ambition of making himself a good farmer and a good citizen. Within this decade the attention of one section of this country has been earnestly and anxiously turned to the best methods for developing its agricultural industry; and the result of this investigation and thought is that the successful, painstaking farmer there has determined not to confine himself to one crop alone, but to diversify his crops and products, so that not a month shall be lost in conducting his business, nor an opportunity be lost by which he can become a prosperous American agriculturist.

All that I have hastily outlined, and more, has been done since the convention assembled in this room ten years ago. I had the honor to preside on that occasion. I have not seen the opening address I delivered since that time, but I desire to say that I stand now exactly where I did then, when I declared that I was in favor of agricultural education, and agricultural colleges, and agricultural work; and when I maintained that if the schools were brought into close connection with the department of agriculture, they would soon secure the respect and support of every intelligent man in this land, [applause] as, I am happy to say, they have done. I am ready to join you in all intelligent endeavors for the purposes to which I have alluded, and I am more than grateful to the gentlemen who have assembled here this morning for the interest they have manifested in the call I have issued; and it is for you to see that your deliberations shall be so conducted as to have a permanent and useful influence upon the agriculture of this country.

Any gentleman who was present at the last convention held in this room, and is here to-day, must see the immense progress that has been made in agricultural education since that time. Some of the strongest men in the country engaged in the debate on that occasion, but it was evident that few of them comprehended its true value and importance. Since that day a great change has taken place. I see now no reason for any discouragement. I presume there never was a college that did not have some period in its existence in which its fate appeared to be somewhat doubtful. But no doubt should now remain with regard to that business interest for which the students of agricultural colleges are educated. As a profitable occupation, it is now recognized. I have always said that there is no such thing as unprofitable agriculture in the hands of an honest, faithful, intelligent farmer. The earth has never yet failed to respond to a wise and proper demand. There are mistakes in farming, to be sure, as there are in other branches of business; but you take the community generally, and you will find that agriculture is as uniformly profitable and yields as generous returns as most of its associate industries. True, there may not be so many industries. True, there may not be so many in-

dividual instances in the east, but there are in the west farmers who would not exchange their farms for any business within their grasp. I visited, last autumn, some of the extensive farms in Illinois, Iowa and Wisconsin, and I looked upon the agricultural enterprises of these various states as one who never had an idea of our eastern industries would look upon the great manufactories of Lowell, or Waltham, or Lawrence. Some of these farms are as imposing in all their business proportions and as encouraging to all the economies of state as are these great mills to which I allude. Nor is this the only section where I have had the pleasure of witnessing the growing, progressive, advancing agricultural enterprises of the country. I desire to bear my testimony to what I have seen in the south. I perceive there, a manifest desire to leave those things that are behind, and to press forward to those things that are before. The gentleman from South Carolina, Mr. Aiken, who is present, knows very well that everywhere in his own state, and other states of his section, there are evidences of advancing steps in the way of diversified and profitable agriculture. The great cattle interest in the west is as sure a mode of profit as is any well organized commercial interest. What better evidence than these can one have of the success which is sure to follow the application of the sturdy common sense of an agricultural community to the business of farming.

As I come east I see another system adopted with sound judgment and enterprise — a system which will ultimately extend throughout this country. It is the cultivation of special products devoted to local markets. Many an acre of land in the vicinity of our large cities is said on good authority to yield $1,000 annually. In my own neighborhood, in Massachusetts, there is land that pays the cultivator $250 and $300 per acre every year. You may see there good farm-houses and barns, the people cultivating their minds, accumulating libraries, and in every way striving to learn their duties as American citizens, and their obligations to the community and state in which they live. There is in the business of practical American farming the basis of our best civilization, the best intelligence, and a broad and enlightened state

policy which is not equaled anywhere on the face of the earth. [Applause.]

Now, if we have proved that our farming communities stand so high among those of the rest of the world, you may ask what is the necessity of agricultural science? For myself, I think the necessity for accurate endeavor is in proportion to the value of the occupation. Hence it is that we of all people need the aid of science in order that we may teach those laws of farming which shall make both the general and special agriculture to which I have alluded more systematically and accurately carried on.

Now, when I am told that young men who graduate from these colleges avoid agriculture and adopt engineering as a profession, the reason at once suggests itself. It is much easier to graduate an engineer than it is a farmer. Every man knows that if he were running a railroad he would find it easier to secure an engineer for his road, or mechanic for his machine ship, than would his neighbor, who owns a thousand acres in Virginia, to find a man to organize his force and manage his land. You can graduate lawyers who will carry you through all the intricate windings of the courts, or physicians who are renowned for their skill, but when you come down to this business of agriculture and would find a man whom you are willing to employ as an expert, you are involved in difficulty at once. And yet there is no want of liberal compensation in this calling. Give me one hundred good horticulturists, competent to arrange vineyards in California or market gardens near New York or Boston, or to adapt themselves to the various systems of farming with their knowledge of the several branches of agriculture and horticulture, give me one hundred such men, and they can find employment at once. There is an abundance of it everywhere. The demand for such is greater than the supply. I have hardly known an instance where the owner of a large estate could go to a college and assure himself that he could find there a man qualified in every way for his purposes. Take moreover the business of veterinary surgery. There are investigators here who have for a long time been struggling to solve certain questions relating to the application of that science,

and in every step they have made thus far they have felt the need of a strong, powerful, educated veterinary corps to take these matters in hand. We have them, to be sure, in individuals, but they have hardly yet established themselves in this country as a strong body of scientific investigators, whose opinion is accepted as law. Give us a corps of veterinary surgeons, graduated from the agricultural colleges of this land, and let us see how long it would be before their services would be in demand.

The same thing applies to market gardening. There are those who, by their ingenuity and skill, are equipping themselves for that profitable industry; an industry whose growth has been so rapid that its importance and value can hardly be estimated.

It becomes each year more and more necessary that we should know how we can better manage and utilize our labor. Teach your young men those things which shall enable them to present themselves properly to the owners of large estates, and there will be no further fault found with reference to their immediate employment. Teach your young men how to keep the buildings in good order; how to select and breed and feed their cattle; how to systematize the whole business of farming. There are no people so imitative as farmers; none who watch their neighbors so closely, criticising the affairs of adjoining farms while taking care of their own; none who estimate more highly the value of good example. There is no reason why young men should be discouraged, or why teachers should be discouraged as to the effect produced upon students by the teachings of these colleges. President Garfield used to tell a capital story of a cultivated and intelligent and practical gentleman, who, when asked what benefit he had ever derived from his knowledge of Latin, replied: "Perhaps no special benefit from the Latin itself, but I have derived some benefit from the fact that I once knew it so that I might forget it." The agricultural colleges can infuse a degree of enthusiasm and love of practical science into the minds of active and vigorous men, by placing before them the agricultural problems of the day, which will produce an immense effect upon the agriculture of this country, and which will tell throughout this whole land.

ANIMAL HUSBANDRY IN THE CENTRAL WEST.

BY E. G. MORROW, PROFESSOR OF AGRICULTURE, ILLINOIS INDUSTRIAL UNIVERSITY.

To include a vast territory under the term Central West — even from Ohio to Kansas, or Nebraska, with the southern boundary cutting off not more than a single tier of states — will not be considered inappropriate when we bear in mind the magnificent extent of our national domain. In this region animal husbandry — the breeding, rearing, feeding of live-stock and the production of live-stock products — is already one of the most important branches of agriculture, and is to become vastly more important in the years to come.

Almost all the reasons which make the domesticated animal so important a factor in nearly all successful agriculture are applicable to the agriculture of this region. Here, as elsewhere, the farmer finds in stock-raising the opportunity for profitable labor and oversight throughout the year; the most practicable means of preventing the waste of land and partial waste of by-products almost irreparable from most classes of exclusive plant cultivation. He finds in it the most effective prevention of deterioration of the fertility of the soil. His animals enable him to retain on the farm a large part of all his plant crops have taken from the soil. Their presence makes it his interest to adopt a beneficial rotation of crops, and to cultivate those best entitled to the name restorative as contrasted with exhaustive. They enable him to produce on his own farm a fertilizer unequaled in its wide application by any product of the skill of the chemist — barn-yard manure — the best type of a complete fertilizer yet produced. During a good part of the year, his animals do what no other fertilizer manufacturers propose; they not only manufacture the manure, but apply it in a satisfactory manner to the soil where needed, making no charge for the labor, and doing full work in the manufacture of valuable products for sale. They enable the farmer to secure larger returns, and, probably, greater profits from a given area of land as the result of the greater labor and skill which

they and their products require, as contrasted with grain-growing. Animal products are, in condensed form, valuable in proportion to bulk, hence are better fitted for transportation to distant markets than are the more bulky grain products. This condensation of the surplus farm products is one of the best safeguards against great loss from excessive transportation charges.

All these reasons apply with especial force to the agriculture of a nation like our own, which must necessarily be a large exporter of agricultural products. To no part of the country are they more applicable than to the Central West, which is to furnish the greater part of the agricultural material for export, and, in the near future, is to supply much food to the thickly populated east. With a soil admirably adapted to the economical production of grains and grasses, and a climate well suited to the healthful and luxuriant growth of both plants and animals, the Central West has laid upon it the desirability of condensing agricultural products, because of the great distance of the markets to which they go.

It is pardonable pride with which we speak of the marvelous rapidity of advance of American agriculture. The exportation of agricultural products may be said to have begun within the memory of men now living. The magnitude of these exports we can scarcely realize. Rapidly as they are increasing, the exportation of live-stock products is increasing, perhaps, most rapidly of all. We are to send largely-increased supplies of breadstuffs to Europe; but the increase in the quantity of our animal product exportation is to be still more rapid.

Probably in no country and in no age has there been equally rapid advance in agriculture with that seen in western states within the last quarter or third of a century. Within a few years, states have grown from sparsely-settled regions, barely supplying the wants of the few inhabitants, to be mighty empires in population and producing power; and in no field has the development and improvement been more rapid than in the live-stock interests.

To one who had the pleasure and profit of studying the largest collection of fine farm animals ever made in Great Britain, whose admiration for the mother country swelled within him as he care-

fully examined the imposing array of animals shown at London in 1879, and who also looked at corresponding collections at exhibitions in our western states a few months ago, there came the conviction that, as a whole, the American exhibits were better than the British; for not only had American importers secured leading prize-winning animals from Great Britain, France and Holland, but side by side with them were American bred animals, their full equals in many classes, and in some cases their superiors.

Not to unduly extol one portion of our common country over another, but because it was in accordance with the plans of nature, the belief is stated that the Central West is to be, for years to come, the region in which is to be produced the greatest number of high-class farm animals of most classes.

The vast importance of the live-stock interests of the farther west, southwest and northwest is fully recognized. But until existing conditions are changed, it is evident that quantity rather than high quality mostly characterize the animal products of these regions. The stock breeders of the farther west will continue to look to the Central West as the nursery ground from which must come the chief supply of high class breeding animals, as a means to the gradual improvement of their own stock.

Almost every section of our country may wisely give increased attention to some class of live-stock production. Especially would I be glad to see millions of acres of land, now almost unproductive, made the home of vast flocks of sheep, even if this led to the fine wool sheep being almost driven out of the Central West. Milk production must receive increased attention in the farming districts comparatively near the great center of population on the Atlantic coast. And I hope the time may soon be that our southern states will have no need to import any live-stock products.

But in the greatest Indian corn producing region in the world, where also the forage grows thrice as well as anywhere in the United States; where the climate is alike free from excessive and long continued cold, and dreary periods of oppressive heat; where the rainfall is usually frequent and plentiful, we have unequalled

facilities for meat production,and all these facilities exist in much of the west. In the northern portion of the Central West there are districts far larger than all the dairy regions of New England and New York, which are unequalled for economical production of dairy goods. The present product of butter and cheese in the west is very large; the annual increase is great, and this increase is to continue for many years.

Much has been done in many ways to help the live-stock interests, but much remains to be done. In the work thus far done in agricultural experimentation in this country the soil and the plant have naturally had chief attention, but in breeding, rearing, feeding and management in health and disease of our domestic animals many unsettled questions confront us, and for their solution we need the aid of the scientist, as well as that of the intelligent breeders.

If it be important to determine how best to utilize the food for plants found in the soil, none the less important it is to learn how most economically to utilize the plants as food for animals; if it be important to improve, modify, produce varieties of plants, so likewise of animals; if it be deserving of attention that better modes of manufacturing vegetable products be wrought out, equally true is it that like work needs to be done for animal products; if the prevention and cure of diseases of plants be a worthy subject for patient investigation by the scientist, the suffering animal has at least equal claims to relief.

In these fields — not alone for the west, but for the whole country — there is room for work by all whose attention can be enlisted. I am glad to know it is the purpose of the distinguished chief of the Department of Agriculture to give increased attention to these matters. It was a cause of regret to me that the discussion of the work of agricultural colleges left no time, in the convention preceding this, for even a word of recognition and commendation of the work already done in many lines by state and district agricultural societies. By their published reports and their annual exhibitions, these societies have done much for agricultural progress. The growth of the American dairy system has been greatly assisted by the dairy associations. The agri-

cultural exhibitions have been the most effective means ever devised for making the masses of farmers familiar with the various breeds of animals and causing the wide spread of the improved breeds throughout the country. Many of these societies are widening and making more effective their work. To the state board of agriculture of a Central West state — Illinois — belongs the credit of having instituted and placed on a secure basis the most instructive and interesting live-stock exhibitions of the country, the annual fat-stock show held at Chicago.

The fairs, special, agricultural, and general, have done good work in their lines, and are ready to do more. Many a farmer's boy has been incited to a desire for better live stock by what he has read in his agricultural paper.

Valuable experiments have been conducted or are now in progress at our agricultural colleges to determine unsettled questions in stock breeding and management. At the Illinois Industrial University, for instance, in continuation of work already done, lists of the comparative progress of cattle and pigs of all attainable breeds will be made.

The general government has given aid to special investigations of diseases, and has attempted legislation in aid of the live-stock interests. Except for a single animal product, American farmers have not asked for any other "protection" by law, than protection from disease — disease imported from foreign countries, from neighboring states, neighboring counties, or neighboring farms. No arbitrary or unnecessary restrictions are desired. Insisting that the herds of the Central West are free from contagious disease, it is asked that they may be permitted to remain so. I hope the time may soon come when all restrictions on importations from Great Britain may safely be removed, just as I hope we may soon be able to leave the British authorities without excuse for not removing all restrictions on exportations from this country.

Among vitally important questions to which too little attention has been given, may be named the adaptation of different parts of the country for the profitable production of different classes of animals and the comparative merits of different breeds for varying purposes and conditions.

Rich stores of valuable animals have been imported, but not enough attention has been given to distributing breeds with reference to their adaptation to special climates and conditions. It cannot be true that cattle from the plains of Holland, the channel islands, the south and the north of England, the lowlands and the highlands of Scotland, are equally well adapted for any one region, yet in some western states there are enthusiastic breeders claiming special superiority for each one of these breeds. It is hardly in accordance with the self-assertion and confidence charged as characteristic of Americans, that we have not only been content to import foreign breeds, but, with rare exceptions, have held the types of those professed in their native lands to be the best for all our widely differing circumstances. Modification of breeds to meet special wants seems more needed than additions to the number of distinct breeds. Multiplication of breeds may be an evil. Certainly it is not sufficient reason for importing a breed to this country that it has been found useful or ornamental in another. For illustration, it is proposed to import to this country the West Highland cattle of Scotland. I have admired the picturesque appearance of these cattle in their native country; their stately horns, shaggy coats, as also their evident good meat; but I do not know where nor for what they would prove more desirable in this country than breeds we already have.

I fully appreciate the heavy draught horses from Great Britain and France, but I do not believe the most popular types in those countries are the ones best fitted for the requirements of our own country. With hearty appreciation of the merit of the almost cosmopolitan Short-horn, I cannot admit it is the best breed for all parts of the west. It seems quite possible it will be best to so modify some of the mutton breeds of sheep that the word American may as properly be prefixed to their names as it is to the Merino. Of swine, one of the very best breeds is the product of crosses and selection made in the west.

So, throughout the west, we need to better classify and distribute the breeds. The central belt is admirably adapted to the production of the heavy draught and "the general" purpose horse; of the larger of the distinctive beef breeds; of the Downs

and the Combing wool sheep, and of the larger breeds of swine. The more northern belt is naturally better fitted for the dairy breeds of cattle, especially those of northern origin; for the lighter breeds of horses and sheep. The southern portion will probably continue to be the chief center for the production of the blood-horse, and perhaps of the trotting horse, while the meat-producing breeds will also thrive well.

There is a wide field for needed instruction concerning the characteristics of breeds, and the fundamental principles of breeding. It is unfortunately true that there are many American farmers to whom the principles of breeding and improvement of live stock are utterly unknown, and who use the term "improved stock" as an exact synonym for "fancy stock," honestly believing that the improved breeds are of direct interest only to wealthy amateurs, or to speculators in agricultural matters.

To popularize the results attained by the most skillful breeders is a needed work. We may best do this by proving, in practice, that the so-called improved breeds deserve the title, because they produce for us, at equal or less cost, more or better meat, wool, milk, or work, than do the common breeds. In so far as we give chief attention to practically useful qualities, rather than to those which simply appeal to the eye or to a sentiment, we aid in this work of popularizing fine stock.

In wise and ready adaption of methods to the circumstances is found the secret of successful agriculture in any region. I grow more and more strongly to believe that the opinions and practice of intelligent and successful farmers are better adapted for their region and circumstances than are the opinions and practice of any other locality. It illy becomes us of the west to criticise the methods of the east, and possibly words of criticism of western methods have been unwisely spoken or written by eastern farmers. But the average farmer is overly conservative. He does not always quickly perceive the changing conditions which demand change of methods. It is important that this department of agriculture, the press, the agricultural societies, and the agricultural colleges help to the readiest appreciation of these changes.

In the west changes of conditions come with marvelous swift

ness. The ruder, simpler methods of the past are often no longer applicable. The farmers of the western states are in competition not only with those of the east, but with those of the civilized world. The enormous additions to the agricultural-producing class each year is rapidly filling up the low-priced lands of the west. The rate of advance in price of land is less rapid as the money-value becomes larger; so that farmers in many parts of the west can no longer look to the rise in the selling value of their lands as the chief source of profit, but must look to profits from careful husbandry.

Greater economy of production, rather than the production of the greatest possible quantity, is coming to be the chief question for American farmers; and the more economical production of live-stock products is already in the front rank of the important problems confronting the farmers of the Central West.

BUTTER FLAVOR.

By T. D. Curtis.

After all is said and done, if the flavor of your butter is not right, it approaches worthlessness in proportion as the flavor is wrong. A bad flavor makes bad butter. So flavor is the main thing. If that is right, almost everything else can be forgiven. But for bad flavor there is no forgiveness. This fact leads me to ask: What is flavor? What causes it? Is it natural, or is it developed? If developed, how can we develop it? I speak not of bad flavor, nor of what is called "off flavor," but of that peculiar flavor or those peculiar flavors that commend butter to the consumer. I am satisfied that there are several flavors, natural and developed, that are preferred by different customers. Each prefers the peculiar flavor that suits him, and condemns all the rest. It is assumed that the base of these flavors is in the liquid fats, or oils, in the butter — such as olein, butyrin, caproin, caprylin, caprin, arachin and myristin. I have seen no analysis giving the relative proportion of these, though such may have been published. It is very likely, however, that the proportions vary, and that this causes a variation in flavor. It is very well known that the proportion between the hard and liquid fats varies a good deal.

It is fair to presume that there is the same variation among the liquids, and also between the two solid fats — stearin and palmitin. All these variations, if they exist, must vary the flavor.

MILK SUGAR FLAVOR.

Then there is another source of flavor — the lactose, or milk sugar. In its natural state, it is sweet, but it soon turns to lactic acid. This gives the first sour flavor to cream. If the cream stands long enough the lactic acid will turn to alcohol, and this again will turn to vinegar. Cream is sometimes allowed to stand and go through all these changes, and every change causes a corresponding change of flavor. We have in turn the lactic acid, the alcoholic and vinegar flavor. These come from the primitive sugar flavor. Then the casein — at first tasteless, or nearly so — oxydizes and takes on what is known as a cheesy flavor. The more casein there is left in the butter the stronger this becomes. I remember to have encountered this flavor in butter so strong that it was hard to tell whether one was eating bread and butter or bread and cheese, so far as taste was concerned. Such butter at first has a mild buttermilk flavor — very palatable to those who are used to it, I have no doubt. I am told that much of the old-fashioned Orange county butter has this flavor. If the buttermilk was washed out it spoiled the flavor for those who had acquired a taste for it. The butter maker had to retain the buttermilk in order to retain his customers. But such butter would not keep. It soon became rank enough for any boarding house.

WHAT IS FLAVOR?

Now, what changes do the liquid fats in butter undergo by exposure to the air, and by the development of acid? I have made inquiry, but thus far I have been unable to find out. Some of the oils, I am told, are entirely destroyed. This removes so much flavor. Others are probably turned to acids. This, of course, changes the flavor. Does it change it for the better or for the worse? This we ought to find out. The controversy between the sweet cream and sour cream advocates will never end until we do; nor will it cease until we recognize the different flavors produced by the different changes, and are able to produce any one of them at will. Then, perhaps, we can provide a variety of

flavors suited to the various tastes of consumers. Here is an open field for some of our universities or experiment stations to work in. Let them find out what constitutes flavor in butter. Almost all other flavors can be manufactured by the chemist. Perhaps he may soon be able to manufacture this, but not until he knows what it is.

MODES OF MAKING BUTTER.

Now let us consider some of the different modes of making butter, and see how the flavor may be affected thereby.

Dr. Voelcker, chemist, of the Royal Agricultural Society, England, says the cream should be raised and kept at a temperature below fifty-eight degrees, or as near fifty-six degrees Fahrenheit as possible, and that it should be churned sweet. He says: "The question is, can ordinary pastures produce first-class butter? I answer decidedly, if you take proper precautions to prevent the cream turning sour before it is churned. This sourness, let me repeat, is the great hindrance in making high-class butter. Many persons deem this a small matter, and unconsciously allow the cream to get somewhat sour before making butter. But, if you desire to make good, sweet, keeping butter, you must churn cream as sweet as possible. * * * Some people are of opinion that a certain degree of sourness in cream is necessary in order to obtain good butter. My experience has taught me differently, and I denounce the sour cream theory as radically wrong. * * * The sweeter the cream, the better the butter will turn out, all other things being equal."

It would be difficult to use much more positive language than this of Dr. Voelcker in favor of sweet cream butter. But a great many good dairymen say they cannot make as good flavored butter, nor as good keeping, nor as much of it, from sweet cream as they can from sour; while many others assert to the contrary. Whence comes this contradiction? Is it in the process? Is it in the taste of the judge? Or is it in the composition of the milk? I think it may be any one of the three.

SHALLOW SETTING.

What is the process of setting on which Dr. Voelcker bases his judgment? Is it deep or shallow setting? I do not know, but

I think it is shallow. Porcelain pans are used in the Queen's dairy. This means shallow setting. What loyal subject, native or adopted, would dare to follow any other method than that followed by the Queen's dairyman? This shallow setting and exposure of a large surface of cream to the air, would have much to do with the development of flavor. According to the experiments made at Cornell University, it would oxydize the oils in the cream and thus develop a flavor that would be almost, if not wholly, lacking in cream raised by deep setting, which exposes but little surface of cream to the air. In other words, the conclusion is, that cream raised by deep setting and that raised by shallow setting require different handling to develop flavor; and I think a decisive test would show a different flavor when it was developed.

Again, what kind of flavor does Dr. Voelcker like? What pleases him might not please somebody else. I judge he wants a delicate, creamy flavor in his butter — a flavor so mild as to be insipid and sickish to some palates, but relished by such as relish cream. Those who like such a flavor could not bear a very positive or rank flavor, which would be the delight of a less sensitive palate. Some prefer their butter not only fresh from the churn, but free from salt. They are poor customers for salt dealers. But others still want a good deal of salt in their butter; and this, of course, smothers other flavors, and would make the consumer less particular about them, so he got his sharp, briny one.

DENMARK BUTTER.

In Denmark, they make a sweet cream butter of great celebrity. There, according to *The Milch Zeitung*, as translated by Prof. Caldwell, the milk is set in large, deep pans, of an oval form, and holding about seventy pounds. These are forced down into water made thick with broken ice. In forty-five minutes the temperature falls from eighty-six degrees Fahrenheit to sixty-eight degrees. In thirty minutes more, to fifty-five degrees; and when skimmed the first time, at the end of nine or ten hours, the temperature is thirty-six degrees. The cream then taken off has its temperature raised to fifty-two degrees in summer and fifty-five degrees in winter, or when the cows are fed on old hay, or given a large amount of beans and vetch in their rations. It is then

churned sweet. Skimmed milk is used to wash down the sides of the churn. No water is used. The butter, while in a granulous state, is gathered in a strainer and worked with the hands until all the milk is got out that can be. Then three-eighths of an ounce of salt is added for each pound of butter, which is made into rolls and laid away in an ice chest, until the temperature is fifty-two degrees, when it is given a final working. The milk is skimmed a second time, and from this cream an inferior sour-cream butter is made; but whether the mode of churning and handling is varied from the mode of churning and handling the sweet-cream butter, I have not seen stated.

In this case, we have sweet-cream butter made by deep setting; and, since sweet skimmed milk is used for washing the sides of the churn, the butter must have a very marked sweet-milk, if not sweet-cream flavor, since less than a quarter of an ounce of salt to the pound cannot much affect the other flavors. This butter is at once sent to market. If not kept from the air, I think it must soon lose its fresh, sweet flavor, and taste quite flat before turning rancid.

L. N. BROWN'S METHODS.

Not long since I visited a former New York state man at Gurnee, Illinois — L. N. Brown. He is an intelligent, observing and enterprising man. When he goes into any kind of business he is bound to do as well as anybody. Since coming west he has engaged in winter dairying — butter making. He markets his butter in Chicago, putting it up in fancy packages and selling it to fancy people with fancy appetites, for a fancy price. But at first he could not get Iowa prices. There was a flavor about Iowa creamery butter that made consumers prefer it to his. His method of setting, by the way, is the Cooley. This, as you probably all know, is deep and cold. To this he has added the Danish idea of converting the water in which he sets his milk into an ice-pap. He says he wants his tank filled with ice clear to the bottom, so as to produce the most rapid cooling. He skims at the end of twelve hours or so. To the night's cream is added the morning's cream. Into this, from his cream which is ready to churn, he dips sour cream at the rate of about a pint to a gallon. This hastens the souring of the cream, so that by night, at a temperature of

sixty-four degrees, which is the one at which he wants it to stand, the cream is loppered. Just "twelve hours after loppering" the cream is ready to churn at sixty-four degrees. From this batch, before it goes into the churn, he dips sour cream into the can of sweet cream to sour it, as I have already indicated. The butter is washed with water at fifty degrees, after the buttermilk is drawn. A second batch of water is added — enough to float the butter — when it is taken out of the water and worked and salted by taste. It stands and receives a second working, when it is put into wooden pails holding seven and a quarter pounds of butter. Eight of these pails are nailed up in a crate and sent to Chicago, where a line of customers willingly pay $4 a pail for it!

BEST BUTTER COW IN THE WORLD.

In the nineteenth volume of the reports of the Wisconsin State Agricultural Society is the picture of the best butter cow in the world. Below is the milk and butter record of the same cow, Jersey Queen, of Barnet, for the year ending May 20, 1882:

DATE.	Milk.		Butter.	
1881.	lbs.	ozs.	lbs.	ozs.
May 20 to June 1	485		20	07.5
June	1,396	01	80	06.5
July	1,401		84	05
August	1,278	12	76	00.5
September	1,116		72	02
October	1,148	08	73	04
November	1,090		74	11
December	1,057	01	74	01.5
1882.				
January	975	12	75	
February	684	12	55	03
March	864		66	11
April	846	04	61	04
May 1 to May 20	511	04	37	09
Total	12,854	04	851	01

This cow I sold last December to A. B. Darling, of New York, for two thousand dollars. JOSIAH S. KENERSON.

BARNET, VT., June 5, 1882.

ADDRESS AT THE BARRON COUNTY FAIR.

BY PROF. JAMES D. BUTLER, LL. D., OF MADISON, WIS.

Farmers of Barron County: Your pioneers found their way hither by following up the Red Cedar and its branches. We love to go up a stream to its source. Twice have I journeyed up and up the valley of the Rhone until I reached the Swiss ice-mountain which is its cradle. So, when I had beheld the mouth of the Jordan, I was not content till I had traversed all the ridges and ravines that divided me from its fountain-head.

Through a similar impulse I have investigated your annals. August Cordot, who had a stockade at Rice Lake, and was killed there by Indians a century ago, has interested me. Long before he was born, French fun-lovers and fur-traders were familiar with your lakelets. One of them must have been Nicholas Perrot, who, for forty years onward from 1660, was at home among all the aborigines of Wisconsin, and who wrote a book about his life among them, not for publication, but for the information of French officials — a work first printed in 1864 — and which has not yet been translated into English.

But I have loved best to study the origin of your present institutions. The foundation of these was laid by Andrew Tainter. He was the Columbus who discovered the capabilities of your country, and his name might have been bestowed upon it as fitly as that of Columbus on our continent. Of course I am not ignorant that Mr. J. H. Knapp, founder of the Knapp & Stout firm, had explored the country years before it was entered by Capt. Tainter.

Scattered here and there in your local papers, the *Chronotype* and the *Shield*, I perceive mention of sundry first things which ought not to be forgotten. Each of them is a step in your progress.

In 1848 come the first loggers. The first farmer — John Myers (his name means farmer) — followed in 1855, and in the same year the first child was born — just one quarter of a century ago.

The first saw mill dates from 1863, the first grist mill from

1871, and the first steam mill from 1875. Each of them marks an era.

The first election, set down as in 1862, amounted to nothing, but in the next year a valid vote was cast. No mail carrier appeared till 1868, and in the same year the first lawsuit was tried. The matter in dispute was a weasel skin. How so little fur could kindle the fire of litigation, an outsider cannot understand. A weasel skin! he who would go to law about that would cavil on the ninth part of a hair. I am reminded of a Greek lawsuit when a man who had lain down in the shadow of a donkey he had hired for riding, was sued for making use of the beast which had not been agreed for in the contract.

The first calling of the county and of this township, *Barron*, was in 1869, and, five years after, the first newspaper began to chronicle your weekly life. Never let it be forgotten that Mrs. Plato, of Chetek, was the first schoolmistress, that Mr. Sexton established the first nursery in northern Wisconsin, and that the first church was built in Stanfold — a nobler one than the first one is apt to be anywhere.

When the first brick were burned I have not ascertained.

The cannon at the soldiers' re-union last month was the first twelve-pounder, except perhaps a baby or two.

As for this burg of Barron, its first shingle machine and hay-scales were brought here last summer. About the same time the first physician began to reside here. No doubt he was welcomed with the toast: "May you never want, may you never be wanted!" or perhaps his greeting was: "May you be like an old maid, always ready but never wanted!"

The next week after the doctor's arrival, a meeting was called for organizing a cemetery association. It was foreseen that a graveyard would be needed for hiding the doctor's failures.

There is some evidence that the Barronites think more of their souls than of their bodies, for a minister was here, I believe, before any doctor. Yet it may be that they value dollars more highly than either body or soul, for pettifoggers came here before either parsons or physicians. It is much disputed whether law or medicine is the more honorable profession. Yet a German em-

peror always gave the foremost place in processions to lawyers. The reason he gave was that a thief ought to go before, and the executioner to follow close behind.

It is gratifying for me to meet here, to day, settlers sifted from many countries. It is our glory to gather together in harmony the multitudinous races which Babel scattered in confusion.

Sons of England, Scotland, Ireland, Scandinavians, Teutons, French, I have traveled in the fatherlands of you all. Nowhere was I accounted a stranger, since you and your landsbrothers had been adopted by my country.

But, while rejoicing to look in your faces, I must regret your mistake in inviting me to tell you what I don't know about farming. Were I to confess *all* my agricultural ignorance, my speech would be the longest you ever heard, or heard of. One professional friend of mine, who had turned farmer, in the spring tapped his maple trees for sugar, and in the fall tapped his apple trees for cider. After all, he was a better farmer than I should be.

On my voyage to the Sandwich Islands I had a glimpse of half a dozen whales, and, wishing to astonish a little girl in my Honolulu boarding-house, I asked her if she had ever seen a whale. Her answer was: "Have I ever seen a whale? why yes, I have seen them killed and cut up." I had fallen in with the daughter of a whale-ship captain, and at once gave up telling fish stories. Now in talking to you about farming I am undertaking to teach whalers about whales.

But though an ignoramus in practical farming, I am not too blind to see the happy lot of you American farmers, and propose now to say something to you concerning your condition as it lies in my mind.

American farmers obtain land that is worth having with greater ease than any other farmers can. Four hundred and sixty-four thousand of them are homesteaders who have paid for their estates about a dime an acre. Some of you before me are of that class. You all wish you were. Millions more may thus secure homesteads. This news long seemed to the old world too good to be true, but no sooner was it believed than it shook all Europe. Hence, within the last year half a million immigrants have landed

on our coasts — a vaster army than ever crusaded to Jerusalem, or than Napoleon led to Russia or Kaiser William against France.

The American farmer as a rule owns his land. Hence the word "farmer," which in England means tenant, has here changed its meaning to free-holder. Farmer would still mean tenant in Barron county had Carver's claim been acknowledged. His grant from the Indians ran down from St. Anthony's Falls to the mouth of the St. Croix, then five days' journey east, and six north. Many an old world prince owns as broad a domain and collects rent for all its acres.

It is fortunate for Wisconsin farmers that farms are here of moderate size. The average acreage of a Wisconsin farm is one hundred and forty eight acres. In seven of the principal Southern States it is more than three times as many, namely, four hundred and sixty acres. In 1870, only thirty-two Wisconsin farms exceeded one thousand acres, while in Georgia nine hundred and two farms were thus overgrown. Between us and the British Islands the contrast is still greater. There fifty thousand people each own an average of one thousand five hundred acres. I am glad their profit is only two per cent.

The worst is that, outside of the aristocracy, there is so little land left that the millions can never master more of it than enough to fill flower-pots for their wives. Eight hundred years ago land-owners were one-thirtieth of the British population; now they are only one in six hundred. The few own so much, that none remains for the many.

The land-owner's possessions must retain value forever, no matter what fires, floods, revolutions in government, in currency and all speculative securities. His property, too, must grow up with the country. Holding fast your land, you are carried up as the country grows, as Dr. Kane, anchoring on the lee of an iceberg, was hurried by it just where he wished to go, or as the boy who catches a ride if he can jump on your sled, slips over the winter snow swifter than his own legs can take him.

The American farmer underrates his blessings, unless he considers at how great cost, if at all, that land is elsewhere acquired, which is at his command well-nigh without money and without

price. In England little land is for sale, and that little is snapped up at prices no laboring man can pay. As lately as 1808 none but nobles could own land in Prussia. In Norway, for every single fertile acre, one hundred and twenty-one are utterly barren. In the Swiss canton Glarus, the arable surface amounts to less than one acre for every eight families. In Holland farms are created by diking and pumping out the ocean, as well as bringing fertilizers from the Pacific. In Italy, farms are made by building retaining walls around a hill and filling the space behind with earth. On one hill I counted forty-nine such walls one above another.

The American farmer is secure in his possessions.

The copy of his title deed once recorded in the county registry, no matter what becomes of the original, he may defy all the world to oust him. In only two English counties is there such a registration as we have enjoyed always and everywhere. What the country does for every farmer here, every farmer must do there for himself in the way of watching his papers.

Again, a farmer among us knows his boundary lines. Thanks to our rectangular surveys, they are as certain as the courses of the stars or as the calculations of mathematics. In this matter we of the west have an advantage over our eastern brethren. There is, in the town where I live, a Pennsylvania deed given by William Penn in 1706, of a lot of one hundred and eight acres bounded as follows: "Beginning from a black walnut tree standing by Brandywine creek at a corner of James Scott's land, to a certain ash tree, then to a hickory, then to a red oak," and so on.

This deed was a copy of current English forms. Very naturally English metes and bounds were in doubt. Hence arose the English custom of beating the bounds, or of an annual perambulation on Ascension day. Boys were led along in the procession, and here and there bumped against a boundary tree, or flogged at a boundary corner, or ducked in a boundary brook, in order to fix in their memories localities regarding which they might be summoned as witnesses.

Our farmers are secure in their houses. Aside from the transient plague of tramps who soon went marching on, what, since the

Indian vanished, has made the western farmer's dwelling unsafe, even when destitute of lock and bolt? But abroad, survivals from times when there was no security in rural districts are abundant. As I rambled over Germany in 1842, I seldom espied any farm-house standing alone. Scores of them were huddled together in a city street, and the tillers of the ground wasted half their time and strength in going to and from their work. They fare like Texan cattle in a drouth feeding beside a river. Those creatures daily consume the grass further and further from the bank, and so must daily go further for water. In the end the gap between food and drink is so wide that they perish either with hunger or with thirst. In a similar way was German energy exhausted in plodding either fieldward or homeward. When the Swiss settled New Glarus, in Southern Wisconsin, they built their first houses after the old country fashion, all in a bunch, though they soon learned bettter.

Not only are our farmers safe in their isolated homes, but their crops are safe from robbers — except now and then a rat or field-mouse. In England up to the present year, hares and rabbits, which no man dared kill, inflicted an annual loss of $20,000,000. I once had an interview with delegates from Russia who were planting a Mennonite colony in Nebraska. Years before, as they told me, they had been offered as good land as lies out doors, in Turkey, Palestine and Persia, and that for nothing. "Why did you not settle there?" I asked. Their answer was: "Because there was no protection for us from Ishmaelites, whose hand is against every man, even though no man's hand is against them;— no probability that we could reap the harvest we had sown, or keep it after we had gathered it into the garner. In many a country every farmer outside of walled towns is in the condition you would be if the Indian scare of 1862 were chronic and haunted you from the cradle to the grave.

In addition to this, one of the great blessings of the American farmer is the smallness of our army. What is it? Twenty-five thousand men. That is at most equivalent to three and one-half soldiers for Barron county. But for the Indian our army would not be half so large as it is. Our military men ought to worship

savages as their saviors. They have saved our army from outliving its usefulness. The Indian is not therefore altogether good for nothing. The curse of an army — how shall I give an idea of it? You who were born abroad know what it is.

Take every young man out of all your houses, say three hundred out of this county — march them to Waupun — give them state prison fare and worse than state prison treatment — tax you that remain, to arm and uniform them — bring them back after three years unfit and indisposed for civil life — "idle weeds in our sustaining corn" — send as many more every three years to be in like manner demoralized, and you will have some faint notion how the European military system works. It bears doubly hard on farmers, partly for the same reason that white sheep yield more wool than black ones, namely, because there are more of them, and partly because farmers are more able-bodied than other classes, and hence cannot, like others, thanks to disease and doctors, dodge soldiering. Having also less ready money than some others, they are less able to buy off two-thirds of their term of service.

Can a farmer work as well when one of his hands is cut off? Yes, if European farms do not suffer in cultivation when half the laboring hands are cut off from the fields and are carrying muskets.

When I asked a foreign veteran what was the strangest fight he had beheld in America, he said it was our volunteer militia — that they could think soldiering the greatest fun and the best amusement.

Militarism is rife in all great trans-atlantic states. Each afraid of every other, they are doubling their debts in order to double their legions. Shunning possible danger they hasten to certain suicide. They are like the strongest man in Greece who, after cracking a log with wedges, undertook to pull it apart with his hands; when the wedges fell out his hands were caught and held so tight that the wolves ate him up. European nations are entangled in military outlays, and the wolves of debt are feeding on their vitals, that is pre-eminently on their farmers. Our war debt is heavy, but it is a hundred millions lighter than a year ago. All

things considered, it is the lightest that any land has to bear. In a few years it will vanish.

Well may a farmer, then, thank God, if he is an American, and hence not penned up in barracks; nor can any monkey use him as a cat's paw for poking his chestnuts out of the fire.

In comparing farmers in different countries, it is obvious that the tools of the American give him a great superiority to most others.

Who has a better plow than he? How few have one that is not far inferior? What sword could be beaten into a plowshare that he would not despise? I have seen plowing in Palestine. The limber end of a sapling was tied between two steers to a yoke. Through its butt-end a sort of sled stake was mortised. A bit of iron that could easily have been forged out of a sword, and which the plowman had brought in his pocket, was stuck on the lower end of the stake. Behold the plow of the land of promise!

Again, in Castle Garden, at New York, my attention was called to the plow of a Norwegian who had just landed. He was bound for Texas and was charged $11 for the transportation of his plow. It was so cumbrous that the charge was not exorbitant. But then the instrument would be useless at the end of his journey. Yankee plows are sent abroad. When one of them, bought by the King of Dahomey, turned up its first furrow, he clapped his hands in royal rapture, and cried out: "I like that Yankee notion; it will save me five wives!"

But it is not so much in the simple plow as in agricultural machinery that the American farmer is pre-eminent. How much better are his implements to-day than those his father or he himself in boyhood used. But our tools of the last generation are superior to most of those now employed for tilling European farms. The excellence of American seeders, cultivators, harvesters and threshers is so world-famous that the export of them last year amounted to almost $3,000,000 — in exact figures, $2,933,408 — besides axes and other edge-tools to the amount of well-nigh another million. Ten times as much of our farm machinery would go abroad if foreign peasants could use it without needless breakage, or could repair it as a Yankee can, or could ever see

its good points. An English heiress, pitying the porters at Genoa, who carried their loads on their heads, presented each of them with a wheelbarrow. When she next walked that way, she saw that each man put his burden in the barrow, but then put his head under the barrow for carrying the load in the old style. Myriads of European husbandmen cannot use machinery without abusing it, and so, be it ever so good, would get no more profit from it than the Genoese porters derived from the lady's benevolent present.

That American farmers are better equipped than others for their tasks appears from the fact that the tillage here accomplished by nine men, in England requires sixteen, and in France forty-five. A delegation sent over from England to see where the breadstuffs come from that are glutting British markets, have just reported to parliament how surprised they were to see in our far west "cultivators fitted with seats, and reapers with metal arms cutting, gathering, binding and delivering wheat, oats and barley."

The position of American farmers is enviable in respect to climate. In Manitoba, but much more in Scotland and Norway, the winters are too long and the days are too short. The winters are so long that the husbandman cannot raise enough to carry him through them. The days are too short in winter for his work, and in summer too long for his strength. On the other hand, in Mexico there is no twilight, so that the cool hours of morning and evening are spoiled for the farmer by darkness. Egypt is fertile, but nothing at all will grow there without irrigation, which there costs more toil than the total of American farm operations. In Barron, where I view so many lakes that I am inclined to name all townships, and not one only, Lakeland, there must be small need of irrigation.

In no respect does your climate please me better than because it yields timber. Had you ridden with me whole days in Nebraska without once coming in sight of a tree, houses all dug-outs or of sods, and fuel only grass or buffalo chips, or corn, you would have died of homesickness rather than consent to live there. Half your acreage is still lumber, a more valuable harvest than you can ever raise — a harvest which you never sowed, but which you can reap all winter long.

You need not envy California her big trees. I have stood on the stump of one that had been twice as high as the Bunker Hill monument. But then one hundred and twenty days' labor were needed to cut it down, and, in felling it, it was shattered to shaky fragments by its own weight. Your trees are better than such monsters. Eagles have come down so low that one of your citizens, Mr. Bracklin, has caught one with his hands. Beholding such a marvel, we may expect next to hear that angels from heaven have built nests in your tallest tree-tops.

The American farmer is master of his situation, owing to his relation to markets.

All things considered, he is nearest of all farmers to markets. Many acres are nearer those markets in miles, and yet in no means by ability to reach them. Why so? Because they are costly acres, while millions of ours have cost nothing. Accordingly, our grain growers can drive the English out of their own markets, though our produce must be transported five thousand miles and theirs no more than fifty, and though our harvest hands are paid $9 and theirs no more than $3. Again, one-half of all railroad mileage in the world is in the United States, and it was constructed mainly for the service of American farmers. Railroad kings have been hotly assailed by grangers, and they deserve a good many kicks and cuffs. On the other hand, their risks have been enormous, and their outlays twice as much as our rebellion debt. They double the value of every acre they go near. There is no living without them.

A man who had broken his leg in railroading, and was asked how he liked riding on a rail, answered: "I like riding on it much better than riding off it." When one at a wedding remarked to an ancient maiden that it was a serious business to marry, she replied that she thought it a much more serious thing not to marry. It is bad to have a railroad, it is worse not to have one.

Moreover, railroads are learning that their true policy is to let a sponge fill before they squeeze it. Hence it came to pass, last year, that wheat was carried from Chicago to Liverpool for seventeen cents a bushel. In 1819 $6 was the lowest rate at which it could have been transported from St. Louis to Philadelphia.

It is further worth notice that Barron county has a felicity of

position. You will soon have your choice between two routes that must always compete for your custom. You lie midway between the great river and the great lake. You are like the lucky maiden who, courted by two sweethearts, can dictate terms to both.

Moreover, you are likely to have your choice between not only two routes, but two railroads — a consummation devoutly to be desired.

It is hard to defend yourselves against *one* railroad which, standing alone, is monarch of all it surveys. But to deal with two railroads is easy. Judge Humphrey easily beat both Thorp and Price, when he would have been beaten by either of them alone.

The more competing roads fight, the more favor they will show you. Let them fight till you shall resemble the bear who, while the lion and the tiger were contending for a sheep, himself ate up that mutton. I mean till transportation from here to Chicago shall cost no more than from that city to Europe.

The Canadians dare not rely on their railroad upon the north shore of Lake Superior, and so have just resolved to run a line through the upper peninsula of Michigan, and then by way of Ashland, and just above you to Duluth.

While talking about roads to market, it is well to consider what you are producing for market. From county statistics it appears that last year your wheat was about eight thousand acres, oats one-half and barley one-sixth as many, corn and rye together about one thousand one hundred, potatoes and other roots about five hundred. Your acres of grass, your cows and your hogs each about one thousand five hundred, your sheep one thousand, and your neat cattle five times as numerous.

This is not a bad report compared with the products at the first fair inaugurated three years ago.

But our state motto, as well as your own, has always been Forward. Let it be so still.

Your tilled ground scarcely amounts to three acres for each inhabitant. Is not this too little?

Let each farmer study which of your staples will pay best, then

experiment till he knows how to raise that staple most cheaply and abundantly. The time and mode of sowing, cultivating and harvesting demand earnest heed. Look to your seed. At our state fair I was talking with the winner of the first prize for wheat. Year after year he had scrutinized his grain in order to select for sowing only the largest and plumpest kernels. His seed he had originally obtained from a farmer whose grain had carried off a gold medal at Paris. His seed had come from Michigan, and thence its pedigree had been traced to Pennsylvania. Get the best, even if you have to go farther. Learn a lesson from Lincoln, who, after the fall of Vicksburg, being told that Grant drank whisky, cried out, "Where did he get it? I want to send a barrel of the same kind to each of my generals." The best varieties and the best samples you can beg, borrow, buy or steal, are none too good for seed, that is to bring forth after its kind a hundred-fold.

Improve your crops. One planter said to a slave, "Find me an ear of corn with an odd number of rows and you shall be free." The next season the bondsman brought him an ear which his master husked and saw it was all he demanded. "Freedom is yours, Sambo," said he, "only tell me how you knew its rows to be odd." The negro's answer was: "I made them so. When the ear first began to form, I opened the husk carefully and cut out one row of the baby kernels. The husk soon grew so as to show no sign of ever having been meddled with." Half that slave's ingenuity will improve any man's corn crop.

It is worth thought whether you are not raising some crops on too small a scale.

You have fifty-eight orchards with little over a thousand trees — not enough to give your boys summer colic. You ought to try many varieties, and each more than once before you confess that apples are for you, as for Adam and Eve, forbidden fruit.

Your acres of tobacco are eight. I wish there was not one in all creation. The truth is that in two Wisconsin counties — Dane and Rock — there are twelve thousand four hundred and seventy-eight acres of that weed, a crop reckoned worth a million dollars.

Flax is a large Wisconsin product. Your share in it is one acre in seventy thousand. Does that content you?

I know not whether any lager beer is drank in Barron county. I am inclined to think it here an unknown beverage when I observe your insignificant acreage of hops. What is it? twenty-three acres.

I hear that some of you have done well with Amber cane. Whoever cannot, like Smith and Wilson at Cedar Lake, turn out four hundred and fifty pounds of maple sugar, let him not believe his farm too far north for sorghum till he has failed more than once after planting the varieties that have already done well in Minnesota. You cannot raise Abel, but you can raise cane. Recent discoveries in granulating sorghum have doubled in value.

What are you doing in cheese? More than a million dollars' worth of it is sent over the ocean every month, and of late much of it goes from Wisconsin. Can you add nothing to her quota?

One hundred and seven thousand live cattle traveled to Europe last year. More have started this season. It is seen that a bag of cowhide will hold ten times more corn than one of canvass. Condense then corn into cows; unless you are certain that corn is worth more converted into those six-footed porkers at Stanfold, already famous all through the state.

Wise farmers will diversify their crops. Without rotation the best soil will at length become exhausted and sterilized. Vary your products and you will never mourn a complete failure of either crop or market. Neither drouth nor deluge is fatal to everything that grows. When wheat is cheap, eggs are dear, since wheat-buyers have more money left for eggs.

Vary your industry and no hour will hang heavy on your hands. Where products are manifold, every man and every field will do its best, for new capabilities of both will be discovered and utilized.

Orientals think they see what a man was made for, when they look at his make-up. They select blind men to stand on towering minarets and call Moslems to prayer. The blind can halloo as well as other men, and yet cannot spy out the secrets of unroofed harem courts. In a similar way they pick out cross-eyed

men for detectives — viewing them fellows by the hand of nature marked to do a Paul Pry's deeds. If none of our farmers mistake their calling more than the blind when they summon to prayer and the cross-eyed when they ferret out rascals — they will make the most of themselves and their soil.

Your presence here to-day testifies interest in your agricultural society. You have laid a good foundation. Build on it wisely and with all your might. Show something at its fairs, at any rate yourselves. If you cannot get a prize for beauty, perhaps you can for ugliness.

A fool cannot learn of the wise, but the wise learn of every fool. No doubt then some of you will go home having gotten hints to-day that will be of use to you all the year,— bees in your bonnet that will make you honey.

All other men of like occupation are banded together. Last month your veterans rallied in a reunion round an old gun in Shetek. Professional men, bankers, teachers, merchants, switchmen, all tradesmen are linked in organizations which

> "Bid each on other for assistance call,
> Till each man's weakness grows the strength of all."

It is well for farmers to do likewise, and the more because their daily routine makes them usually keepers at home. Some of you took hold of this farming fair as reluctantly as your contrary calves began taking their mother's milk. Hold on as tightly as they do upon the good thing you have secured. Like these calves, be as slow to let go as you were to take hold.

Then shall this farming fraternity do its perfect work, till the present convocation — and good as they are — shall be no more than the baby figure of a giant mass ere long to come at large. May you live to see all this an accomplished fact, and then may you live a good while after that!

HIGHWAYS IN BELGIUM AND IN THE UNITED STATES.

While the department of state is making such laudable efforts for the extension of our commerce and industry, it behooves us not to lose sight of matters at home equally conducive to our prosperity.

In order to lay clearly and concisely my subject before the department, I will do so by presenting two pictures.

PUBLIC HIGHWAYS IN BELGIUM.

Americans who find themselves in Europe are struck with astonishment at the enormous loads drawn by horses and dogs here. One glance of the eye from the bulk just mentioned to the roads, and half the wonder would be accounted for, because the roads have almost everything to do with it. We are too apt to ignore that which we trample under foot. The ancients knew and appreciated more the importance of good public roads than we do to-day, though at the present time in Europe this is a subject of first importance.

Many of the roads built by the ancient Romans and traveled by the proud Roman conquerors remain to this day. This is particularly the case in Turkey, where they have, ever since the Roman era, been in use with little or no repair. Of the numerous evidences left by them of their greatness and civilization, I deem these roads the seal and stamp.

Belgium is divided into nine provinces, and each province is the seat of a well organized state government, presided over by a governor. Each of the nine provinces, at each seat of government, has a bureau for roads and bridges, whose chief gives his undivided attention to these things.

The roads are most carefully engineered in the first place, heavy grades, even in mountainous localities, being carefully avoided. The roads are built in an oval form, and in most cases paved with stones; in others gravel forms the road bed; and still in others gravel covers the stone, which, soon becoming hard and smooth, makes the best road bed of all others, because the jolts and noise of a

paved road, which are both tiresome and disagreeable, are avoided; and then the wear and tear are not so great on the running gear, and this kind of road is decidedly more agreeable to pedestrians, and possesses, in addition to other advantages enumerated, the advantage that if the gravel washes away, the stones remain and a good road is always assured.

The stones composing the roads are of a blunt wedge shape, four or five inches square, and are quickly laid and quickly taken up if necessary. These stones are uniform and regular in size, and, when placed, dirt is placed over the new pavement, and then a large roller, drawn by four horses, is passed and repassed over it until the stones are well settled in their places, and the crevices filled with earth. In constructing roads here, regard is always paid to locality and liability to wash. Where there is no danger of washes, stones are dispensed with altogether, and an oval-shaped gravel road substituted at less cost, but in all cases the sides of the road receiving the drainage, and where it is apt to show first symptoms of yielding to bad weather, are carefully paved, so that washes and gullies cannot commence in that quarter.

These roads are flanked on either side by two, and sometimes four, rows of shade trees, which add much beauty to the country through which they run, and from a distance are particularly picturesque where several roads intersect. One can mark the roads in their windings sometimes as far as the eye can reach by these fresh green trees, which, with the various teams of horse and dog laden with the products of farms, mines, and shop, conspire to make a very pretty scene. I never look at these roads but what I think of the enormous blessing and luxury they would be in certain sections of our country.

The public roads of Belgium enter into successful competition with the railroads, so much so that a man who has his team does not by any means consider himself forced to send his products by rail. It is one of the commonest of sights here in Liege to see wagons laden with merchandise from Brussels, which is sixty, or from Antwerp, which is seventy-two, miles from this place; this fact does not possess anything astonishing until the enormous loads pulled that distance by one horse is considered, and there is noth-

ing that so astonishes the American as this. Sometimes the wagon itself looks like a sufficient charge for two horses, while wagon, load, and all are drawn by one with the greatest ease. Those horses are of a larger and stronger build than our horses, and from their size and strength are called in England "English draughts." Place the same load on almost any of our roads in the United States, and at least two more, if not three more, "English draughts" would be required to pull it the same distance. Dog carts come to this market, laden with beef and other products of the farm, a distance of twelve and fifteen miles, drawn by one dog. Two grown persons return in the wagon.

AMERICAN HIGHWAYS.

In presenting the other side of the picture the task is not an agreeable one, because I will have to write some very disagreeable things. Can it be said that we have any public roads in the United States? I have only made the acquaintance of the public roads in the Western and Southern States, and there is only one within my knowledge that can make pretensions to being called a road in the Belgian sense, and that is in the Valley of Virginia. Most of the others that have come under my notice are little short of bogs, swamps, and marshes, and the bridges man-traps. These roads are utterly at the mercy of the weather, and are passable or impassable according to it, and are entirely out of keeping with the enlightened and intelligent people who, through apathy, patiently endure such a state of affairs.

I have been in certain sections of the south, in the fall and winter months, when the farmer had gathered his crop, and when the business season would naturally be good, when the farmer would go to market, make his sales, and return with merchandise, and heard the most dismal complainings of dull business and "hard times." This is the case simply because in most cases the roads are utterly impassable, the distribution of products is at a standstill, and of course dull business follows. There are few outside of these sections that know the real condition of these roads. The emigrants, however, know more on the subject than many Americans, as I will show further on. I have been on the roads

and seen a poor old Rosinante tugging away at a wagon stuck in the mud almost out of sight; when released from his gear he could hardly pull himself out of the mire. Some of these roads are marked with skeletons of horses that have been beaten to death or drowned in the mud or some bridgeless stream, and wrecks of wagons and other vehicles mark the place of an accident to some one who had courage enough to venture out on the road. I was in one of the most beautiful of our southern cities last winter, and while there a glowing account in one of the newspapers of the place of a horse having been smothered in the mud, and this on one of the principal streets of the city. When poor roads prevail in a section, everything else is very apt to be poor — the horse, the farmer, and the merchant, and the church.

Where good roads prevail, you find a community that would be loth to give them up.

It is a well-known fact that in spite of the strenuous efforts made in some sections of our country to induce emigrants to settle among them, very few accept the invitation. I am in a position here to know something of the emigrant. He generally posts himself pretty thoroughly about a section before he goes to it. This is made easy by the numerous emigrants who have preceded him, and he is sure to have acquaintances in several sections who give him information. I have invariably been informed by them that they would not go to a section where the roads were impassable. This is their only objection. They inform me that they would gladly go to such sections, but that they do not wish to be mud-bound or mud-blockaded for six months in the year. I can say to such sections that they must make good public roads before they can induce emigrants to come among them. If it is economy that restrains, it is a false economy; every day that they allow their public roads to remain in an impassable condition, their streams to remain without bridges, they deal a direct and severe blow at their own interests; the country will remain undeveloped, its hidden treasures locked up. These roads, if improved at once, newly engineered, and made good roads, with permanent bridges that could not be swept away with every rise in the stream, would give some sign of permanence of settlement, and

of contentment with the section; the burden of the tax would soon be shared by so many that the roads would not only be self-sustaining, but would be a source of revenue to the state. The taxes would return in the improved condition of stock and running gear, and of the increased loads that could be sent to market in wagons. Circulation, which is the backbone of business, would be facilitated; where now it is a hazard and a task to venture on the public highways it would become a pleasure. In short, there are few blessings that any community can know equal to that of having first-class roads. But unless roads are made first-class, to commence with, you will never have them, and you throw away the money you invest in them.

GEO. C. TANNER,
Consul.

BUTTER MAKING IN FINLAND AND RUSSIA.

I have the honor to transmit subjoined a report from a lecture delivered at the Royal Agricultural Society relating to dairy thrift in Finland, Russia, and to an agricultural meeting held at Abo in Finland.

Three large dairy districts — Finland, the Russian Baltic provinces (Easland, Lifland, and Courland), and the interior of Russia between the Volga and the Dwina — form, as it were, a complex with St. Petersburg as the central and chief market. They have at the same time that in common, that they are specially adapted for cattle breeding and dairy thrift.

The interior of Russia embraces extensive flat plains with numerous rivers, bordering on which are extensive meadow grounds. Finland is a more hilly country, where the natural conditions are less favorable for corn products.

In the latter years the yield has been three hundred and fifty thousand barrels of rye, a similar amount of oats, two hundred thousand barrels of barley, and four hundred and fifty thousand barrels of potatoes, and in good years from two hundred thousand to three hundred thousand barrels of grain are exported from Fin-

land. The discussion in the meeting at Abo dwelt in a great measure upon the way by which sowing seed might become a valuable article of export for the country, the same as it might be expected to become for Sweden, in which country Finland rye seed is highly estimated and obtains a higher price than Baltic seed. A great hindrance to the cultivation of the grain crops is, however, from the night frosts, and from which one is never safe. The summer is of short duration and very hot, but occasionally in the nights a sharp frost may set in causing considerable damage. When this occurs in the spring, the winter seed is killed by the frost, and when it takes place in the autumn, before the grain has matured, it has also an effect on the spring seed. When frost makes its appearance, both in spring and autumn, as was the case in 1867, there is dire want felt throughout the country. It is therefore more and more acknowledged that Finland is better adapted for cattle breeding than for grain culture, and on the part of the government at present all endeavors are made to improve the breed of cattle and the dairy thrift.

In the beginning it was attempted to arrive at this end by importing foreign breeds. This has been carried on to a great extent, so that at a cattle show held in Abo there were only forty-four animals of native breed, whilst there were four hundred and sixty of Ayrshire, Angles, and other foreign breeds. The same is also in part the case in Russia, where only a small number of cattle of Russian breed were to be found on the large estates. A steady movement has, however, now set in in Finland for the purpose of bringing forward again the old Finland race, and a small collection thereof, consisting of one bull and four cows from "Jarvikyla" of the so-called North Savolaksisk breed, obtained a great amount of attention at the cattle show in Abo; they not only obtained the first prize, but also, without doubt, tended in a great measure that one of the large honorary premiums awarded by the society was bestowed upon the exhibitor. They were somewhat small, yellow-colored cows, weighing about six hundred pounds. The cows especially were of good milking appearance, and the best yielded about two thousand seven hundred quarts of

milk annually. In Russia a similar movement towards the maintenance of the old breeds has also commenced, and there are probably better elements to build upon.

From remote times considerable quantities of butter have been manufactured in Finland, but the quality thereof left much to be desired, and it was a matter of great difficulty to get the butter transferred from the interior of the country.

Finland has an area of about six thousand square miles, with a sparse population. The surface is of a hilly nature, but at the same time not a mountainous country. The hills are densely wooded, and at the foot of these are numerous and large lakes; in the valleys fine meadows are to be seen, and between the forests extended grazing grounds. The lakes and rivers occupy one-tenth of the area of the country. These lakes were formerly of considerable benefit for inland communication, although there was the great drawback that they did not stand in sailing communication with the sea.

The government has therefore endeavored to assist this unfavorable state of intercourse by improving the canal ways in the country, and they have effected a great deal in this respect. Sluices have been made in many parts, and the large number of lakes in the eastern part of the country have been brought into sailing communication with the sea by means of a canal way from Saima Lake to Wyburg, so that vessels can now be brought fifty miles into the interior of the country. A railway with branch lines has been laid down between Abo and St. Petersburg, and is connected with several of the lakes which could not be brought into communication with the coast by means of the canal. It is therefore much easier now than it was in former days to convey the produce from the interior of the country, especially to St. Petersburg, and for the transport by rail very appropriate arrangements are made.

There is thus expedited every week a butter train, which in the summer months is provided with ice wagons, and in winter, when it might be too cold for produce like potatoes, eggs, etc., etc., these are dispatched in heated cars. Everything is specially

arranged for the direction towards St. Petersburg, the market of which place is made use of with great sagacity.

The efforts made for improving the dairy thrift in Finland commenced by importing from abroad dairy people, who could be able to impart their knowledge, but soon the younger farmers began also to go to other countries for the purpose of learning the dairy business. From 1867, when Senator Normen was made minister of agriculture, the number of these young farmers increased considerably, and when they again returned home, they generally obtained appointments where their knowledge could be brought into use. Likewise a number of the dairy people at home have been further educated as dairy inspectors, and such like, for government accounts, and apprenticeship places have been opened in the country itself for young girls.

In every county in Finland there will now be found a salaried agricultural adviser, and, as a rule, one skilled in dairy management; he is often assisted by a salaried help, and over these are two state dairy managers, the one of whom is a Dane, the other a Finlander who has passed his examination at the Danish agricultural high school. There is at the same time to be found a dairy institute where two large dairy exhibitions are held, and money is lent by the state for the purposes of erecting dairies round about the country.

The effects of these efforts are to be seen in many directions.

It is specially worthy of notice in what manner in Finland the people know how to make use of the different accessories in St. Petersburg, which are so different to what Finlanders are accustomed. In the large Russian towns they follow the French system; they will neither have salt nor sourness in the butter, and make as many and as severe demands in this respect as in Paris. Butter has even been imported from Paris for the tables of the wealthier Russians. In former times the Fins manufactured solely sour and salt butter, and that is still done by the greatest number, but the most advanced producers now try to imitate the French butter by not putting any salt into it, and by churning it from sweet cream. The latter rapidly spread, owing to the sud-

den bound in the manufacture of sweet butter, which for a time took place in Sweden and Denmark, and this has taken place to such an extent that in the exhibition at Abo there were to be found one hundred and thirty-one brands of unsalted butter, and over two hundred brands of butter had been churned from sweet cream. The fine Finland butter is not entirely made like the French butter, where the cream is allowed to become well soured and the sour taste afterwards washed out of the butter. The cream in Finland is frequently heated up to sixty degrees to ninety degrees C. (forty-eight degrees to seventy-two degrees Reau.), thereafter to be again cooled to the required temperature for churning. Of this description of butter there were about forty samples at the exhibition, and it was specially denoted as "Paris butter." There is, however, this objection to the warming up of the cream, that the butter gets to taste of boiled milk. Experience has shown that this butter keeps better than other sorts. Both in Finland and in Russia considerable quantities of sweet butter are made without any warming up of the cream, especially during winter, but the mode of manufacturing is somewhat different to the Danish. In many places, for example, the butter was washed in water, or iced water was put in the churn so soon as the butter was formed. In this country it is the general opinion that butter does not permit any severe cooling with ice, and that it keeps best at the temperature of eight degrees to ten degrees R. The lecturer held formerly the same opinion, but after what he had observed during his travels he had greatly modified these views. On one farm which he visited a severe ice cooling was employed during kneading, by which the butter was reduced to the temperature of five degrees R. All the butter was shaped in square pieces of ten pounds, and these pieces were immediately transported to an ice cellar, where they were placed in an iron chest, in which they remained at about 0° until they were sent away. During the journey the butter is protected against heat, and at St. Petersburg it is immediately placed in ice, both in the shops and in the warehouse cellars. Thus those people are not afraid of bringing butter into contact with ice, and

the butter treated in this manner was excellent. In the interior of Russia the lecturer was informed that for many years the means had been sought for how to preserve butter from summer to winter when the prices are highest and means of transport easier.

It has been tried to pack the butter in glass jars, placed in flowing water, or in salt pickle, etc., but the greatest success was obtained at a large farm where, after a trial of three to four years, the following system was pursued:

In the month of May the unsalted, washed and sweet butter, with just a slight tinge of sour, was packed in large tin boxes of thirty to forty pounds. These were made about fourteen inches high and eight inches broad, cylinder form, and were so arranged that there was a space of about one-fourth inch between the butter and the tin, and this space was filled up with salt pickle. The boxes have lids, which are fastened down with gutta percha bands.

Throughout Russia ice-houses are to be found; large reservoirs dug down in the ground and filled with snow or ice. In such ice-houses trenches are dug, in which the boxes are laid and covered over with snow or ice, and by degrees, as the ice is melted, the trenches are dug deeper down. At the same time the butter is inspected and the boxes refilled with pickle when requisite.

In the month of September the butter was taken out, which had remained in this manner for four months, and had kept so very well that it could not be detected from freshly-churned butter. It had also been essayed to place the boxes lengthwise against the partitions or at the top of the ice, but it was found that the butter in this way did not keep so well as when it was dug down into the ice.

The lecturer had been greatly astonished at these results, and should it be confirmed, it will be a matter of the greatest importance, as one of the most difficult problems will thus be solved; but he must, however, remark that it is not certain that it will also succeed in this way to preserve butter which is salted or soured. In Russia, however, it appears to be an old custom

amongst the butter dealers to keep all descriptions of butter in this manner, and in St. Petersburg and Moscow ice was to be found in all the warehouses as before mentioned. The Finnish and Russian producers, who only in the cooler part of the year could satisfy the demands for unsalted sweet butter for the St. Petersburg market, manufacture it solely in the winter, and those who neither during summer or winter can fulfill the demands in this respect, manufacture throughout the year sour and salted butter, which is disposed of partly in St. Petersburg and partly abroad. In the interior of Russia the peasants manufacture "melted butter," which in Russia goes under the name of Russian or Siberian butter.

The milk is strained into small jars and first skimmed after it has thickened. The cream is then put into another jar, in which it is churned by being stirred about with a wooden pin with bent branches. When the butter is formed it is not removed from the jar, but the butter-milk is poured off and more cream put in, which is again served in the same way and the butter is separated therefrom proportionally quick. Afterwards the butter is collected and placed in the bake-oven, which is to be found in all Russian houses. So soon as it has melted it is poured into another jar, where it stiffens. This butter keeps remarkably well, inasmuch as the great water mass and the albumen are removed. It resembles something between fat and butter, is more palatable than one might expect, and enters into trade to an enormous extent.

Finland exported, in 1861, five million pounds of butter; in 1870, ten million pounds, and in the last two years twelve million to thirteen million pounds. The number of cows is about the same as in this country (Denmark), and yet in 1870 more butter was exported from Finland than from here; but the home consumption is, however, very small, as the Finnish peasant lives very frugally, and only makes use of butter on holidays, or during hay harvest. Whilst the export at present only comes up to two-thirds of the export from this country, it is, nevertheless, very considerable, and if Finland lay nearer to the English markets, it might become a dangerous competitor for Denmark.

In the interior of Russia great exertions are also made in the dairy line; but fortunately the distances are very great, and the inland markets consume large quantities.

In the government of Twer an extensive and good cheese production is to be found, inasmuch as the government for a number of years has devoted some sixteen to eighteen thousand roubles annually towards the advancement of dairy thrift, and this, for the most part, has been devoted towards the improvement of cheese produce.

HENRY B. RYDER,
Consul.

AMERICAN SHEEP HUSBANDRY.

Sheep husbandry is not confined to any particular state, section or locality in this country. It is carried on to some extent in every state and territory of the Union, although more advantageously and profitably in some sections than in others, consequent upon cheaper lands, more favorable climate, and less expense in feeding and in caring for sheep in some sections than in others.

It is an industry in which the farmers of the country are directly and to a great extent interested.

It is estimated that there are from four hundred thousand to eight hundred thousand persons who own flocks of sheep in this country, and that about $300,000,000 are invested in the production of wool in the United States.

The popular cry "the favored few" — "rich corporations," cannot be raised against the hundreds of thousands of industrious and hard-working American wool-growers scattered over the whole country from Maine to California and Texas, nor can the odious stigma of "monopoly" be attached to this extended and individualized industry. The flocks of the greater part of the sheep-owners of this country are numbered by the tens and twenties and by the hundreds, and but few by the many thousands. Their habitations are not of palatial grandeur or regal

splendor so much decried against, but humble farm cottages, rude cabins and huts, and rough jackals. Their paths do not run amid beds of flowers, but wind their dreary way over the wild prairies and through the mountain gorges. The bleating of the timid lamb, the howling of the hungry wolf, and the whoop of the savage Indian often greet our shepherds' ears in quick succession.

NUMBER OF SHEEP IN THE UNITED STATES.

1850	21,731,880
1860	22,471,275
1870	28,477,957
1880	42,381,389
1882, estimated	50,000,000

Increase by decades, 1850 to 1860, 739,395=3½ per cent.; 1860 to 1870, 6,006,682=28 per cent.; 1870 to 1880, 13,903,432=48 per cent.

We have foreign competitors in this great enterprise, who up to this time have kept far in the lead in the amount and quality of wool products, and may continue to do so unless we duly guard and promote this growing and important home industry.

From the data already given it will be seen that the wool industry of the United States is of vast and rapidly growing importance; not yet equal, however, to our demands for home consumption by an average of sixty million pounds imported into the United States annually, not taking into account the many millions of pounds necessary to manufacture the large amount of woolen goods imported into this country annually, in value many millions of dollars.

Wisconsin is the eighth state in the Union in the number of its sheep — its people owning one million two hundred and fifty-eight thousand one hundred and thirty-one according to the assessment of 1882 — which is probably one hundred thousand less than the actual number.

Mr. J. B. Killebrew, of Tennessee, in his late work on Sheep Husbandry, reminds us in some beautiful and touching allusions that the sheep is the first animal spoken of in the Bible as kept

by man; that Abel found favor in the sight of God by offering up the firstlings of his flocks; that Abraham, the father of the Jews, was a shepherd; that Rachel, the beautiful daughter of Laban and the mother of Joseph, attended her father's flocks; that Jacob was a wealthy shepherd; that Moses, the great law-giver, attended the flocks of Jethro; that David, the sweet singer of Israel, the greatest king of the Jews, kept his father's sheep; that the coming of the Saviour, who is called the Lamb of God, was first made known to the shepherds; that kings and princes prided themselves in the number and vastness of their flocks; that the shepherds watching their flocks were made the theme of some of the sweetest pastoral songs; that the Asiatics raised sheep principally for food; that the ancients used sheep-skins as clothing for their bodies and as shoes for their feet, and, after the fig-leaves, were among the first things used by man to cover his nakedness and protect him from the cold of winter. Job, whom the Lord answered out of the whirlwind, the greatest of all the men of the east, who was perfect and upright, feared God and eschewed evil, had seven thousand sheep.

Dating back to the earliest history of man, and having been signally recognized by the angels from heaven as the first to whom they appeared and announced the "glad tidings of great joy," and selected of all men as the chosen instruments to proclaim to a "fallen world" the glorious news of the birth of Christ the Redeemer, may we not regard the shepherds, the keepers of sheep, with peculiar favor, and their calling, if not sacred, at least as deserving of "incidental protection?"

Sheep were first introduced into the American colonies in 1609, at Jamestown, Virginia. To prevent them from destruction by wolves and Indians required the greatest care. The growth of sheep in the colonies was deemed of the greatest importance, and made a subject of special encouragement and solicitude. On the 14th of May, 1645, the general court of Massachusetts declared its desire that, "having an eye to the good of posterity," "all towns in general and every one in particular will endeavor the preservation and increase of such sheep as they have already, as

also to procure more with all convenient speed into the several towns by all such lawful ways and means as God shall put into their hands."

To protect sheep from being destroyed, a premium of £4 was offered for every wolf's head. In 1657 the assembly of Virginia prohibited the exportation of sheep, and in 1762 ordered that no wool should be exported under a penalty of fifty pounds of tobacco for every pound of wool exported. In 1774 the general congress passed resolutions requesting the people to use their utmost endeavors to improve the breed and increase the number of sheep, killing as few as possible and not exporting any. In 1775 the assembly of Pennsylvania recommended the people to abstain from eating and the butchers from the killing of sheep. In 1774 the congress of deputies which met at Annapolis resolved to encourage the breeding of sheep, and to promote the manufacture of wool. Likewise did the provincial congress of Massachusetts in the same year, as well as the convention of Virginia in the year following. At this early date we find the American colonies encouraging and fostering the growing of wool and woolen manufactures.

I set up no plea of "infant industry," in behalf of this interest. It was born at the creation, "when the morning stars sang together and all the sons of God shouted for joy," but rather as an industry venerable for its patriarchal and sacred antiquity — handed down from the "fathers of old" to the "fathers of the American colonies," and by them transmitted to us, deserving of our filial fostering care, conveniently denominated the "American system" of "incidental protection."

SUMATRA TOBACCO.

A few years ago some wealthy merchants in Amsterdam conceived the idea of cultivating tobacco on the Island of Sumatra, a dependency of Holland. A rich soil and genial climate, aided by the cheapest kind of cheap labor — cooly labor — made the

experiment a complete success. In 1881 the crop yielded eighty-two thousand three hundred and fifty-six bales, and official records show that there was imported into the United States of this tobacco, up to June 30, 1881, two hundred thousand six hundred and two pounds, and during the months of July, August, September, October and November, 1882, six hundred and ten thousand five hundred and nineteen pounds.

These excessive importations naturally alarmed the American tobacco-grower. An examination of the Sumatra tobacco proved that it was a new and peculiar variety. The leaf is oval in shape, soft and pliable as tissue paper, uniform in color, and being free from large stems is admirably adapted for cigar-wrappers. The American seed-leaf, as all know, is long and tapering, with heavy central and side stems. These, at an expense of at least from ten to twelve cents per pound, have to be removed before the leaf can be used for wrapper purposes. The Sumatra leaf, on the contrary, is fit for a wrapper in its natural state. It is, moreover, agreed by cigar manufacturers that one pound of Sumatra will go as far as four pounds of seed-leaf.

In a letter dated December 23, 1882, addressed to Mr. Joseph Nimmo, government statistician, E. Hoffman & Son, of New York, the recognized agents of the Amsterdam Sumatra tobacco brokers, say the "yielding qualities of Sumatra is four to one of our domestic tobacco, one pound covering as much as four pounds of our domestic leaf."

Sumatra tobacco is worth in New York from ninety cents to $1.25 per pound, making an average of $1.07 per pound. Add to this forty cents, the difference between thirty-five cents, the present duty, and seventy-five cents, the duty proposed by the Committee on Ways and Means, and we have $1.47 as the price of one pound of Sumatra. A pound of seed leaf prepared for wrappers is worth forty cents, but it takes four pounds to equal one pound of Sumatra, which would make the equivalent in seed-leaf cost $1.60, a difference of thirteen cents in favor of its foreign competitor. It is evident, therefore, to protect our home-grown product, it is necessary to make the duty $1, and this

would only give the seed-leaf the benefit of twelve cents, a difference the Sumatra grower could easily overcome by advantage of cheap land and cheap labor.

The agents of the Amsterdam house before mentioned, with a frankness that does them credit, say in the aforesaid letter:

"That the importation of Sumatra tobacco under the present duty of thirty-five cents per pound is working great evil to our producers or farmers is an indisputable fact, and the failures and losses in our trade verify this assertion."

The circular of Binger & Hershel, sworn tobacco brokers of Amsterdam, just issued and sent to their correspondents in the United States, with equal frankness admits the losses which must follow to the American grower from these excessive importations, and concedes the propriety of legislative interference. Hear what they say:

"If the importations really increased in such proportions, everybody would of course understand that in a few years the American planters would be the loser by the falling off in the demand for several thousand cases of seed-leaf, and who would blame them if in that case they sought to get their interests protected by their government, in the form of an additional duty on the imports of Sumatra tobacco."

This industry is not local but eminently national. While Pennsylvania, Connecticut, New York, and Wisconsin are mainly growers of the seed-leaf, all the states use more or less of the same in the manufacture of cigars. From the last census it appears there were in the United States in 1879, six hundred and thirty-eight thousand eight hundred and forty-one acres in tobacco, which yielded four hundred and seventy-two million six hundred and sixty-one thousand one hundred and fifty-seven pounds. Pennsylvania had twenty-seven thousand five hundred and sixty-six acres, yielding thirty-six million nine hundred and forty-three thousand two hundred and seventy-two pounds; Connecticut, eight thousand six hundred and sixty-six acres, yielding fourteen million forty-four thousand six hundred and fifty-two pounds; New York, four thousand nine hundred and thirty-seven acres,

yielding six million four hundred and eighty-one thousand four hundred and thirty-one pounds; Wisconsin, eight thousand eight hundred and ten acres, yielding ten million six hundred and eight thousand four hundred and twenty-three pounds.

The following table shows the number of factories in each state and territory, and that nearly three billion cigars have been made in the United States in 1881:

STATES AND TERRITORIES.	Factories.	Cigars manufactured.
Alabama	42	1,340,375
Arizona	2	39,900
Arkansas	15	1,508,005
California	239	137,786,645
Colorado	36	1,232,545
Connecticut	299	28,019,668
Dakota	15	621,400
Delaware	45	5,135,347
Florida	133	32,377,394
Georgia	34	2,685,000
Illinois	1,011	136,517,375
Indiana	413	47,800,483
Iowa	273	35,218,571
Kansas	109	12,138,504
Kentucky	233	32,163,901
Louisiana	168	36,057,739
Maine	56	3,960,379
Maryland	717	84,153,523
Massachusetts	540	69,436,311
Michigan	496	78,874,236
Minnesota	107	16,850,826
Mississippi	3	42,100
Missouri	563	59,366,903
Montana	1	3,850
Nebraska	68	5,902,089
Nevada	1	18,050
New Hampshire	45	3,085,345
New Jersey	727	56,468,796
New Mexico	1	13,550
New York	3,970	953,034,334
North Carolina	26	1,573,820
Ohio	1,479	262,028,017
Oregon	9	584,080
Pennsylvania	3,956	555,949,256
Rhode Island	72	8,335,133
South Carolina	19	1,370,252
Tennessee	33	3,167,240
Texas	54	4,672,603
Utah	2	225,250
Vermont	16	2,380,633
Virginia	132	22,669,343
Washington	3	100,260
West Virginia	111	37,749,885
Wisconsin	376	63,174,008

The capital employed in the cigar industry in the United States is $22,787,891; the average number of hands employed, fifty-four thousand eight hundred and thirty-one; the total amount paid in wages during the year, $18,635,433; value of material, $30,987,335; and value of the products, $65,877,110.

The tax paid into the United States treasury on tobacco amounts to $47,391,988.91, of which in round numbers $18,000,000 comes from cigars. From 1862 to 1882 there was paid into the United States treasury, as a tax on tobacco, $589,750,447.04.

Nor will this duty interfere with the importation of Havana tobacco, as it is used chiefly as a filler. There is no conflict between it and the seed-leaf wrapper. Unless, however, the seed-leaf wrapper is protected the Sumatra would supersede it, and in that event our tobacco-growers would be entirely at the mercy of foreign capitalists, who could then control both Cuba and Sumatra; for our farmers cannot possibly grow tobacco for the sake of furnishing fillers.

THE 2:20 HORSES.

The following list of all the horses that have ever trotted in 2:20 or better has been carefully compiled to the close of 1882, and will be found well worth preserving. For many years the 2:19¾ of Flora Temple, at Kalamazoo, stood at the head of all performances on the trotting turf, Dexter being the first horse to equal or beat it. Now the records show that ninety-eight horses have trotted in 2:20 or better, and every year the number of those within the magic circle is being largely increased:

NAME.	SIRE.	RECORD.
Maud S	Harold	2:10¼
St. Julien	Volunteer	2:11¼
Rarus	Conklin's Abdallah	2:13¼
Goldsmith Maid	Alexander's Abdallah	2:14
Trinket	Princeps	2:14
Clingstone	Rysdyk	2:14
Hopeful	Godfrey's Patchen	2:14¾
Lula	Alexander's Norman	2:15
Smuggler	Blanco	2:15¼
Hattie Woodward	Aberdeen	2:15½
Lucille Golddust	Golddust	2:16¼
American Girl	Amos' C. M. Clay, Jr	2:16½
Darby	Delmonico	2:16½
Edwin Thorn	Thorndale	2:16½
Jerome Eddy	Louis Napoleon	2:16⅔
Occident	Dot	2:16¾
Charlie Ford	Grey Eagle	2:16¾
Gloster	Volunteer	2:17
Dexter	Rysdyk's Hambletonian	2:17¼
Piedmont	Almont	2:17¼
So So	Geo. Wilkes	2:17¼
Black Cloud	Ashland Chief	2:17¼
Santa Claus	Strathmore	2:17½
Hannis	Mambrino Pilot	2:17¾
Kate Sprague	Gov. Sprague	2:18
Nettie	Rysdyk's Hambletonian	2:18
Dick Swiveller	Walkill Chief	2:18
Judge Fullerton	Edward Everett	2:18
Great Eastern	Walkill Chief	2:18
Edwin Forrest	Brannock's Ned Forest	2:18
Proteine	Blackwood	2:18
Red Cloud	Legal Tender	2:18
Robert McGregor	Major Edsall	2:18
Lucy	Geo. M. Patchen	2:18¼
Lady Thorne	Mambrino Chief	2:18¼
Lady Maud	General Knox	2:18¼
Midnight	Peacemaker	2:18¼
Monroe Chief	Jim Monroe	2:18¼
Fanny Witherspoon	Almont	2:18¼
Pickard	Abdallah Pilot	2:18¼
Rosa Wilkes	George Wilkes	2:18¼
William H	Young Wilkes	2:18½
Slow Go	Sharatack, Jr	2:18½
J. B. Thomas	Sterling	2:18½
Col. Lewis	Rifleman	2:18¾
Cleora	Minelaus	2:18¾
Nutwood	Belmont	2:18¾
Patchen	Unknown	2:18¾
Alley	Volunteer	2:19
Albemarle	Tom Hunter	2:19
Kitty Bates	Jim Monroe	2:19
Minnie R	J. C. Breckenridge	2:19
Jay-eye-see	Dictator	2:19
Adele Gould	Jay Gould	2:19
Bonesetter	Brooks	2:19

NAME.	SIRE.	RECORD.
Edward	Fisk's Hambletonian	2:19
Cozette	Blumberg's Bashaw	2:19
Alexander	Ben Patchen	2:19
Troubadour	Revenge	2:19
Wedgewood	Belmont	2:19
Croxie	Clark Chief	2:19¼
Comee	Daniel Lambert	2:19¼
Bodine	Volunteer	2:19¼
Aldine	Almont	2:19¼
Geo. Palmer	Ames' Bogus	2:19¼
Keene Jim	Lookout	2:19¼
Von Arnim	Sentinel	2:19½
Romero	A. W. Richmond	2:19½
Driver	Volunteer	2:19½
Moose	Washburn Horse	2:19½
Parana	Mambrino Hambletonian	2:19½
Thos. L. Young	Yellow Jacket	2:19½
Will Cody	Blue Bull	2:19½
Daisydale	Thorndale	2:19¾
Deck Wright	Hinsdale Horse	2:19¾
Adelaide	Phil. Sheridan	2:19¾
Camors	General Knox	2:19¾
Flora Temple	Kentucky Hunter	2:19¾
John S. Clark	Thos. Jefferson	2:19¾
Josephus	Green's Bashaw	2:19¾
Dr. Norman	Colonel Moore	2:19¾
Nellie R	General McClellan, Jr	2:20
Humboldt	Stocking Chief	2:20
Belle Brasfield	Viley's Cripple	2:20
Capt. Emmons	Continental	2:20
Etta Jones	Parrish's Pilot	2:20
Frank	Pathfinder	2:20
Fleety Golddust	Golddust	2:20
John H	Blumberg's Bashaw	2:20
Little Fred	Eastman Morgan	2:20
Mambrino Gift	Mambrino Pilot	2:20
May Queen	Alexander's Norman	2:20
Nancy Hackett	Wood's Hambletonian	2:20
Orange Girl	Rysdyk's Hambletonian	2:20
Prospero	Messenger Duroc	2:20
Graves	Whipple's Hambletonian	2:20
Elane	Messenger Duroc	2:20
Annie W	Bostick's Almont, Jr	2:20

GRASSES AND THEIR CULTIVATION.

According to Dr. Voelcker, analysis of white and red clover grown on the same land in a natural condition, on the farm of the Royal Agricultural College, at Cirencester, Eng., gave for white (Dutch) clover (A in the table), and red clover (B in the table), the following:

DESCRIPTION.	A.	B.
Water	83.650	77.570
Nitrogenized matter (flesh-formers)	4.520	4.481
Substances (fat-formers) capable of sustaining respiration	10.260	15.949
Inorganic substance	1.570	2.000

According to Prof. Way, red clover hay on clay soil contained 12.20 per cent. water, and white clover contained of water 12.00 per cent. Hence, if nothing were lost in curing, and, assimilation being equal in each case, the difference in feeding quality of red clover would be, ton for ton, nearly six times as much in the form of the hay as in that of grass. But every practical man knows this to be erroneous in fact. The hay loses considerable in nutriment in drying, and also in the power of being assimilated by the animal. If an acre produce two tons of dried clover, the equivalent green would be more than twelve tons. Now, since it takes a good acre of grass to feed a cow during six growing months, it is nonsense to say the same acre, of twelve tons, would winter six cows.

Ensilage is not a perfect food. It is, however, an essential aid in connection with other food, especially if fed with grain. It should be experimented with by every stock grower, and especially so by dairymen.

HOW TO FORM A SILO.

Some would-be scientific writers have used so much mystery in their ideas of how to form a silo that many persons have been deterred from attempting the labor. The fact is, a pit dug in any compact soil free from moisture, and not less than six feet across,

will keep green vegetable matter when in a proper state of division, if pressure is applied to so compress the mass as to fairly exclude the air. In the case of corn or other fodder cut just before frost, the pressure may be lighter than that cut earlier. The kind of pressure cuts no figure. Barrels of sand or any other easily obtained material will furnish this.

The material must be free from rain or dew, should be cut into lengths of two or three inches, so it may settle uniformly, and it should be well tramped while being placed in the silo. It is better that not more than two or three days be spent in the filling. In any case strong pressure should be applied in the intervals, and from a well known law, that the stronger the pressure the less liability to heat of moist material. It is the action of the air, or rather the oxygen of the air, upon fermentable matter that causes heating, and green vegetation piled in a body is just in the proper condition of moisture to heat strongly and quickly.

TO MAKE A SILO.

Any person having a bank barn in a soil through which water does not filtrate, may easily make a silo. The wall may be laid up of brick or stone, or even of plank thick enough to resist the pressure of the earth. The silo should not be less than twelve feet square, and deep, to save the ensilage perfectly. The upper four feet may be of boards or planks, and the whole roofed over. If built wholly in the ground, next the barn cellar, it need not be water tight unless there is danger of filtering in from the outside. Put in the cut fodder as quickly as convenient. When settled, add still more, and so on until filled. No definite rule of pressure can be given. Strong pressure, however, is better than light pressure, for reasons heretofore given. Barrels of sand closely set together over the planking covering the ensilage (and this planking must be so fitted that it will settle freely with that of the ensilage) will be sufficient. If it gets hot in the silo increase the pressure. Stone is, perhaps, easiest to handle as a means of pressure.

If the ensilage comes out in the state called wine sour — the acid fermentation — it will be right according to some good Euro-

pean authorities, but the less the fermentation the better; and this is determined by the more or less perfect exclusion of air. When the material is removed from the silo, it should be cut down square, and only so much taken daily as will serve as the proper ration. It will range in weight from thirty-five to forty pounds per cubic foot, which may serve for two cows daily. One cubic foot per day would be a full ration in connection with other food, and at this rate a cow would eat, at thirty-five pounds per cubic foot, over two and a half tons in five winter months.

AN ENGLISH VIEW OF GRASSES AND CLOVERS.

The clovers are sometimes called trefoils in England, from the manner in which the leaves are placed in threes. The leading seedsmen there, as well as some seed growers in the United States, are constantly experimenting with a view to acquire something new and valuable. An examination of the experimental plats devoted to clover, at the establishment of Messrs. Sutton & Sons, and described in the *Agricultural Gazette*, London, will be interesting and valuable, not only as indicating still further our proposition heretofore stated, but the very careful and complete manner in which they were carried out there. These were one hundred and twenty-six in number, each four yards square, and devoted to lawn grasses, permanent pasture and other mixtures. At the end of three months all of these were said to show a thick, firm, elastic bottom, as good as turf could well be, and composed wholly of fine grasses. This is undoubtedly due to the perfect preparation of the soil, a matter insisted on in our series of papers, and also undoubtedly to the constant supply of soft rains and cool climate, for which England is noted.

THE TRIAL OF CLOVERS.

There were ten samples of red clover experimented with. The correspondent states, of these, that three plots of giant hybrid cow clover appeared to be decidedly distinct from either English cow grass or common red clover; the leaf broader, the growth more vigorous, the flowers rounder. These patches were sown on May 2d, and had been cut over once, and they were nearly

ready for the scythe again. There were also patches of perennial red clover or single-cut cow grass. This, it is said, does not give a second crop, but comes in for use between the first and second cuttings of red clover, and that on this account it is invaluable, as it gives the farmer an abundant supply of green food at a time when it is most needed.

The true perennial white (probably our dwarf white) is reported rare at Reading, Eng. We notice that a shrewd attempt is made throughout the article to decry American-grown seed. Perhaps all grass seed is more or less injured in crossing the ocean. It is to this we object in foreign-raised grass seed, as well as their liability to contain the seeds of foreign noxious weeds. For the reason that western-grown grass and clover seed is exempt from noxious weeds, and especially that of the Canada thistle, they have acquired an enviable reputation all over the United States.

Trefoil, with its pleasing yellow flowers, is said to be extensively used in England for alternate husbandry, but it is reported not suitable for permanent pasture mixtures, except in very small quantities. The writer of the article we quote from states that this plant is well-deserving of cultivation on light, dry and high, elevated, inferior soils, and on such will yield a greater bulk of herbage than any of the cultivated clovers. It is highly nutritious, and eaten with avidity by cattle. From the great depths to which its roots penetrate, it is not liable to be injured by drought, and is thereby enabled to retain its verdure after the grasses and other plants are burnt up, a fact worthy of notice by western farmers.

It is also stated that " Alsike, or hybrid clover, with pink and white flowers, is included in all permanent pasture mixtures; it is particularly adapted for what are termed clover-sick lands. By clover-sick lands is meant soils that fail to grow red clover, and the reason assigned for land falling into this condition is that if red clover be sown successively for a few years, the land will tire of it. By sowing alsike, the ability to grow red clover is restored, and for this reason — that the roots being long and of a fibrous character, they pierce into the subsoil that the red clover does not reach, and so get nourishment."

ITALIAN CLOVER.

Of Italian crimson clover (annuals), four varieties are noted — early red, late red, late white, and Sutton's extra late red. In looking over these samples, the correspondent says: "The extra late red is not fit to cut till the end of June or early in July, and, indeed, is not in flower till that time. The others are decidedly earlier in flower. In England it has been found to succeed best either drilled or sown broad-cast on stubble, after the grain crops have been removed, and with no previous preparation save a course or two of harrowing, just sufficient to stir the soil to depth enough so that the seed may be more easily covered. In general it is found better to dispense with the plow altogether, for the many failures which occurred previous to its culture being properly understood are now attributed to the ground being too much loosened and pulverized by repeated plowings. The advantages to be derived from the cultivation of *T. incarnatum* (Italian clover) are, that, when sown in autumn, it may be cut and cleared from the ground in the beginning of the June following, and the land fallowed for wheat or spring corn; it forms a valuable green food for cattle at an early period of the season, and, if cut when in full flower, it yields a more abundant crop of hay than that of common clover."

This fact, previously noticed — that for all grass seed the soil should be well packed, except the surface tilth — should be carefully borne in mind; and also, that while in England clover may be sown in autumn, that here it cannot be except in drained soils, or those not liable to heave.

THE CORN FIELD.

However important the cereal crops may be, the great money crop of the west is Indian corn. Its value is not resolved by the actual number of bushels sold in the market. Far from it. It lies in what is fed at home, in fat hogs and cattle. Hence, considering its immense acreage, every additional bushel gained per acre adds notably to the wealth of the farm. As a rule, what we

call dry seasons, are our most prolific ones. There could be no more eloquent argument than this of the value of drainage in the west. The man who plows for corn, or who plants in the mud, does so to his sorrow. The hints given for surface draining the land for small grain, will apply equally well to the corn land. No time should be lost in draining water furrows where they may be needed, and deepening them as necessity requires. It may make days' difference in the plowing, and the field planted, again draw these water lines. It may save the crop. The same thing should have been said in relation to small grain. These water lines drawn after the seed is in, may prevent much drowning out.

How about seed corn? Have you carefully selected at husking time, or before, the soundest and most perfect ears, and attended to their careful curing? If so, you have been sensible for this year's planting. If not, lose no time in selecting the best you have; again carefully sort this over. From that you think is pretty sure to grow, shell a small quantity from a number of ears selected as they run, mix all well together, count out fifty grains, place them between folds of flannel cloth, kept constantly moist and at a temperature of fifty-five to sixty degrees, not more. Corn does not germinate at a temperature much below fifty degrees. Note the time it takes to sprout. If it does so in seven days it is good. Ascertain the number of grains that come promptly and you can decide how much to drop in a hill.

The sooner corn is planted after the ground is plowed the better. Put all the plow teams on consecutive lands, let the harrow follow close to the plows (we believe in harrowing corn land), and it is better that the planter follow the plowing close enough so that each day's work will be fairly up to the plowing.

The cost of cultivating the corn crop, in the west, per acre, is really so little that there seems no excuse why it should not be done well. The great variety of cultivators that really leave but little to be desired, so far as cleaning the crop is concerned, leaves no excuse for weedy fields, unless wet weather interferes with cultivation. This may be entirely obviated by drainage, and since underdraining is to be charged to permanent improvement, it is only a question of the interest on the investment per acre

that really figures. If it cost $50 per acre to drain, six per cent. would be $3 per acre per year; but the actual drainage on a farm would not amount to more than from one-tenth to one-fifth of the surface, so that the interest on the whole acreage would be only from thirty to sixty cents per year. It is a question that every farmer should study.

Let us now look at the actual expense of cultivating a crop of corn, from plowing the ground to cribbing the corn. Actual figures on a field of one thousand two hundred and twenty-five acres will furnish good data. But the smaller the field the more it costs per acre, but again the smaller the field the greater the average yield, so one hand will wash the other. The field yielded a little over thirty-nine bushels per acre, and the tillage was at the rate of sixty-five acres to the man and team for cultivating.

Fall plowing	$600 00
Two hundred and seventy-five bushels seed corn at 80c	220 00
Fifty bushels seed corn at $1.50	75 00
Manual labor	1,958 13
Team labor	1,174 25
	$4,027 38

This brings the corn ready to husk. The husking cost us:

One thousand four hundred and seventy days' manual labor	$1,837 50
Seven hundred and thirty-five days' team work	918 75
Thus the corn costs in the crib	$6,773 63

The crop was forty-eight thousand two hundred and twenty-five bushels. That portion not fed on the farm brought forty-two and one-half cents per bushel in the crib, making a total for forty-eight thousand two hundred and twenty-five bushels of $20,495.63. Deduct from this cost of producing the crop, and the balance is $13,691 for the crop, or $11.09 per acre for the use of the land.

The men were all paid at the rate of $1.25 per day, and the teams were estimated at the same price for each double team. Every individual item was correctly charged, as plowing, harrowing, rolling, planting, cultivating, uncovering corn, etc., and there was even a charge of $13.20 for cutting and pulling weeds. Looking at the matter in another light, it will be seen that the whole expense of making the crop ready to husk, for man and

team, was, counting man and team at $2.50 per day, at the rate of one and one-fifth days' work per acre, or, in other words, counting the value of seed corn, the cost of raising an acre of corn was $3.29 per acre. These figures are interesting, as showing why the west can raise the world's corn so cheaply.

In raising a crop of corn, it is, as a rule, economical to use three horses abreast to the plow, even with a twelve-inch plow, for one man will drive them as easily as he will two, and they will do one-third more work to the hand, a matter of no small importance in the outcome. The same may be said of harrowing. If the ground is not trashy, requiring the harrow to be constantly lifted, three or four horses abreast, attached to double harrows, will save nearly half the manual labor in harrowing. If the ground is reasonably clean and correctly check-rowed, the crops may be harrowed twice — once, preferably, just as the corn is fairly sprouting, and again the other way just as it is fairly out of the ground so the rows may be seen. If it gets higher, a hand should follow each harrow with a narrow garden rake to uncover any upon which clods may have fallen. In cultivating, a good hand will cover but little corn, and this he will uncover with the toe of the boot, and generally without stopping the team. While the corn is young the cultivation should be as deep as possible, without covering the corn. The later cultivation, when the soil becomes pretty well filled with roots, need only be shallow. But here, again, the operator must be guided by circumstances.

As a rule early planting gives the best crop, but a good crop need not be expected if the land is either plowed, planted or worked, when wet. It sometimes requires considerable courage to decide to wait when weeds are pressing. When it is a question of having the crops smothered by weeds or of waiting, we should take the chances, on wet land, rather than to wait.

[We are indebted to Maj. Henry E. Alvord, General Manager of Houghton Farm, owned by Mr. Lawson Valentine, near Mountainville, New York, for the following reports of experiments made at Rothamsted, the leading agricultural experiment station of the world. G. E. B.]

EXPERIMENTS AT ROTHAMSTED.[1]

Upon request, Dr. Lawes has contributed to this report a summary of the most important results obtained in the extended and elaborate experiments with wheat at Rothamsted.

From the great practical value of these experiments, I am pleased to invite the attention of American farmers to Dr. Lawes' paper, which presents in a clear and concise form some of the leading facts of general interest that have been developed in the course of his investigations.

Soon after entering into possession of his hereditary property at Rothamsted, in 1834, Dr. Lawes began to experiment with different manures, first in plots and afterwards in the field. His interest in the results, obtained on a small scale, led him to extend his experimental work, and in 1843 the systematic field experiments were commenced, which are still in progress.

In June, 1843, Dr. J. H. Gilbert was associated with Mr. Lawes, and since that time he has had the direction of the laboratory.

An old barn was used for laboratory purposes until 1855, when a new laboratory, built by public subscription of agriculturists, was presented to Mr. Lawes.

"The Rothamsted station has been entirely disconnected from any external organization, and has been maintained entirely by Mr. Lawes. He has further set apart a sum of £100,000 and certain areas of land for the continuance of the investigations after his death."

The experimental staff has consisted of from one to three chemists,— two or three general assistants; two or three computers and record keepers have been occupied in calculating and tabulating field, feeding and laboratory results. One or two

[1] Rothamsted is near St. Albans, in Hertfordshire, twenty-five miles from London, on the Midland Railway, Harpenden station.

laboratory men are also employed, and occasionally a botanical assistant, with from three to six boys, have been engaged in special work.

"Besides the permanent laboratory staff, chemical assistance is frequently engaged in London, or elsewhere; and in this way, for some years past, Mr. R. Richter, of Berlin, has been almost constantly occupied with analytical work sent from Rothamsted."

A considerable, but variable, force of agricultural laborers is employed in the field and feeding experiments.

The following brief abstract of the subjects and methods of investigation, compiled from the "Memoranda of Experiments at Rothamsted for 1881," and other sources, will enable the reader to form some idea of the scope and extent of the experimental work at Rothamsted.

FIELD EXPERIMENTS.

The field experiments have been made on a large scale, including,—

Wheat for thirty-nine years in succession; thirteen acres in thirty-seven plots, many of them duplicates.

Barley, thirty-one years in succession; four and one-half acres in twenty-nine plots.

Oats, ten years in succession; three-fourths of an acres, six plots.

Wheat, alternating with fallow for thirty years; one acre, two plots.

From four to eight acres, in a different field each year, for fourteen years, with different varieties of wheat, now more than twenty plots.

Beans, thirty-two years (including one year wheat and five years fallow); one and one-fourth acres, ten plots. Also twenty-seven years; one acre, five plots. Beans, alternated with wheat, twenty-eight years; one acre, ten plots.

Clover, with a fallow or a grain crop intervening, twenty-six years; three acres, eighteen plots. The land is now devoted to experiments with various leguminous plants, commenced in 1878.

Turnips, twenty-eight years (including three years barley); eight acres, forty plots.

Sugar beets, five years; about eight acres, forty-one plots.

Mangel-wurzel, seven years; about eight acres, forty-one plots.

Potatoes, seven years; two acres, ten plots.

Crop rotations, thirty-four years; about two and one-half acres, twelve plots.

Permanent grass-land, twenty-six years; about seven acres, twenty-two plots.

The plan has been to grow some of the most important crops of rotation, each separately, year after year for many years, on the same land without manure, with barn-yard manure, and with a great variety of chemical fertilizers, the same description of manure being, as a rule, applied year after year on the same plot. Experiments on an actual course of rotation, without manure, and with different manures, have also been made.

Comparative experiments with different manures have also been made on other descriptions of soil in other localities.

INFLUENCE OF SOILS AND MANURES ON COMPOSITION OF CROP.

Samples of all the experimental crops are taken to the laboratory, and subjected to a more or less complete analysis. Dry samples and ash constituents are preserved for future reference.

In selected cases illustrating the influence of season, manures, exhaustion, etc., more than six hundred complete ash analyses have been made, and in a large proportion of samples the nitrogen is determined; and in some the amount existing as albuminoids, amides, and nitric acid.

Also in selected cases illustrating the influence of season and manuring quantities of the experimentally-grown wheat have been sent to the mill, and the proportion and composition of the different mill-products determined.

RELATIONS OF BOTANICAL CHARACTERISTICS TO SOIL AND MANURES.

In experiments on the mixed herbage of permanent grass land, besides the samples taken for the determination of the chemical composition (dry matter, ash, nitrogen, woody fibre, fatty matter, and composition of ash), carefully averaged samples have fre-

quently been taken for the determination of the botanical composition. In this way, on four occasions, at intervals of five years, viz., in 1862, 1867, 1872, and 1877, a sample of the produce of each plot was taken and submitted to careful botanical separation, and the percentage, by weight, of each species in the mixed herbage determined. Partial separation, in the case of samples from selected plots (frequently of both first and second crops), have also been made in other years.

With reference to the difference in the character and amount of the constituents assimilated by plants of different botanical relationships, under equal external conditions, or by the same description of plants under varying conditions, observations have been made on the character and range of the roots of different plants, and of their relative development of stem, leaf, etc. In the case of various crops, but more especially with wheat and beans, samples have been taken at different stages of growth, and the composition determined, in more or less detail, sometimes of the entire plant and sometimes of the separated parts. In a few cases the amounts of dry matter, ash, nitrogen, etc., in the above-ground growth of a given area, at different stages of development, have been determined.

SOILS.

Samples of the soils of most of the experimental plots have been taken at the depth of nine, eighteen, and twenty-seven inches, and sometimes from twice this depth, and the physical and chemical qualities determined.

Several hundred samples have been examined, and a systematic investigation of the amount and condition of the nitrogen, and of some of the more important mineral constituents of the soil of the different plots, and from different depths, is now in progress.

WATER TRANSPIRED BY PLANTS.

For several years in succession experiments were made to determine the amount of water given off by plants during their growth.

These experiments have been made on representatives of the gramineous and leguminous families of cultivated plants, and also upon evergreen and deciduous trees.

ASSIMILATION OF FREE NITROGEN.

Experiments with gramineous, leguminous, and other families of plants were made for several successive years, to determine whether plants assimilate free or uncombined nitrogen, and also various collateral points. These experiments, in which the late Dr. Pugh took a prominent part, are of great practical interest.

RAIN AND DRAINAGE WATERS.

Since 1853 the rainfall at Rothamsted has been measured in a gauge having an area of one thousandth of an acre, and also in an ordinary funnel gauge of five inches diameter.

The first determinations of nitrogen in rain-water at Rothamsted were made as early as 1846. After the construction of the large rain-gauge, the ammonia of the rainfall, for fifteen months in 1853 and 1854, was determined at Rothamsted. The collected rainfall of 1855–56 was analyzed by Professor Way; and in 1869–70 Dr. Frankland made analyses of the rainfall, and also of dew and hoar-frost. Since that time the investigations have been continued in the laboratory at Rothamsted.

For the purpose of determining the quantity and composition of the water percolating through the soil of a bare, unmanured fallow, at different depths, three "drain gauges" were made in 1870, each having an area of one thousandth of an acre, and respectively twenty, forty, and sixty inches deep.

The sub-soil of these gauges was in its natural state of consolidation, and the surface has been kept free from vegetation.

Each plot of the experimental wheat field has a separate drain, so that facilities are provided for determining the composition of drainage waters from soils growing a crop without manure, and with a variety of manures.

The drainage waters from the experimental wheat field, collected in 1866–68, were analyzed by Dr. Voelcker, who made an able report of the results of his sixty-five analyses in the Journal of the Royal Agricultural Society for 1874.

Of the drainage waters from the experimental wheat field, collected from January 15, 1868, to February 26, 1873, Dr. Frankland made one hundred and three analyses, and he also analyzed

the drainage waters from the "drain gauges," collected from 1870 to 1874. Since that time the drainage from the "drain gauges" has been systematically investigated at Rothamsted, and of the drainage water from the wheat plots about thirteen hundred samples have been analyzed.

The results of all the investigations relating to rain and drainage waters since 1853 have been recently discussed by Drs. Lawes and Gilbert, assisted by Mr. Warington, in a valuable paper, published in three numbers of the Royal Agricultural Society's Journal, 1881 and 1882. The last part, which is just published, contains a summary of results and conclusions, which is copied in the following pages for convenience of future reference.

EXPERIMENTS WITH ANIMALS.

Experiments with animals were commenced at Rothamsted in 1847, and have been continued at intervals to the present time.

From the large number of animals under experiment, the wide range of topics under consideration, and the scrupulous accuracy with which the investigations have been conducted, the results obtained are of particular interest and value in almost every department relating to the care and economy of animals in practical agriculture.

Among the points investigated, the following may be enumerated as bearing directly upon the practical problems of farm practice:

(1.) The amount of food, and of its several constituents, consumed in relation to a given live weight of animal within a given time.

(2.) The amount of food, and of its several constituents, consumed to produce a given amount of increase in live weight.

(3.) The proportion and relative development of the different organs or parts of different animals.

(4.) The proximate and ultimate composition of the animals in different conditions as to age and fatness, and the probable composition of their increase in live weight during the fattening process.

(5.) The composition of the solid and liquid excreta (the manure) in relation to that of the food consumed.

From the results of these investigations the excretions from the lungs and the cutaneous glands have also been estimated.

To provide data as to the amount of food, or its several constituents, consumed in relation to a given live weight of animal within a given time, and to produce a given amount of increase in live weight, several hundred animals, oxen, sheep, and pigs, have been experimented upon. Selected lots of animals were supplied for many weeks, or for months, consecutively, with weighed quantities of foods, selected and allotted according to the special point under inquiry. The composition of the foods was determined by analysis. The weights of the animals were taken at the commencement, at intervals during the progress, and at the conclusion of the experiment.

The amount and relative development of the different organs and parts were determined in two calves, two heifers, fourteen bullocks, one lamb, two hundred and forty-nine sheep, and fifty-nine pigs.

The percentage of water, mineral matter, fat, and nitrogenous substance were determined in certain separated parts, and in the entire bodies of ten animals, namely: one calf, two oxen, one lamb, four sheep, and two pigs. Complete analyses of the ashes, respectively, of the entire carcasses of the mixed internal and other "offal" parts, and of the entire bodies of each of these ten animals, have also been made.

From the data provided, as just described, as to the chemical composition of the different descriptions of animal in different conditions, as to age and fatness, the composition of the increase whilst fattening, and the relation of the constituents stored up in increase to those consumed in food, have been estimated.

The amount and composition of the manure in relation to that of the food consumed has been determined by experiments on oxen, sheep, and pigs.

Independently of the points of inquiry above enumerated, the results obtained have supplied data for the discussion of the characteristic demands of the animal body, for nitrogenous or

non-nitrogenous constituents of food in the exercise of muscular power; the sources in the food of the fat produced in the animal body, and the comparative characters of animal and vegetable food in human dietaries.

An extensive investigation has also been made on the application of town sewage to different crops, but especially to grass, the amount and composition of both the sewage and of the produce grown were determined, and in special cases the composition of the land drainage waters was determined. Comparative experiments were also made on the feeding qualities of the differently grown produce; and the amount of increase yielded by oxen, and the amount and composition of the milk yielded by cows, were determined. In this inquiry part of the analytical work was performed at Rothamsted, but most of it by Professor Way in London.

As a matter of special interest to British farmers, the chemistry of the malting process, the loss of food constituents during its progress, and the comparative feeding value of barley and malt, have been investigated.

Since 1847, nearly one hundred reports of experiments and dissertations on the results obtained have been published in agricultural and scientific periodicals and journals of societies; many of them, from the full discussion of details and the comparisons made with other experiments, have taken the form of monographs that must take a high rank in the literature of the relations of science to agriculture.

Many of the results are, however, still unpublished.

From the pains-taking character of the valuable investigations he has provided for, at the expense of so much time and money, Dr. Lawes is truly entitled to the hearty thanks of all farmers; and Rothamsted, in its past and its prospective future, must be looked upon as an appropriate monument to the life-work of a great public benefactor.

The great value of Dr. Lawes' contributions to both the theory and practice of agriculture has been repeatedly recognized.

In 1854 he was elected a Fellow of the Royal Society, and in 1867 the Royal medal was awarded to Drs. Lawes and Gilbert

jointly, by the council of the Society. The Imperial Agricultural Society of Russia presented a gold medal to Dr. Lawes; and last year the Emperor of Germany, by imperial decree, awarded to Drs. Lawes and Gilbert jointly the gold medal of merit of agriculture.

Since the above was written we learn that Dr. Lawes has just been created a baronet as a national recognition of his eminent services.

M. MILES,
Director of Experiments at Houghton Farm.

EXPERIMENTS WITH WHEAT AT ROTHAMSTED BY SIR JOHN BENNET LAWES, LL. D., F. R. S.

Through the kindness of Mr. Lawson Valentine, I am permitted to place before those of his countrymen who are interested in agriculture some account of the Rothamsted experiments.

If I began at the commencement, I should have to go back to a period when the late Baron Liebig, one of the most brilliantly gifted men who has lived in my time, was unknown as an agricultural writer. If I attempted to give a general review of what has been done here, I should unduly trespass on the space so kindly placed at my disposal, and probably at the end only leave the minds of my readers in a state of confusion.

I fear that when strangers pay me a visit, it often happens that after spending a few hours walking over the farm, and a few minutes in the laboratory, where possibly the only fact they remember is that the shelves hold from thirty thousand to forty thousand bottles containing the products of the crops, animals, and soils, instead of their having acquired any clear views upon the subject of agriculture, they find themselves in a state of complete bewilderment; and their thoughts, if expressed aloud, would probably be something to this effect: "It is all very wonderful, but I don't know whether I am very much wiser." If they happen to be farmers, and have retained a distinct impression upon some one point, which they determine to put into practice on their own

farms, it is quite as likely as not that the result will be unsatisfactory.

The aim and object of experiments is not how to produce a crop in the cheapest possible manner, but to ascertain what are the circumstances under which crops grow.

What is the law of growth, is the guiding principle which should be ever present in the mind of the investigator.

When experiments are first commenced, as I believe is the case at the present time in many places in the States, the results are so little encouraging that we might be almost led to suppose that the growth of crops was the result of chance, rather than of fixed, and what will some day be found to be beautiful and simple laws.

It may be said that field experiments have not arrived at a state to be of much value until, apart from the fluctuation of seasons, or in other words, the influence of temperature, moisture, and such agencies upon the growth of crops as we have no power to control, the effect of each special manure upon the future crop can be predicted, not only for one, but for several years in advance.

At Rothamsted, in some of our crops we may be said to have arrived at this state; in others we are very far from having obtained the knowledge necessary for such a forecast.

After this short prelude I would now assume, what frequently happens, that one of your countrymen has come down to see my farm with the object of getting as much and as clear information with regard to our experiments as time will permit; and that I propose to accompany him through the fields, and draw his attention to some points of special interest, with such comments as may help him to understand them better, and thus forward the purpose for which he came.

Let us now go into Broadbalk field, which has been under permanent wheat for forty years, and look at the crop as it appears at the present time, the latter part of April.

The surface soil is heavy, and after a shower of rain so sticky that we can carry on no operations except in dry weather. There is an abundance of flint stones on the surface, and in the yellow clay which forms the subsoil; the farmers describe the latter as

"raw," and not liking to see it upon the surface they avoid deep ploughing. About twelve feet below the surface we come to the chalk. Our ancestors were very fond of chalking their land. The process they pursued was to sink holes in the fields, and draw the chalk up to the surface by means of buckets. There are several depressions in Broadbalk field, the result of old chalk pits which have been filled up; the soil has therefore been chalked, and the value of this chalk will be seen further on.

Two bushels of seed per acre were drilled over the whole field during the last week in October; the winter has been mild, and the spring dry and warm; the crops are unusually forward and promising. We are now standing before the plot of permanently unmanured land. Here nothing has been added to the soil for forty years. There is a very good, even plant from one end to the other, but the color is a sickly green. There is no disease, any more than there is in a man who has recovered from some sickness which has left him in a very weak condition; all that is required to restore health and vigor in either case is plenty of good food.

In the early period of our experiments, this unmanured crop, on two or three occasions, exceeded twenty bushels per acre; latterly the produce has not averaged more than ten bushels per acre, but this has been under a series of exceptionally bad seasons. It would surely not be a very bold assertion if I were to say that this experiment would never again yield a crop of twenty bushels, and, further, that there would be a slow and steady decline of the present produce.

Let us now see what is to be learnt from analyses of the soil and drainage water.

In the soil, almost the whole of the nitrogen is found in combination with carbon, in an insoluble form. In the drainage water, on the other hand, nearly all of the nitrogen is in the form of nitric acid, combined with lime, and is soluble. When the crop is in full growth the drainage water contains no nitric acid; at all other times it contains more or less.

We estimate that about thirty pounds of nitrogen, as nitric acid, are liberated each year, of which the crop takes about

twenty pounds and the drainage water ten pounds. There are several thousand pounds of nitrogen in combination with carbon still in the soil; it is evident, however, that the wheat crop cannot make use of this source of fertility, but is entirely dependent upon the limited amount of nitric acid available each year, of which the larger portion is liberated from the soil.

Analyses of the soil, made from time to time, show that there has been a loss of some thousands of pounds of carbon and some hundreds of pounds of nitrogen; but while the total stock has diminished, the relative proportion of these two substances each to the other remains the same.

The nitrifying organism oxidates the carbon into carbonic acid, and the nitrogen into nitric acid.

Surely any stranger would say these next two lands must be also unmanured; at all events, the eye can distinguish no difference between this and the last experiment as regards the crops.

This is quite true, and they will continue very much alike until the harvest. To this plot we apply every year a very large dressing of potash, soda, magnesia and superphosphate of lime — that is to say, everything that is required to grow a large crop, but one; and as the result of this large application of mineral manures, there will be hardly any difference between this and the unmanured crop at the time of harvest.

What I have said with regard to the decline of nitrogen in the soil, and the composition of the drainage water upon the unmanured land, applies also to this experiment. At present there is upon the unmanured land sufficient mineral matter to use up all the nitric acid liberated; and as the addition of the mineral manures does not appear to add to the nitric acid liberated, these important ingredients remain dormant in the soil. At some distant day, however, we may expect that the difference in the produce between this and the unmanured plot will be greater than it is at present.

These next three experimental plots receive exactly the same application of minerals as the last, but with the addition respectively of two hundred pounds, four hundred pounds and six hundred pounds of salts of ammonia. Here we bid good-by to the

sickly green, and see for the first time the hue of health. But here, even at this early period of the season, there is a marked difference in the color and vigor of growth in the three experiments. Although the amount of nitrogen applied in the two hundred pounds of salts of ammonia is probably more than what the whole crop will contain at the harvest, and there has been no rainfall since the salts were applied sufficient to wash any quantity of nitric acid from the soil, still it is evident that this crop, while it will be far superior to that on the mineral manured plot, its neighbor on one side, will be equally inferior to the plot which received four hundred pounds of ammonia of salts, its neighbor on the other side.

There is probably no wheat crop in England, at the present time, which could surpass in beauty or luxuriance the crop which received the six hundred pounds of ammonia salts. A practical farmer, on seeing such luxuriant growth so early in the season, would say, "I fear if you have a wet summer it will go down." This is exactly what under such circumstances would be sure to happen, and I may add that, with our uncertain climate, it supplies one with the strongest arguments against farming too highly.

A few days after the salts of ammonia are placed upon the land, nitrification takes place, and the amount of nitric acid found in the drainage water is in proportion to the amount of ammonia applied. The wheat takes up all that it can, but of course its daily powers of growth are limited; and when once the nitric acid gets into the drainage water, it is past recall.

In the next experiment we have an application of ready-formed nitric acid as nitrate of soda, containing an equivalent amount of nitrogen to that in the four hundred pounds of salts of ammonia applied to the middle plot of the last three. If, as sometimes happens, a heavy fall of rain takes place immediately after the application of the salts of ammonia and nitrate, the latter will appear in large quantities in the drainage water; but neither ammonia nor nitrate will appear where the ammonia salts were applied, as in their case a few days are required to accomplish the process of nitrification.

When we consider that the application of a few pounds of ni-

trogen in nitrate of soda to a soil which contains several thousand pounds of nitrogen in its organic form is capable of increasing the crop from fourteen to forty, or even fifty, bushels per acre, I think it must be apparent to all that we have very convincing evidence of nitric acid being the main source of the nitrogen in plants.

In the next two experiments we have crops which neither show the beautiful green of health, the result of the ammonia salts in combination with the minerals, nor the sickly green which was the result when the minerals were applied alone; in the latter case the green was blended with yellow, while here it appears to be mixed with blue. These plots receive nitrate of soda or salts of ammonia respectively without minerals. The color is due to the large accumulation of nitrogenous matter in the leaf; carbon formation being retarded for want of the necessary minerals.

The crops upon these experiments have been hitherto much larger than those where minerals alone have been used, but the time must come when the case will be reversed, and for this reason, that while the atmosphere and rain do furnish a certain amount of nitrogen to the one plot, unless microscopic dust should come to our aid, I fear we must trust to the store in the soil for a supply of the necessary alkalies and phosphates to the others.

The next four experiments are manured with the same amount of ammonia and phosphates; the first plot without the addition of any alkaline salts, while of the other three, in addition to the ammonia and phosphates, one receives soda, one potash, and one magnesia.

In the earliest days of our experiments, when, in accordance with the teaching of the highest authorities, the view was held that the atmosphere would supply all the nitrogen required for the growth of a crop, if all the minerals were applied to the soil, these four plots received a very considerable amount of potash, which has been a source of trouble to us ever since, as it is quite certain that applications of potash, made between the years 1844 and 1849, have had a distinct influence upon the thirty succeeding crops. From this cause the results from this series of experiments have been very much alike; the plot where ammonia and

phosphates are applied is alone beginning to show marked decline, and it will be followed by a decline in the two plots which receive respectively the soda and magnesia. No rapid change can, however, be looked for.

These experiments were commenced many years before the special properties of nitric acid were known. In those early times, salts of ammonia were always sown with the mineral manures in the autumn; while of late years all the ammonia has been sown in the spring, except in the case of the experiment to which we are now coming.

Here we have two parallel plots which receive exactly the same minerals and the same ammonia, but with this difference: that in one case the ammonia is applied in the month of October, in the other in March.

In estimating what will be the result of the two applications in this experiment, the character of the weather has to be taken into account. This necessarily introduces an element of uncertainty into our forecast; but at all events we can say with tolerable certainty that if the rainfall between November and March does not wash too much nitric acid out of the soil, the autumn application will give the better crop; and that the contrary will be the case if the rainfall is in excess. In confirmation of this I may say that in one or two of the last very wet years we estimate that almost the whole of the one hundred pounds of ammonia applied in the autumn, at a cost of nearly one shilling per pound, was washed out of the soil!

At the present time, although the winter has not been very wet, and for the last three months the weather has been unusally dry, the color of the wheat is much paler than it is where the ammonia was sown in the spring; and on the lower part of the field, where there is a considerable fall in the land, the plant is yellow, proving that there the washing of nitric acid has been greater.

I would draw special attention to the next two plots, numbered 17 and 18, which are not only extremely interesting, but also tell their story in the very clearest way.

This experiment was arranged about thirty years ago, to meet

one of the numerous objections which the late Baron Liebig raised against one of the most important of our conclusions.

The minerals and ammonia are here applied alternately to the two plots, or in other words, one year plot 17 receives ammonia only, and plot 18 minerals only; the following year plot 17 receives the minerals, and plot 18 the ammonia, and so on. Observe what a contrast the two crops present at the present moment! A practiced eye will see that the wheat which this year received the minerals, plot 18, has only the slightest possible more shade of green than the unmanured wheat, or than that which received minerals alone for thirty-nine years. The wheat which has received the ammonia this year, plot 17, on the other hand, looks as luxuriant as any crop in the field. I may say with absolute certainty that this result will be reversed next year, when the crop which now looks so luxuriant from the application of ammonia will be transferred to plot 18, which, though now so pale and sickly, will next year be flourishing, while plot 17 languishes. The proof of this is that on the average of the first twenty-six years of the experiment we find:

	Bushels.
On the plot which received ammonia	29¼
On the plot which received the minerals	14¾

What then has become of the ammonia applied during the last year, and all the previous alternate years, as certainly not one-half ever entered into the crop?

The answer is to be found in the composition of the drainage water.

In all the experiments hitherto recorded, the amount of substance supplied in the manures, and taken up in the crop, would not amount to more than from two to four per cent. of the whole produce. The carbon, which constitutes fully one-half of the whole crop, may be said with almost certainty to be derived from the atmosphere.

It is true that the soil has lost carbon as well as nitrogen; but the relation of the carbon to the nitrogen in the soil is about ten per cent. of carbon to one per cent. of nitrogen; while in the crop it is about fifty per cent. of carbon to one per cent. of nitrogen.

In those experiments where larger amounts of carbon have been

removed in the increased crops grown by liberal supplies of manures containing no carbon, the amount of both carbon and nitrogen in the soil does not appear to have been at all reduced.

We have, however, a still stronger proof that the amount of carbon fixed by vegetation is quite independent of any supply furnished to the soil in the experiment to which we are now coming, where fourteen tons of dung per acre have been applied every year since 1844.

Here the amount of carbon placed on the land every year in the dung is greater than that which is removed in the crop, and at the same time the amount of carbon removed in the crop is not so large as it is in several of the experiments where no carbon is used.

The soil in this experiment is distinguished from that in all other parts of the field by the fact of its containing largely increased amounts of both carbon and nitrogen. On the unmanured and mineral-manured land we have a loss of both these substances. On the plot which receives a large amount of minerals and nitrogen there appears to be neither loss nor gain, the residue of the large crops in the form of stubble and roots apparently making up the loss by drainage; but in the dunged land the increase of carbon and nitrogen is due to the unused dung, and possibly, if no further application were made, half a century of cropping would not be sufficient to remove the large accumulation of fertility due to this source.

The wheat, as it appears now, is by no means luxuriant; the leaves are neither so broad nor of so bright a green as those in several of the other experiments; still the crop not only always yields well at the time of harvest, but also never falls down from over-luxuriance.

The drainage water from this experiment — owing to the large accumulation of vegetable matter which holds the rain like a sponge — is very small, and the amount of nitric acid found in the water is also small; the increased amount of carbonic acid which must fill all the pores of the soil evidently prevents the process of nitrification.

Nothing can show more completely the difference between

nitrogen in combination with carbon, and nitrogen in combination with hydrogen and oxygen, than the crops grown by the application of dung, and those grown by the salts of ammonia or nitrate of soda. The dunged land contains from one thousand pounds to two thousand pounds more nitrogen per acre than any other experiment in the field; and yet the comparatively small amount applied in the salts every year produces greater growth in the crops.

The question as to whether plants do or do not take up organic nitrogen is not yet finally settled, but it is quite evident from the above results that a very small amount of nitrogen as nitric acid will fix more carbon in a crop than a very large amount of organic nitrogen.

I have been somewhat minute in my remarks with regard to these experiments, because the wheat crop is one of the most, if not the most, important that is grown; and secondly, because this is the only field under experiment where the composition of the drainage water and of the soil has been investigated.

An opinion is often expressed by writers in the States to the effect that the influence of nitrogen on growth can hardly be so great, as no adequate supply of this substance exists. This is true enough even if applied to so small an area as Great Britain; what must therefore be the feeling of those who farm in the boundless regions of the States?

There is much that might be said on this point, but as it would involve opening an entirely new question, quite distinct from the purport of our investigations, it will be better to put aside for the moment all questions relating to the *cost* of the various substances used in our experiments, and merely to look upon them as the means by which we ascertain the law of the growth of a wheat crop, under ordinary circumstances.

I have said that the crops grown upon the unmanured land and upon that receiving mineral manures alone do not much differ, the produce of both being from twelve to fourteen bushels per acre. The reason why the application of mineral manure produces no sensible increase in the crop is this, that the minerals in the *soil* are sufficient to meet the moderate requirements of the

plant, limited as they are by the small amount of nitrogen liberated.

This is a most important fact, as we thus get a clear explanation of the varying action of mineral manures throughout the world. It is evident that their influence will in a great measure depend upon the amount of nitric acid liberated, and the larger the amount the greater will be the influence of the mineral manures.

In the progressive increase of the produce which takes place where we add increasing amounts of salts of ammonia or nitrate of soda, we are merely showing what might be naturally taking place in much more fertile soils; though it is not probable that the richest soil in the world could, for any length of time, liberate as much nitric acid as we apply in some of our experiments, and consequently, no soil has yielded continuously such large crops.

The main distinction between the nitrogen liberated from ordinary soils and that contained in the sulphate of ammonia is that one goes on continuously,— increasing in amount with the temperature, provided that the soil is moist enough,— while the salts are applied at once; and in the course of a few days sulphate and nitrate of lime are formed, both of which compounds are liable to be washed out of the soil.

Organic nitrogen, ammonia, nitric acid, and again organic nitrogen, forms the continuously recurring circle of evolution.

The more active the vegetation and the longer it remains in the ground, the less will be the loss of nitric acid; mineral manures do not therefore *prevent* the exhaustion of the soil, but they enable the plant to utilize the nitrogen which would otherwise be lost; this is very clearly shown by the fact that very large amounts of nitric acid pass away in the drainage water from the plot where we apply nitrate and ammonia every year without minerals.

If we went into the next field where barley has been grown continuously for thirty years in succession, I should, if time permitted, be able to show how very great is the affinity between the wheat and barley crops, as regards the circumstances of their

growth; but as time presses, I should prefer stopping a few minutes before an acre of ground which has been under wheat and fallow experiment for thirty years.

Tull, in ancient times, and the Rev. Mr. Smith, in my own time, have both advocated the beneficial effect of a summer fallow, as a means of restoring fertility to the land. "Tillage is as good as manure," is a very old saying.

Land left without a crop, and constantly stirred during the summer months, would possess all the properties favorable for nitrification. It is quite evident, therefore, that upon soils containing much organic nitrogen the amount of nitric acid produced would be very large; indeed, in the earlier years of this experiment I have reason to think that more than one hundred pounds of nitrogen were converted into nitric acid during the year of fallow, and the period during which the wheat was growing.

In the favorable season of 1854, the wheat which followed the summer fallow yielded forty-two bushels per acre. The winter and spring of the year 1853–54 were remarkably dry, and consequently the nitric acid liberated during the period of fallow was not washed out of the soil. With this fact before us, there is no difficulty in accounting either for the large crop of 1854, or for the great decline which has since taken place in the yield of wheat upon this land, where the last crop only amounted to thirteen bushels per acre.

Although under a favorable season for nitrification, and a dry winter and spring, the produce may be considerably increased, it may be predicted with tolerable certainty that no crops will ever again be grown on this land as large as those of the early years of the experiment, unless we bring upon the soil substances which contain nitrogen.

With the evidence furnished by the permanent wheat in the next field, it may also be said that the application of mineral manures will not be attended with success upon this land.

Last year samples of the soil of the fallow land were analyzed both for nitric acid and for the nitrogen in combination with carbon. The results of these analyses show a considerable decline

in the fertility of the soil; thus confirming what was already indicated by the great decline in the produce.

We have thus far arrived at the fact that by nitrification the insoluble organic nitrogen is converted into soluble nitrate of lime.

Lime must be present to unite with the acid, and potash and phosphoric acid must also be present, or the vegetation will be unable to take up the nitric acid as quickly as it is formed.

In these facts we get an explanation of the uncertainty which frequently attends the application of various manures; we learn why lime is beneficial on one soil, and not on another; why one experimenter gets such great results from the application of phosphate or potash, while others are comparatively unsuccessful.

Some soils are so full of organic and so deficient in mineral matters that the water passing through them contains no nitric acid whatever; when such is the case, the application of lime and minerals, or even of clay, acts like a charm,— a fact which has, with some, given rise to the belief that, by means of the minerals, the plants obtain their nitrogen from the atmosphere.

Except at Rothamsted I am not at present aware of any attempt having been made to measure the loss of the nitrogen stored up in the soil; as far as our evidence goes, the indications are in the direction of the loss of soil nitrogen being equal to that taken off in the crops.

It would be a great mistake to suppose that all plants have the same capacity for taking food out of a soil. Very early in our experiments we noticed that plants of the same botanical order resembled each other in their chemical properties, as also in their powers of assimilating nourishment.

The gramineous plants — which include what constitutes the chief food supply of the human race in all parts of the world — appear to possess a greater power of extracting nourishment from a poor soil than any other class of plants.

In our permanently unmanured rotation, barley and wheat continue to produce fair crops where turnips, beans, and even red clover in alternation with them, either do not grow at all, or give an exceedingly scanty produce.

I think it may be desirable here to give a few words of explanation with regard to the large increase in the growth of turnips as the result of an application of soluble phosphate of lime to land otherwise wholly unmanured; the more as the somewhat similar effect of the application of plaster to clover, has led to the opinion that these plants derive their nitrogen from the atmosphere.

In our rotation experiment every fourth year for thirty-two years, turnips have been sown upon land entirely unmanured, and upon land supplied with superphosphate of lime. In one case the turnips have become weeds, incapable of forming a bulb; in the other the crop amounts to about nine tons per acre.

We have every reason to suppose that quite as much nitrogen is converted into nitric acid upon the unmanured land as upon the land which receives the phosphate, but the turnips sown in the summer, on the unmanured land, have not sufficient vigor to spread their roots in the soil in search of the phosphate existing there; consequently they cannot take up the nitrate, which is therefore washed away during the winter.

The case is very different with the turnips sown on the plot which receives an application of phosphate, as, finding this food available, they proceed to develop a vigorous plant, which not only takes up the nitrate, but also converts it into an insoluble form.

The phosphate, therefore, in this case has acted as a conserver of nitrogen.

Quite apart from the question as to whether an artificial application of nitrogen will pay or not, we see how that substance, in its various forms of organic nitrogen, ammonia, and nitric acid, becomes a most important element when we attempt to explain the ordinary processes of agriculture and their influence upon the fertility and exhaustion of soils.

The experiments of corn, now in progress on Mr. Valentine's farm, will be watched by me with the greatest possible interest; and I have myself little doubt that, when the irregularities due to the differences in soil have been eliminated, the same regularity in the action of the various manures and the same power of fore-

casting their effect for some period in advance — which I claim to be our position as regards the wheat experiments at Rothamsted — will be apparent in a still more striking manner in the field devoted to the giant among the cereal grain crops in the United States.

ON THE AMOUNT AND COMPOSITION OF THE RAIN AND DRAINAGE WATERS, COLLECTED AT ROTHAMSTED.

BY J. B. LAWES, LL. D., F. R. S., F. C. S.; J. H. GILBERT, PH. D., F. R. S., F. C. S.; AND R. WARINGTON, F. C. S.[1]

SUMMARY OF RESULTS.

AMOUNT AND COMPOSITION OF RAINFALL.

1. The rainfall at Rothamsted during twenty-eight years, 1853–80, has varied from eighteen and fifty-six one-hundredths inches in 1864 to thirty-six and four one-hundredths inches in 1879, the average being twenty-eight and thirty one-hundredths inches.

2. Determinations of ammonia at Rothamsted in the rain of 1853–54 showed an average of seventy-four one-hundredths nitrogen per million; determinations by Way (1855 and 1856), eighty-eight one-hundredths and one and eighteen one-hundredths nitrogen per million. Frankland's determinations in 1869–70 showed thirty-seven one-hundredths per million. Determinations made quite recently at Rothamsted confirm Frankland's results; the earlier figures are probably too high.

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[1] As the paper under this title (Journal of the Royal Agricultural Society, 1881, parts 1 and 2, 1882, part 1, 150 pages), containing an exhaustive discussion of the investigations relating to rain and drainage waters that have been in progress at Rothamsted since 1853, will have a limited circulation in this country, the summary of results and conclusions, which are of striking interest, are reproduced here as a suitable supplement to Dr. Lawes' paper on wheat experiments.

The intimate relations of the two papers will be seen from the fact that the drainage waters from manured land referred to in this article were from the experimental wheat plots described by Dr. Lawes. M. M.

3. The total nitrogen supplied in the annual rainfall at Rothamsted is probably four to five pounds per acre, excluding the condensation by the soil. The mean of continental estimates, including localities near towns, is ten and twenty-three one hundredths pounds per acre.

4. The chlorine in Rothamsted rain has averaged thirteen and forty-two one-hundredths pounds, equal to twenty-two and twelve one-hundredths pounds pure common salt per acre per annum. At Cirencester the amount is equal to fifty-three and sixty-six one-hundredths pounds of salt.

DRAINAGE WATER FROM LAND UNMANURED AND UNCROPPED.

5. The annual drainage during ten years, 1870–71 to 1879–80, from three drain-gauges, of heavy loam with clay subsoil in natural condition of consolidation, twenty, forty, and sixty inches deep, has varied from four and ninety-seven one-hundredths to twenty-five and eighty-six one-hundredths inches, mean thirteen and forty-nine one-hundredths inches, or twenty-one and seven-tenths, sixty and five tenths, and forty-three and four-tenth per cent. of the rainfall.

6. The evaporation from the bare soil averaged five and fifty-eight one hundredths inches from October to March, and eleven and ninety-seven one-hundredths inches from April to September; total seventeen and fifty-five one-hundredths inches. The evaporation during the summer and whole year is a fairly constant quantity with great differences of rainfall.

7. The evaporation from a cropped soil is far more considerable, and very variable.

8. Nitrates are largely produced in soil by the action of a living ferment on the nitrogenous organic matter and ammonia; nitrification takes place chiefly in the upper layer of soil, and is very greatly favored by the presence of water and by summer temperature. The waters from the drain gauges are richest in nitrates in late summer and autumn, and poorest in spring.

9. The quantity of nitrogen as nitrates annually removed in the drainage waters (October to September) has varied from thirty-one and seventy-eight one-hundredths to fifty-seven and ninety-

five one-hundredths pounds per acre; the average of four years, 1877–78 to 1880–81, is forty-one and eighty-one one-hundredths pounds, equal to two hundred and sixty-eight pounds of ordinary nitrate of sodium per acre.

10. The amount of chlorine in the drain-gauges is approximately the same as in the rainfall.

11. The advantage of a bare fallow is largely due to the production of nitrates in the soil; in fields in bare fallow at Rothamsted, fifty pounds per acre of nitrogen as nitrates have been found at the end of summer in the first twenty inches. If followed by a wet winter, bare fallow must result in a serious loss of soil nitrogen.

DRAINAGE WATERS FROM LAND MANURED AND CROPPED WITH WHEAT.

12. The drainage water passing through a natural soil is of two kinds: 1. Surface water passing downwards through open channels. 2. The discharge from the saturated soil. The first is much weaker than the second, save when soluble manures have been recently applied to the surface.

13. The annual average loss of lime and magnesia by drainage from the continuously unmanured wheat-plot is apparently about two hundred and twenty-three pounds; where four hundred pounds ammonium salts are applied, the loss is three hundred and eighty-nine pounds; where sulphates of sodium, potassium, and magnesium are also added, the loss is still greater; the two last named salts exerting most influence. Nitrate of sodium does not apparently increase the loss of lime.

14. The chlorine and soda applied in manure are retained to only a small extent, either by the wheat-crop or the soil; sulphuric acid is retained to a somewhat greater extent.

Phosphoric acid and potash are very perfectly retained, the part unassimilated by the crop being held by the soil, chiefly in the upper layers; this is especially true of phosphoric acid.

15. The quantity of nitric acid lost by drainage from unmanured land cropped with wheat is far smaller than that lost by uncropped land, the crop assimilating the nitrates formed.

In summer the drainage waters contain little or no nitrates; after harvest nitrates reappear, and are found in the waters through the winter.

16. When ammonium salts are applied to land, the ammonia is at first retained by the soil, while the sulphuric acid or chlorine passes into the drainage water, chiefly as calcium salts.

17. The conversion of the ammonia into nitric acid commences almost immediately after the application of ammonium-salts to wet soil; the conversion is apparently complete in a few weeks, if wet weather follows. The nitrogen of rape-cake is more slowly converted into nitric acid.

18. The drainage waters from plots manured with ammonium-salts are richest in nitrates shortly after their application. With four hundred pounds of ammonium-salts per acre, applied in March, the April drainage waters have averaged six and seven-tenths pounds of nitrogen (equal to forty-two and eight-tenths pounds nitrate of sodium) per inch of drainage.

19. With an equivalent amount of nitrogen applied at the same time as nitrate of sodium, the April drainage waters have contained eleven and eight-tenths pounds of nitrogen (equal to seventy-five and six-tenths pounds nitrate of sodium) per inch of drainage.

20. In summer the drainage waters from plots receiving two hundred to four hundred pounds ammonium-salts contain little or no nitrates if phosphates and potash have been supplied; but with an excess of ammonia, or a deficiency of ash-constituents, the nitrates produced are imperfectly assimilated by the crop, and appear in the drainage water.

21. In winter time the drainage waters from all the plots tend to approximate in composition.

QUANTITY OF NITROGEN LOST PER ACRE BY DRAINAGE.

22. Taking the average of two seasons of excessive drainage, but for which we have analyses of every running from the drain-pipes in the experimental wheat field, it was estimated that from fifteen to seventeen pounds of nitrogen were lost per acre per

annum by drainage from plots which had received no nitrogenous manure for many years.

Nearly the whole of this loss occurred during the period of the year when there was either no crop on the ground, or but little growth.

23. With forty-four, eighty-eight, and one hundred and thirty-two pounds nitrogen applied as ammonium-salts in the spring, the estimated loss by drainage was twenty-two, twenty-eight, and forty-two pounds of nitrogen per acre per annum. With eighty-eight pounds of nitrogen applied as ammonium-salts, without or with different mineral manures, the loss ranged from twenty-eight pounds with the most liberal mineral manure, to fifty pounds without any mineral manure for many years.

The loss was the greater, the greater the deficiency of available potash and phosphoric acid in the soil. With nitrate of sodium, spring sown, the loss was greater than with ammonium-salts; but it was greater still with ammonium-salts, autumn sown.

24. Reckoned over thirty years, with much better average seasons, the estimated loss by drainage was from ten to twelve pounds of nitrogen per acre per annum, without any nitrogenous manure. With forty-three, eighty-six, and one hundred and twenty-nine pounds nitrogen applied as ammonium-salts, in most years autumn sown, the estimated loss was nineteen, thirty one, and forty-two and four-tenths pounds; and with eighty-six pounds nitrogen applied, without, or with, different mineral manure, the estimated loss ranged from thirty one pounds with the most liberal mineral manure, to forty-three and two-tenths pounds with the ammonium-salts continuously used alone.

25. Reckoned over thirty years, not quite one-third of the nitrogen supplied by manure was recovered in the *increase* of crop under favorable conditions as to mineral manure and growth, and very much less when there was a deficiency of potash and phosphoric acid, and defective growth accordingly.

26. With four hundred pounds of ammonium-salts, and the most liberal mineral manure, there was the maximum amount of nitrogen recovered in the crop, and the minimum amount in the drainage; but with the ammonium-salts used alone, there was the

minimum amount in the crop, and the maximum amount in the drainage.

27. Only with the smallest quantity of ammonia applied was the amount of nitrogen in the total crop and drainage together more than was supplied in the manure; in all other cases there was a greater or less deficiency. Besides the nitrogen supplied in manure (which was not entirely recovered in the crop and drainage), it is estimated that on the average about thirty pounds would be contributed per acre per annum by the soil and by rain, and condensation of combined nitrogen from the atmosphere; perhaps more by the soil in the earlier than in the later years.

28. Analyses of the soils of the different plots, made at different periods, show that the amount of nitrogen was considerably reduced where no nitrogenous manure was applied; but where nitrogenous manures were applied, the amount remained stationary, or slightly increased or diminished, according to the condition of the soil as to mineral constituents, and to the amount of growth. In fact, the difference in the amount of nitrogen in the soils of the plots with ammonia applied, compared with that where none was applied, bore a close relation to the amount of growth, and was mainly due to the residue of the crops.

29. The amount of nitrogen in the crops, and estimated to be lost in the drainage, together with the excess in the soil where it was supplied in manure, is not sufficient to account for the whole of that so applied, and that available from other sources; but there is evidence that, reckoned according to the composition of the collected drainage waters, the estimates of the loss of nitrogen by drainage are too low.

30. When farm-yard manure is largely used, there is sometimes considerable loss of nitrogen, due to the decomposition of nitrogenous organic matter, and the evolution of free nitrogen; or when the soil is saturated with water, or imperfectly aerated, there may be destruction of nitric acid, and evolution of free nitrogen. It is believed that, under the condition of the artificially manured plots in the Experimental Wheat-field, there would be very little loss from either of these sources, and that the loss is almost exclusively by drainage.

31. In ordinary agriculture, with a larger proportion of the nitrogen supplied in farm-yard manure or animal manures, with ammonia or nitrate used in smaller quantities, and with a variety of crops covering the ground with vegetation for longer periods of the year, the loss of nitrogen per acre by drainage will be considerably less than it has been shown to be in the Experimental Wheat-field.

PRACTICAL CONCLUSIONS.

1. Most of the nitrogen of farm-crops is derived from the nitric acid of nitrates within the soil.

2. The nitric acid in the soil is produced from the nitrogenous compounds of the soil itself, from the nitrogenous organic matter of animal and vegetable manures, from the ammonia of artificial manures, and from the ammonia supplied by rain and condensation from the atmosphere. A very small quantity of ready-formed nitric acid is supplied by rain and condensation from the atmosphere. Nitric acid is also provided by the direct application of nitrates.

3. The ammonia of ammonium-salts is rapidly converted into nitric acid in the soil, as also is the nitrogen of some organic matters, such as urine.

The nitrogen of rape-cake, that of the less soluble parts of farm-yard manure, of stubble, of roots, etc., is much more gradually converted into nitric acid, and it may require many years for the conversion of the whole of it. The nitrogenous compounds of the soil itself are very slowly converted into nitric acid, but the soil yields a certain quantity every year.

4. When there is no vegetation, and there is drainage from the land, or even when there is vegetation, and excess of drainage, nitric acid is lost by drainage.

5. As, in case of permanent grass-land, the soil is always covered with vegetation, there will be with it the maximum amount of nitric acid utilized by the crop, and the minimum amount lost by drainage. Land without vegetation will be subject to the maximum loss of nitric acid by drainage.

6. The power of a growing crop to utilize the nitric acid in the soil is much diminished if there be a deficiency of available min-

eral constituents, and especially of potash and phosphoric acid, within reach of the roots.

7. As the various crops grown upon a farm differ very much as to the period of the year of their most active growth, the length of time they remain on the land, and the character and the range of their roots, their capacity for taking up nitric acid from the soil is very different.

8. The recognized exhausting character of corn crops is largely due to the limited season of their active growth, and the long period during which the land is bare, or there is little growth, and so subject to loss of nitric acid by drainage.

9. When salts of ammonium, or nitrates, are applied as manure, the chief, if not the only, unexhausted residue of nitrogen left within the soil available for future crops is that in the increased roots and other residues of the crops; and this is only slowly available.

10. When oil-cakes or other foods are consumed by stock, the formation of nitric acid from the manure produced is slower, but continues longer, than when salts of ammonium are used. When there is a liberal use of animal manures, an accumulation of nitrogenous and mineral matter takes place in the soil, and such accumulation is known under the term "condition."

Under such circumstances the fertility of the soil is maintained, or it may even be considerably increased.

THE GRANGE.

By Hon. D. Y. Aiken, of South Carolina.

In its incipiency, the Grange movement was not popular in many sections of the United States, even among farmers, and notably was this the case in the south. For a few years succeeding the war that people were greatly harassed by secret political associations, which had a tendency to widen the breach, if any existed, between the races. The Grange being secret and confined to one class of citizens, was accused of introducing political machinations, that augured trouble to the community; hence many citi-

zens, not a few of whom were farmers, discouraged its introduction. Other farmers south, as well as elsewhere in the United States, condemned the Grange as a woman's rights institution, because women were received as voting members into the order, while thousands everywhere, with significant emphasis exclaimed, "What do farmers want with women in a secret society?" And yet still others of peculiar religious idiosynerasies (and not Romanists either), set their faces against any and all secret associations of any character or for any purpose whatsoever.

There was little difficulty in removing most of these objections when an opportunity was afforded to explain the purposes of the order, for although upon the surface there appeared obstacles in the path of the organizer, there was apparent to every observant man a readiness, a willingness, yea, an anxiety in the agricultural mind of the country for organization of some sort. The Grange literally "filled the bill," for its constitution positively inhibited the discussion of political or religious subjects during its sessions; it did not ask the farmer to *send* his wife or daughter to the Grange, but invited, yes, urged him to bring them, and thus protect himself against evil and vicious associations, for where woman graces an assemblage with her presence, virtue presides; and our esoteric cavilers were easily silenced by the assurance that a semblance of secrecy was necessary to get farmers in and keep non-farmers out; but it was a mere semblance, for the secrecy did not extend beyond "a ceremony of initiation, which binds us in mutual fraternity as with a band of iron, but although its influence is so powerful, its application is as gentle as that of the silken thread that binds a wreath of flowers."

With these cobwebs swept aside, it was amazing how rapidly the scales fell from the eyes of our inquisitors. From the Potomac to the Rio Grande, from the Golden Gate to the Hudson, and even on into the pineries of Maine, and across the border, throughout the length and breadth of the Dominion of Canada, farmers fairly leaped, as with one preconcerted bound, to the upholding of the Grange standard.

I have already confessed my inability to define the term "agricultural education;" with humility I make the further confession,

as a representative farmer, that an agricultural education is not an accomplishment possessed by the average American farmer, and further that the shrewder, quicker, more crafty, and perhaps better educated classes of American citizens are neither professional nor practical farmers. And where farming and planting is the avocation of a majority of our citizens, I know it is almost impossible to say who is or even who is not "interested in agricultural pursuits," to use the language of the Grange constitution. Hence, with the public mind ready and waiting to seize upon some form of organization, as it was in 1873 and 1874, and with the hurly-burly rush of this majority class into an association admitting all who were "interested in agricultural pursuits," the wonder to my mind is, that the Grange was not perverted from its legitimate purposes by the admission of those whose entrance to the fold, if not sought for sinister ends, was certainly not intended for the aggrandizement of the farmer or his vocation. Frequently had it to bear the odium of other men's sins, when denied the opportunity of correcting a misguided public opinion. For instance, there existed in Illinois and Wisconsin or other sections of the Northwest at sundry times, agricultural clubs, composed of men who could not or would not join the Grange, whose province seemed to be to wage war against transportation companies. Anathemas thick and heavy were hurled upon the Grange for making this attack, whereas every Patron of Husbandry knew that the Grange, as such, was not a participant in the fight from beginning to end. To say that Patrons did not sympathize with and rejoice at the result of this contest would be admitting their complaint of grievances as ill founded; but as an organization, they could not have participated, for such a course would have been in violation of their organic law.

The keel of the Grange ship was well laid. Its majestic sides were ribbed by the mechanism of profound thought. Its spars braced by fraternal cords have never been shattered by the fury of the storm. Its sails are still whole, and have been whitened by the friction of popular criticism. Often has it buoyed in turbid waters. Still oftener has it glided gracefully and triumphantly over the billows of prejudice that lashed so furiously

under its bow. To-day it floats in placid waters. Its haven has not yet been reached, nor will it be until every farmer in the land shall have received some of the benefits of its launching.

The harvest of improvement which the American farmers reaped during the prosperous era of the Grange, and which is still ripening in every state of this Union, cannot be limited to a monetary valuation. The social elevation, the moral improvement, and the educational advancement have been beyond comprehension. These three grand purposes are never ignored nor forgotten from the moment the initiate closes behind him the outer door of the Grange hall, until by death or from other causes he dissolves his connection with the Order. Every precept of the Order is elevating and improving. The steps taken by the applicant in his passage through the four degrees that must be conferred upon him before he is acknowledged to be a Patron of Husbandry in good standing — all have this tendency. He who enters the fold must begin with the rudiments of his vocation, and be taught that "he who will not plow by reason of the cold shall beg in the harvest, and have nothing."

Beginning as the humble *Laborer*, who clears the forest, or digs the ditch, or prunes the vine, or turns the sod, he is instructed that all honest labor is honorable, and has the doctrine inculcated on him that he must "drive the very plowshare of thought through the heavy soil of ignorance, and thus prepare the mind for the growth of knowledge and wisdom." Advancing one degree he becomes a *Cultivator*, when his moral nature is educated and refined by repeated assurances, that he who intelligently cultivates the growing plant is brought into close companionship with his Creator. "As we see the beautiful transformation of seeds into attractive plants, we have but another lesson of the wondrous works of God; and if the beauties of this world, when rightly viewed, offer so much of the magnificence of the Creator to charm us here, what must be the sublime grandeur of that Providence above, not made with hands but eternal in the Heavens."

Nor do the lessons of encouragement cease when the *Harvester* is warned, that he must reap for the mind as well as the body, because nature has made nothing in vain. "Wherever she has

made a habitation, she has filled it with inhabitants. On the leaves of plants animals feed, like cattle in our meadows, to whom the dew-drop is an ocean without a shore; the flowers are their elysian fields, decorated with cascades, and flowing with ambrosial fluids." Hence, the *Harvester's* duty is to cultivate an observing mind, for it is delightful to acquire knowledge, and much more so to diffuse it.

But he who harvests must not rest content, until he has by lawful means attained to ownership of the products of his own toil, and thus becomes an *Husbandman;* who, while he was passing practically through the hardships of a farmer's life, and has had them emblematically riveted upon his moral nature, has learned to look with careful solicitude upon children, and encouraged in them a love of rural life by making its labors cheerful, for what children see makes the most lasting impression upon them. "We may tell them of the pleasures and independence of the farmer's life, but if their daily intercourse with us shows it to be tedious, irksome and laborious, without any recreation of body or mind, they will soon lose all interest in it and seek employment elsewhere. We should, therefore, strive to make our homes more attractive. We should adorn our grounds with those natural attractions which God has so profusely spread around us, and especially should we adorn the family circle with the noble traits of a kind disposition, fill its atmosphere with affection, and thus induce children to love it."

But the attractions of a farmer's life are not within the keeping of the *Husbandman* alone. It is not his exclusive prerogative to fashion and shape the character of those plastic youths, who in the future are to wield the destiny of our country. It is the mother's influence that molds the child into noble manhood or bewitching womanhood. Therefore the founders of the Grange, reverently approving the divine injunction, that "it is not good that the man should be alone," introduced woman into the order; but in doing so they required her to enter as a *Maid*, whose station in the order involves the common and lowly duties, preparatory to advancing to all that is most honorable and useful. As *Shepherdess*, she is admonished that it is her sacred duty to re-

claim the wandering, as well as to keep in safety those in the fold. And as *Gleaner* only to glean the good seed, remembering "that our associations in life are the fields in which we reap." And thus when she reaches, through successive degrees, the responsible position of *Matron*, she is solicited "to wear garlands of noble deeds, that shall adorn her life on earth, and be crowns of rejoicing in immortality."

Thus it will be seen, that the Grange is a family where the father's manhood, the mother's devotion, the brother's affection, and the sister's love are so cultivated and developed that they reach out beyond the purview of the family circle, and embrace with fraternal kindness every member of the order, practically obeying the injunction of our Saviour when he said: "The second commandment is like unto it: Thou shalt love thy neighbor as thyself." This is the fellowship to be found in the Grange, and it is the fellowship of the noblest character. Twenty-nine days in the month social differences, moral convictions, or political prejudices may estrange Patrons of Husbandry; but when on that thirtieth day of the month they meet on a common level in the Grange, all these alienating features are dissipated.

Is it any wonder, then, that farmers are attracted to the order? Nay, verily, the greater wonder is, that every farmer in the Union is not an active co-laborer with those of us who are desirous to so impress the advantages of the Grange upon the agricultural mind of the country, that it as an organization may never be defaced by neglect, injured by prejudice, nor destroyed by ignorance, but may go on prospering and to prosper until it shall merit the fulfillment of its own selected motto,

"ESTO PERPETUA."

MORTUARY.

Isaac Adams.
Chauncey Abbott.
Chas. D. Atwood.
Wm. W. Brown.
Timothy Brown.
James Barry.
Fred Bemis.
A. A. Bennett.
H. M. Billings.
C. M. Bliss.
Perry Bostwick.
W. A. Briard.
B. F. Brown.
H. D. Barron.
J. B. Bowen.
Wm. Casar.
C. M. Campbell.
C. B. Chapman.
John Child.
W. W. Church.
D. R. Coit.
B. F. Catlin.
A. J. Craig.
J. B. Cross.
Satterlee Clark.
N. W. Dean.
S. S. Daggett.
E. P. Doty.
J. B. Dousman.
Chas. Durkee.
Andrew Dunn.
M. L. Daggett.
Abel Dunning.
Wm. Dunn.
Sidney Foote.
Jacob Fowle.
Eleazer Grover.
Joseph Goodrick.
G. Goodrich.
Orrin Guernsey.

R. E. Gillett.
H. D. Greenman.
W. H. Hiner.
L. P. Harvey.
B. F. Hopkins.
J. C. Hopkins.
Wheldon Hughes.
John W. Hunt.
E. Hurlbert.
Sol. Hutson.
N. W. Harrington.
Robert Hodge.
A. G. Hanford.
E. H. Janssen.
Paul Juneau.
H. C. Jacobs.
J. C. Johnson.
S. P. Kingsley.
L. F. Kellogg.
L. H. Kellogg.
A. C. Kent.
I. A. Lapham.
James R. Larkin.
Sam'l Morse.
E. F. Mabie.
Jno. B. Macy.
O. F. Maxon.
Alex. McBride.
A. S. McDill.
David McKinna.
Wm. A. Mears.
Ira Miltimore.
G. F. Moseley.
D. S. Morse.
E. D. Masters.
B. F. Nott.
George Paddock.
George Paine.
W. F. Porter.
David Post.

John Reynolds.
M. Reynolds.
Herbert Reed.
J. O. Rizer.
John Rodermund.
N. C. Rowley.
Simon Ruble.
Jas. H. Rogers.
Wm. B. Slaughter.
Jas. Sullivan.
Geo. B Smith.
Frank Scollan.
L. Sexton.
M. Spaulding.
A. C. Shipman.
Kellogg Sexton.
J. M. Sherman.
Joseph Spaulding.
Geo. C. Stevens.
Dr. W. Thompson.
M. J. Thomas.
Ole Thompson.
B. Throop.
Wm. H. True.
James Utter.
L. B. Vilas.
Henry Vilas.
E. B. Wolcott.
J. F. Willard.
Dennis Worthington.
Charles Weed.
C. L. Williams.
Wm. A. White.
A. White.
T. T. Whittlesey.
H. O. Wilson.
N. A. Wright.
Wm. R Warren.
Jas. Webster.
Wm. A. Wheeler.