Transactions of the Wisconsin State Agricultural Society including proceedings of the state agricultural convention, held in February, 1878, and practical and useful papers. Vol. XVI 1877/1878

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, 1878,

AND

PRACTICAL AND USEFUL PAPERS.

VOL. XVI.—1877-78.

PREPARED BY

GEO. E. BRYANT, SECRETARY.

MADISON, WIS.:
DAVID ATWOOD, PRINTER AND STEREOTYPER.
1878.

TABLE OF CONTENTS.

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 three o'clock P. 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 businees, though a less number may adjourn from time to time.

ARTICLE VI.

OF AMENDMENTS.

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

BY-LAWS.

SECTION I.

OF OFFICERS.

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

SECTION II.

OF THE DUTIES AND POWERS OF OFFICERS.

The duties of the President, in addition to those defined by the Constitution and the By-Laws regulating the duties of the permanent committee, shall be as follows, to wit:

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

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

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

The duties of the Secretary, more specifically 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 whos e objects are kindred to ours, whether in this country or 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 coöperate 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 coöperate with the president and special committee of arrangements, for the judicious preparation and management of our state exhibition; and to have the sole supervision and control of the office of entry thereat.

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

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

It shall be the duty of the Treasurer —

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

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

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

SECTION III.

OF MEETINGS.

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

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

SECTION IV.

OF A QUORUM.

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

SECTION V.

OF PERMANENT COMMITTEES.

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

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

The *Finance Committee* shall consist of the President and Treasurer, and it shall be their duty to suggest means for increasing the revenues of the Society.

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

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

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

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

SECTION VI.

OF THE ORDER OF BUSINESS.

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

1. Reading the minutes of the preceding meeting.
2. Reading the minutes and reports of the Standing committees.
3. Reading the minutes and reports of the Finance committee.
4. Report of Auditing committee.
5. Report 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 by any regular meeting of the Executive committee by a vote of eight of the members thereof.

LIFE MEMBERS.

Names.	Residence.	Names.	Residence.
Adams, James.....	Janesville.	Bostwick, J. M.....	Janesville.
Adams, Isaac.....	Cottage Grove.	Bostwick, R. M.....	Janesville.
Adams, L. L.....	Stoners Prairie.	Bonnell, James.....	Milwaukee.
Alexander, O.....	Milwaukee.	Bonnell, Lansing..	Milwaukee.
Allen, J. W.....	Janesville.	Boorse, Henry.....	Granville.
Allen, W. C.....	Delavan.	Boyce, A. A.....	Lodi.
Allen, H. M.....	Evansville.	Boyd, R. B.....	Milwaukee.
Allis, Edward P.....	Milwaukee.	Bowen, J. B.....	Madison.
Angel, R. R.	Janesville.	Bowman, J. M.....	Madison.
Angel, W. H.....	Sun Prairie.	Bradley, C. T.....	Milwaukee.
Atkins, Albert R....	Milwaukee.	Braley, A. B.....	Madison.
Atwood, Charles D..	Madison.	Brazea, Benj.....	Wauwatosa.
Atwood, David.....	Madison.	Brichener, G. H....	Sheboygan F's.
Atwood, Wm. T....	San Francisco.	Briggs, F.....	Buffalo, N. Y.
Atwood, R. J.....	Madison.	Brockway, E. P....	Ripon.
Armour, P. D.....	Milwaukee.	Brodhead, E. H	Milwaukee.
Armstrong, L. G....	Boscobel.	Brown, Jas. J.....	Madison.
Arnold, I. M.....	Milwaukee.	Brown, J. A.....	Milwaukee.
Aspinwall, D. M....	Farmington.	Brown, T.....	Madison.
Ayres, J. W.....	Kenosha.	Bruce, A. T.....	Milwaukee.
		Bryan, John.....	Cross Plains.
Babbitt, Clinton	Beloit.	Bryant, D. D.....	Madison.
Babbitt, D. H.....	Janesville.	Bryant, G. E.....	Madison.
Bacon, J. P.....	Westport.	Bull, Stephen.....	Racine.
Bacon, W. D.....	Waukesha.	Bullard, James.....	Evansville.
Bailey, A. P.....	Oshkosh.	Bump, N. P.....	Janesville.
Bailey, M. T.....	Madison.	Bunker, Geo.....	Madison.
Baker, Robt. H.....	Racine.	Burgess, J. M.....	Janesville.
Barlass, Andrew....	Emerald Grove.	Bush, Samuel	Milwaukee.
Barlass, David.....	Emerald Grove.	Button, Henry H...	Milwaukee.
Barnes, George	Janesville.	Burnham, Miles ...	Danville.
Barrows, E. S.....	Chicago.	Burnham, A., Jr....	Milwaukee.
Barry, James..	Fitchburg.	Burnham, J. L.....	Milwaukee.
Bates, A. C.....	Janesville.	Byrne, John A.....	Madison.
Beecroft, W. G.....	Madison.		
Bement, E.....	Oregon.	Casar, Wm.....	Janesville.
Bemis, Jervis.....	Footville.	Camp, H. H.....	Milwaukee.
Benedict, J. D.....	Bristol.	Capron, Geo.....	Madison.
Benedict, S. G.....	Providence, R.I.	Carleton, W. D.....	Sun Prairie.
Benedict, W. G	Milwaukee.	Carpenter, J. A.....	Waukesha.
Benson, S. W.....	Bloomfield.	Carpenter, J. E.....	Windsor.
Bigelow, F. G.....	Milwaukee.	Carpenter, J. H ..	Madison.
Billings, Earl	Madison.	Carpenter, S. D.....	Madison.
Bird, I. W.....	Jefferson.	Carr, N. B.....	Madison.
Bird, T. E.....	Madison.	Carr, Joseph S.....	Eau Claire.
Bishop, John C.....	Fond du Lac.	Carter, A. M.....	Johnstown.
Black, John.....	Milwaukee.	Carter, Guy.....	Janesville.
Blair, Franklin J...	Milwaukee.	Carver, P. S.....	Delavan.
Blanchard, Willard.	Windsor.	Cary, J.....	Milwaukee.
Bliss, C. M.....	Iowa.	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, N. W.....	Madison.
Chase, Enoch.....	Milwaukee.	Dean, John S.....	Madison.
Chase, H.....	Milwaukee.	De La Maytr, W. A.	Elkhorn.
Cheney, Rufus.....	Whitewater.	Delaplaine, G. P...	Madison.
Children, E.	Lancaster.	DeMor, A. B.....	Milwaukee.
Chipman, A.....	Sun Prairie.	Dewey, Nelson.....	Cassville.
Chipman, C. R.....	Waunakee.	DeWolf, E.....	Fitchburg, Mas
Church, Wm. A.....	Milwaukee.	Devoe, A. B.....	McFarland.
Clapp, G. W.....	Fitchburg.	Dexter, W. W.....	Janesville.
Clark, C. M.....	Whitewater.	Dickerman, I. A...	Verona.
Clark, Lewis	Beloit.	Dickson, J. P.....	Janesville.
Clark, Satterlee.....	Horicon.	Dodge, J. E.....	Lancaster.
Cochrane, John.....	Waupun.	Dodge, H. S.....	Milwaukee.
Cogswell, A. W.....	Brookfield.	Doolittle, W. J.....	Janesville.
Colby, Charles.....	Janesville.	Doris, John.....	Milwaukee.
Coleman, W. W.....	Milwaukee.	Dorn, M M.....	Madison.
Colladay, Wm. M...	Stoughton.	Dousman, T. C.....	Waterville.
Colton, S. B.....	Middleton.	Dow, O. P.....	Palmyra.
Cooper, E. J.....	Mineral Point.	Drakely, S.....	Madison.
Cornell, James.....	Oshkosh.	Drury, E. W.....	Fond du Lac.
Cornwell, H. H.....	Verona.	Dunlap, S.....	Burke.
Corrigan, John.....	Cedarburg.	Dunn, Andrew.....	Portage City.
Cottrill, J. P. C.....	Milwaukee.	Dunn, Wm.....	Madison.
Cottrill, W. H.....	Milwaukee.	Dunning, Abel.....	Madison.
Cottrill, C. M.....	Milwaukee.	Durkee, H.....	Kenosha.
Cory, J.	Footville.	Dutcher, J. A.....	Milwaukee.
Crampton, N. B.....	Madison.	Dwinnell, J. B....	Lodi.
Crawford, E. B.....	Omaha, Neb.		
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.
Cross, J. B.....	Milwaukee.	Elliott, E.....	Lone Rock.
Crossett, B. F.....	Janesville.	Elliott, Jos. T.....	Racine.
Culver, Caleb E.....	Shopiere.	Ellis, J. A.....	Chicago.
Cummings, Wm.....	Fitchburg.	Ellsworth, O.....	Milwaukee.
Curtis, L. S.....	Wauwatosa.	Ellsworth, L.....	Milwaukee.
Curtis, F. C.....	Rocky Run.	Ellsworth, W. J....	Madison.
Curtis, Seymour.....	Fitchburg.	Elmore, A. E.....	Green Bay.
Curtis, D. W.....	Fort Atkinson.	Elmore, R. P.....	Milwaukee.
Curtis, Dexter.....	Madison.	Eldred, John E....	Milwaukee.
Cutting, J. W.....	Harmony.	Elson, Charles.....	Milwaukee.
		Emmons, N. J.....	Milwaukee.
Daggett, M. L.....	Madison.	Enos, Elihu.....	Waukesha.
Dahlman, Anthony..	Milwaukee.	Esterly, Geo. W....	Whitewater.
Dahlman, John.....	Milwaukee.		
Dann, Obed.....	Janesville.	Fairbanks, E.....	St. Johnsb'y, Vt
Danks, E. P.....	Stoughton.	Farwell, L. S.....	Chicago.
Daniells, W. W.....	Madison.	Fenn, G. W.....	Janesville.
Darling, K. A.....	Fond du Lac.	Ferguson, D.....	Milwaukee.
Darwin, A. G.....	Brooklyn, N. Y.	Ferguson, Benj	Fox Lake.
Daubner, Geo. H....	Brookfield Cen.	Fernly, Jno.....	La Grange.
Davidson, Adam.....	Verona.	Field, Martin.....	Mukwanago.
Davis, G. L.....	Milwaukee.	Field, W. W.....	Boscobel.
Davis, John.....	Milwaukee.	Fifield, L.....	Chicago.
Davis, N. P.....	Pierceville.	Fifield, D. E.....	Janesville.
Davis, S. B.....	Milwaukee.	Fifield, E. G.....	Janesville.

Names.	Residence.
Finch, Lorin	Bradford.
Firmin, F. H	Madison.
Fisher, C. C	Center.
Fisher, Elijah	Newark.
Fisher, S. W	Center.
Fisher, Seth	Center.
Fitch, D	Madison.
Fitch, W. F	Madison.
Fitch, W. G	Milwaukee.
Fitzgerald, R. P	Milwaukee.
Fletcher, John	Springfield.
Flint, J. G. Jr	Milwaukee.
Folds, Geo. H	Madison.
Foot, E. A	Kansas.
Foote, Sydney	Madison.
Foote, A. E	Milwaukee.
Fowle, Jacob	Oshkosh.
Fowler, James S	Milwaukee.
Fox, W. H	Fitchburg.
Fratt, N. D	Racine.
Frank, A. S	Madison.
Frank, George R	Boscobel.
Frankfurth, Wm	Milwaukee.
Freeman, C. F	Milwaukee.
Friedman, Ignatius	Milwaukee.
French, Jonathan	Madison.
Fuller, M. E	Madison.
Fuller, F. D	Madison.
Furlong, Thomas T	Chicago.
Furlong, John	Milwaukee.
Gammons, Warren	Middleton.
Gates, D. W. C	Madison.
Gaylord, Aug	New York City.
Gernon, George	Madison.
Gibbs, Chas. R	Whitewater.
Gibert, Thomas	Oregon.
Giles, H. H	Madison.
Gilman, Henry	Stoughton.
Giliett, R. E	Tomah.
Goodenow, H. D	Madison.
Goodrich, Ezra	Milton.
Goodrich, G	Whitesville.
Gould, L. D	Madison.
Grady, F. M	Fitchburg.
Graham, Alexander	Janesville.
Grant, S. B	Milwaukee.
Grant, Albert	Milwaukee.
Graves, R. A	Ripon.
Graves, S. W	Rutland.
Green, Anthony	Milwaukee.
Green, Geo. G	Milwaukee.
Greene, N. S	Milford.
Green, Samuel	Fitchburg.
Greenleaf, E. B	Milwaukee.
Greenman, C. H	Milton.
Greenman, H. D	Milwaukee.
Gregory, J. C	Madison.
Grinnell, J. G	Adams.
Groom, John	Madison.
Grover, E	Madison.
Grubb, W. S	Baraboo.
Guernsey, Orrin	Janesville.
Gurnee, J. D	Madison.
Haight, J. M	Sacramento, Cal
Haight, Nicholas	Madison.
Hall, Augustus	Janesville.
Hallock, Youngs	Middleton.
Hall, H. P	Madison.
Hanchett, A. M	Hanchettville.
Hancock, Brad	Marshall.
Hanks, A. S	Milwaukee.
Hammond, L. M	Janesville.
Hammond, E S	Fond du Lac.
Harrington, N. H	Delavan.
Harris, Jas	Janesville.
Harvey, J. W. H	Madison.
Hasbrouk, W	Eau Claire.
Hastings, S. D	Madison.
Hausmann, Jos	Madison.
Hawes, J. F	Madison.
Hawes, W. N	Verona.
Hayes, A, J	Milwaukee.
Hazelton, Geo. C	Boscobel.
Hazen, Chester	Ladoga.
Helfenstein, J. A	Milwaukee.
Hempstead, H. W	Milwaukee.
Hicks, J. H	Oshkosh.
Hibbard, W. D	Milwaukee.
Hibbard, Wm. B	Milwaukee.
Higbee, A. T	Stoughton.
Hill, H. J	Madison.
Hill, James H	Madison.
Hill, J. W. P	Windsor.
Hill, P. B	Milwaukee.
Hill, Robt	Milwaukee.
Helmer, A. M	Milwaukee.
Hiner, W. H	Fond du Lac.
Hinkley, B. R	Summit.
Hobart, L. J	Milwaukee.
Hodge, Robt	Janesville.
Hodson, C. W	Janesville.
Hœflinger, Carl	Wausau.
Hogan, Gilbert	Janesville.
Hollister, R. M	Janesville.
Holmes, A. M	Milwaukee.
Holt, David	Madison.
Holton, Edward D	Milwaukee.
Hopkins, Bedford B	Milwaukee.
Hopkins, James	Madison.
Hopkins, J. C	Madison.
Hopkins, E. C	Milwaukee.
Hoskins, J. W	Milwaukee.
Hoskins, Alfred	Janesville.
Houston, Peter	Cambria.
Hoyt, J. W	Madison.
Hurlburt, E	Oconomowoc.
Hume, Wm	Oshkosh.
Hutson, J. S	Stoughton.

Names.	Residence.
Hyde, Edwin	Milwaukee.
Ilsley, Chas. F	Milwaukee.
Imbusch, J. H.	Milwaukee.
Ingham, A. C.	New York.
Jacobs, Wm.	Madison.
Jackman, Hiram	Chicago.
Jeffrey, Geo.	Smithville.
Jenks, S. R	Madison.
Jenkins, J. C.	Janesville.
Jerdee, L. P.	Madison.
Jerdee, M. P.	Madison.
Johnston, Jno. Jr.,	Madison.
Johnson, M. B	Janesville.
Johnson, Joseph	Hartland.
Johnson, John	Milwaukee.
Johnston, Hugh L.	Milwaukee.
Johnston, John	Milwaukee.
Jones, C. H	Sun Prairie.
Jones, John N.	Madison.
Juneau, Paul	Juneau.
Janssen, E. H	Mequon.
Kellogg, L. F.	Madison.
Kellogg, Geo. J.	Janesville.
Keiwert, 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, S. 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.	Milwaukee.
Knapp, J. G.	Tampa, Florida
Koss, Rudolph	Milwaukee.
Ladd, M. L.	Sugar Creek.
Lamb, F. J.	Madison.
Landauer, Max	Milwaukee.
Lapham, I. A.	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.
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. H	Janesville.
Lloyd, Lewis	Cambria.
Lockwood, John	Milwaukee.
Ludington, H.	Milwaukee.
Ludington, James.	Milwaukee.
Ludlow, A.	Monroe.
Lucy, O. K.	Columbus.
Lyman, H.	Dakotah.
Lynch, T. M	Janesville.
Lynde, W. P.	Milwaukee.
Lysaght, Wm.	Bellville.
Main, Alex H.	Madison.
Mann, I. L.	Fitchburg.
Mann, J. E.	Sun Prairie.
Mann, Henry	Milwaukee.
Mann, Curtis	Oconomowoc.
Macy, J. B.	Fond du Lac.
Manwaring, Wm.	Black Earth.
Marshal, Samuel	Milwaukee.
Martin, A. C	Ashton.
Martin, C. L.	Janesville.
Martin, Nathaniel.	Monroe.
Martin, S. W.	Madison.
Mason, George A.	Madison.
Masters, E. D.	Jefferson.
Mathews, A. K.	Milwaukee.
Matteson, Clinton.	Rosendale.
Matts, I. H. B.	Verona.
Maxson, O. F.	Waukegan.
May, A. C.	Milwaukee.
Mayhew, T. J.	Milwaukee.
Mayhew, J. L.	Milwaukee.
McCarty, F. D	Fond du Lac.
McConnell, T. J.	Madison.
McCormick, J. G.	Madison.
McCullaugh, And.	Emerald Grove.
McDonald, A.	Alloa.
McDougal, Geo. W.	Madison.
McDowell, H. C.	Oconomowoc.
McGeoch, P.	Milwaukee.
McKenna, Martin	Madison.
McKenna, David	Madison.
McLaren, Wm. P.	Milwaukee.
McNiel, David	Stoughton.
McGregor, Alex.	Nepeuskum.
McPherson, J. P.	Springdale.
Merrill, Alf.	Madison.
Merrill, S. S.	Milwaukee.
Miller, John	Madison.
Mills, Simeon	Madison.
Miltmore, Ira	Chicago.
Miner, Cyrus	Janesville.
Miner, John B.	Milwaukee.

Names.	Residence.	Names.	Residence.
Mitchell, Alex.....	Milwaukee.	Pond, Samuel A...	Albany.
Mitchell, J. L.....	Milwaukee.	Porter, Wm. F....	Maine.
Morden, E	Madison.	Porter, Wm. H....	Marshall.
Morehouse, L. H...	Milwaukee.	Porter, G. E.....	Eau Claire.
Morse, Samuel.....	Milwaukee.	Post, David.....	Milwaukee.
Moseley, J. E.....	Madison.	Power, G. D.....	Milwaukee.
Mosher, J. C.....	Lodi.	Powers, D. J.....	Chicago.
Moxley, A. R.....	Madison.	Powers, W. J.....	Black Earth.
Mullen, James.....	Milwaukee.	Pratt, E. E.....	Chicago.
Murray, George....	Racine.	Pres. St.Peter's Val. Farmers' Club...	Springfield.
Nash, C. D.....	Milwaukee.	Pritchard, P. M....	Fitchburg.
Nazro, John.....	Milwaukee.	Proudfit, Andrew..	Madison.
Needham, J. P. ...	Wauwatosa.	Rawson, C. A.....	Madison.
Newcomb, S. B.....	Cold Spring.	Ray, Charles.....	Milwaukee.
Newton, Ephriam..	Oregon.	Raymond, S. O....	Geneva.
Newton, I. S.....	East Middleton.	Riordan, Charles..	Oshkosh.
Nicholas, L. T.....	Janesville.	Reed, Herbert.....	Arena.
Norris, C. W.....	Milwaukee.	Reed, Harrison....	Jack'nville,Fla.
Norton, J. B.....	Madison.	Ressigue, A. C....	Janesville.
Nott, F. B.....	Oregon.	Reynolds, M.....	Madison.
Nowell, W. A.....	Milwaukee.	Reynolds, John....	Madison.
Ober, R. P.....	Milwaukee.	Reynolds, Thomas.	Madison.
Ogilvie, Robert.....	Madison.	Reynolds, John ...	Kenosha.
Oliver, Joseph B...	Milwaukee.	Rexford, J. D....	Jrnesville.
Olney, C. W.....	La Cygne, Kan.	Rice, E. M.....	Whitewater.
Orr, G. H.....	Verona.	Richards, Richard.	Racine.
Ott, Geo. V.....	Madison.	Richardson, D....	Middleton.
Page, H. M.....	Madison.	Richardson, James.	Buffalo, N. Y.
Palmer, H. L.....	Milwaukee.	Richardson, R. J..	Janesville.
Palmer, J. Y.....	Oregon.	Richardson, H....	Janesville.
Palmer, O. M.....	Oregon.	Richmond, Amaz'h	Whitewater.
Palmer Henry	Oregon.	Riebsam, C. R. ...	Madison.
Park, John W.....	Vernon.	Robbins, J.....	Vienna.
Park, Wm. J.....	Madison.	Robbins, J. V.....	New York.
Parker, C. H.....	Beloit.	Roddis, R.	Milwaukee.
Parmley, Ira.....	Center.	Rodgers, Lawrence.	Westport.
Parsons, P. B.....	Madison.	Roe, J. P.....	Franklin.
Partridge, J. S.....	Whitewater.	Rogers, C. H.....	Milwaukee.
Patten, L. F.....	Janesville.	Rodgers, D. J.....	Milwaukee.
Patton, Jas. E.....	Milwaukee.	Rogers, J. S.....	Burlington.
Paut, Geo. H.....	Milwaukee.	Rogers, Anson.....	Janesville.
Payne, Wm.....	Janesville.	Rogers, H. S.....	Milwaukee.
Payne, H. C.....	Milwaukee.	Ross, James.....	Botany Bay.
Peffer, G. P.....	Pewaukee.	Rowe, Richard W.	Madison.
Pember, R. T.....	Janesville.	Rowe, W. E.....	Mazomanie.
Perkins, P. M.....	Burlington.	Ruble, Simon	Beloit,
Perrine, L. W.....	Janesville.	Ruggles, J. D.....	San Francisco.
Perry, B F.....	Madison.	Russell, Harvey...	Milwaukee.
Pfister, Guido.....	Milwaukee.	Ryder, James K...	Waterloo.
Phelps, A. Warren..	Milwaukee.	Sage, E. C.....	New Lisbon.
Pierce, C. L.....	Milwaukee.	Salisbury, R. W...	Fitchburg.
Pilgrim, D. T.....	West Granville.	Salisbury, D. F....	Fitchburg.
Pinney, S. U.....	Madison.	Sanderson, Edw...	Milwaukee.
Pickney, B.....	Fond du Lac.	Sanderson, R. B...	Madison.
Plankington, John.	Milwaukee.	Sarles, John H....	Boscobel.
Plumb, J. C.....	Milton.	Schute, Charles....	Milwaukee.
Plumb, T. D.....	Madison.	Schutt, U.....	Janesville.
Plummer, B. C.....	Wausau.	Scolland, Frank...	Madison.

Name.	Residence.	Name.	Residence.
Scott, S. B.....	Milwaukee.	Tallman, W. H....	Janesville.
Seville, James.....	Merrimac.	Taylor, E	Mukwanago.
Sexton, Kellogg	Milwaukee.	Taylor, W. R.....	Cottage Grove.
Sexton, W. F.....	Milwaukee.	Tenney, H. A.....	Madison.
Simmons, C. J.....	Monroe.	Tenney, D. K.....	Chicago.
Sinclair, Jeff	Milwaukee.	Tenney, Samuel...	Durham Hill.
Sharp, J. W.....	Iowa.	Terry, A. H	Milwaukee.
Shaw, J. B	Milwaukee.	Terwilliger, Jas ...	Syene.
Sheldon, A. H.....	Janesville.	Thorson, John	Milwaukee,
Sheldon, D. G	Madison.	Tibbits, Geo. M....	Milwaukee.
Sheldon, S. L.....	Madison.	Tierney, K.....	California.
Shepherd, C.....	Milwaukee.	Thompson. W. H..	Chicago,
Sherman, Amaziah .	La Prairie.	Thompson, Dr. W..	Madison.
Sherman, George ...	La Prairie.	Thorp, J. G	Eau Claire.
Sherman, J. M.....	Burnett.	Todd, J. G	Janesville.
Sherwood, J. C.....	Dartford.	Tolford, J. W.....	Neillsville.
Shipman, S. V.....	Chicago.	Torgerson, Lars ...	Madison.
Shipman, A. C	Sun Prairie.	Torrey, R. D	Oshkosh.
Skelley, Charles....	Janesville.	Townley, John	Moundville.
Skinner, George J..	Sioux Falls, D.T	Treat, R. B..	Chicago.
Skinner, E. W.....	Turner, D. T.	Treat, George E...	Milwaukee.
Slaughter, G. H	Middleton.	True, W. H.....	Fitchburg.
Slaughter, W. B	Middleton.	Twining, M. S.....	Magnolia.
Sloan, I. C.	Madison.		
Slocum, G. A.....	Chicago.	Utter, Jas.....	Oregon.
Smith, Winfield	Milwaukee.		
Smith, Angus.....	Milwaukee.	Van Brunt, W. A..	Horicon.
Smith, Adam.....	Burke.	Van Cott, Albert B.	Chicago.
Smith, George B....	Madison.	Van Etta, Jacob. ..	Madison.
Smith, J. B	Milwaukee.	Van Kirk, N.....	Milwaukee.
Smith, S. W.....	Janesville.	Van Norstrand, A.H	Green Bay.
Smith, H. L.....	Janesville.	Van Schaick, I. W.	Milwaukee.
Smith, M. C.....	Janesville.	Van Slyke, N. B ..	Madison.
Smith, S. B.....	Vernon.	Vaughan, O. A	Lodi.
Smith, J. Maurice ..	Chicago.	Viall, Andrus	Madison.
Snell, H.....	Madison.	Vilas, Chas. H.....	Cleveland, O.
Spaulding, William.	Janesville.	Vilas, L B.	Madison.
Spaulding, Joseph .	Janesville.	Vilas, L. M.....	Eau Claire.
Spencer, James C...	Milwaukee.	Vilas, Wm. F.....	Madison.
Spencer, R. C.....	Milwaukee.		
Squier, Thos. H.....	Waterloo.		
Stannard, A. C	Milton.	Wackerhagen, E...	Racine.
Stark, Chas. A	Milwaukee.	Wait, J. B.....	Waitsville.
Steele, Chester.....	Milwaukee.	Warren, J. H.....	Albany.
Stephenson, Isaac ..	Marinette.	Warren, W. R.....	Madison.
Stevens, Geo. C.....	Milwaukee.	Webster, James ...	Danville.
Stevens, J. T	Madison.	Webster, Martin...	Fox Lake.
Steensland, H	Madison.	Webb, James A....	Janesville.
Stewart, C. K.....	Danville.	Welch, W.	Madison.
Stewart, G. H	Colorado Spr'sC	Wells, Daniel L...	Milwaukee.
Stilson, Eli.....	Oshkosh.	Werner, John	Sauk.
St. John, J. W.....	Janesville.	West, A. H.....	Madison.
Stockman, John....	Milton.	West, Henry	Madison.
Stone, G.....	Beloit.	West, S. C.....	Milwaukee.
Storm, Wm	Madison.	West, Henry M....	Milwaukee.
Stowe, La Fayette..	Sun Prairie.	Whaling, J. M.....	Milwaukee.
Street, Richard.....	Waukesha.	Wheeler, Geo. F...	Waupun.
Sullivan, James	Burke.	Wheeler, Guy	La Prairie.
Sutherland, C..	Seyene.	Wheeler, W. A	Middleton.
Swain, Wm. W.....	Madison.	Wheeler, L. A.....	Milwaukee.

Name.	Residence.	Name.	Residence.
Wheelock, W. G.	Janesville.	Williams, S. G.	Janesville.
Wheelwright, J.	Middleton.	Wilson, Wm.	Westport.
White, A.	Verona.	Wilson, Zebina.	Palmyra.
Whiting, W. F.	Milwaukee.	Wood, J. W.	Baraboo.
Whitney, W. F.	Milwaukee.	Woolcott, E. B.	Milwaukee.
Wicks, Thomas.	Milwaukee.	Wooley, J. T.	Milwaukee.
Wight, O. W.	Milwaukee.	Wootton, Robert.	Madison.
Wightman, H.	Black Earth.	Worden, Ed.	Madison.
Wilcox, C. T.	Janesville.	Worthington, B. M.	Madison.
Wilkins, A. W.	Milwaukee.	Worthington, D.	Chicago.
Willey, O. S.	Benton Harbor, Mich.	Worthington, Geo.	Milwaukee.
Williams, C. L.	Madison.	Wright, D. H.	Madison.
Williams, C. H.	Baraboo.	Wright, Geo.	Mt. Horeb.
Williams, D.	Darien.	Wright, J. S.	Emerald Grove.
Williams, Daniel.	Madison.	Wright, Josiah S.	Janesville.
Williams, Daniel.	Summit.	Wylie, Geo. W.	Elkhorn.
Williams, G. G.	Whitewater.	Young, J. E.	Janesville.
Williams, J. P.	Janesville.	Zwietush, Otto	Milwaukee.
Williams, Randall.	Janesville.		
Williams, S. B.	Madison.		

OFFICERS OF THE SOCIETY.

1877.

PRESIDENT.

ELI STILSON, OSHKOSH.

VICE PRESIDENTS.

1st Cong. Dist.—N. D. FRATT, RACINE.
2d " GEO. E. BRYANT, MADISON.
3d " J. H. WARREN, ALBANY.
4th " JOHN L. MITCHELL, MILWAUKEE.
5th " SATTERLEE CLARK, HORICAN.
6th " R. D. TORREY, OSHKOSH.
7th " J. G. THORP, EAU CLAIRE.
8th " JOHN T. KINGSTON, NECEDAH.

SECRETARY.

W. W. FIELD, BOSCOBEL,
(OFFICE AT MADISON.)

TREASURER.

F. J. BLAIR, MILWAUKEE.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

DR. C. L. MARTIN, JANESVILLE. GEO. H. DAUBNER, BROOKFIELD.
A. A. BOYCE, LODI. E. J. COOPER, MINERAL POINT.
H. C. MCDOWELL, OCONOMOWOC. ISAAC STEVENSON, MARINETTE.
CHESTER HAZEN, LADOGA.

TRANSACTIONS.

ANNUAL REPORT.

To His Excellency, WILLIAM E. SMITH,

Governor of Wisconsin.

SIR:—In your annual message, delivered to the legislature January 10th, 1878, you were pleased to use the following words:

"We have been accustomed to regard Wisconsin as only a growing state. It is more than that—it is a great state. Its financial, educational, penal and charitable affairs involve the annual collection and disbursement of millions of dollars of money; the support and care of thousands of schools; the detection and punishment of a long list of criminals; and the furnishing of food, shelter, clothing, instruction and medical attendance for the destitute, the unfortunate and the afflicted.

"These are indeed noble themes upon which to dwell, calculated to arouse and maintain a well founded state pride, and indicative of a healthy, vigorous and self-perpetuating civilization. Contemplating them, we should not forget, however, that it is to the productive industries, to the *agriculturist*, the manufacturer and the miner, their allies and assistants, that we are most largely indebted for what we are, and that our principal reliance under God is upon them for continued prosperity and development as a state. Whatever tends, therefore, to the enlargement of these industries and to the protection of the persons engaged in them should receive encouragement and support.

"*Agriculture* is, and for many years must continue to be, the *most important industry* of the state, not only as furnishing employment to the *greatest* number of individuals, and utilizing in the aggregate the largest amount of capital, but upon its success de-

pends very largely the success of all other industries. Whatever, therefore, the state can do in disseminating information in regard to the results of improved processes in agriculture, and to the relative profits derived from the different branches of this industry, it is not only proper, but important that it should do. The State Agricultural Society was organized to assist in the accomplishment of these purposes, and has rendered most efficient service in this direction."

And Daniel Webster said truthfully:

"Agriculture feeds us, to a great extent it clothes us; without it, we could not have manufactures, we should not have commerce; these all stand together, but they stand like pillars in a cluster, the largest in the centre, and that largest is *agriculture*."

The State Agricultural Society, keeping steadily in view the sentiments so truthfully uttered, is striving, as best it can, to advance the agricultural and other interests of the state. It points with pride to the scores of thoroughbred studs, herds and flocks that are now bred and reared in our state; believing that its annual fairs have done much to encourage the breeding of the *best* stock; the profit of thorough breeding is already being realized, not only horses, cattle, sheep and swine, Wisconsin bred, are finding markets on the *old* side of the Atlantic; but butter and cheese made from cows that feed in our dales, and drink from our rivulets, are wafted by the white wings of commerce to Albion Isle, and are found upon the tables of the people of "Ayr," "Jersey," and "Devonshire."

Fifty-five county and district societies have filed their reports in pursuance of law, in this office. All show evidence of thrift and advancement.

Our annual conventions have become very interesting to the people, and the February meeting was largely attended; a summary of its doings will be found in the accompanying pages of this volume, together with the transactions of the Board and Society up to that time; also reports of treasurer, superintendents, and a list of premiums awarded in 1877, most of which has been done under the supervision of our long tried and faithful secretary, Hon. W. W. Field, and president, Hon. Eli Stilson.

For the Executive Board,

GEO. E. BRYANT,

Secretary.

PROCEEDINGS.

EXECUTIVE BOARD MEETINGS.

OFFICE OE THE SOCIETY,
MYERS HOUSE, *Janesville, Sept.* 10, 1877.

In accordance with the requirements of the by-laws of the Wisconsin State Agricultural Society, the executive board met at the the Myers House, in the city of Janesville, at 7:30 P. M., Sept. 10, 1877.

Present—President Stilson, Vice Presidents Fratt, Bryant, Warren, Clark and Torrey, Treasurer Blair, and Messrs. McDowell, Boyce, Daubner, Hazen and Secretary Field.

President Stilson in the chair. The president called to order, and stated that the board was convened for the purpose of taking such action as might be deemed important relative to the annual exhibition.

Remarks were made by Secretary Field, and by several of the superintendents, to the effect that more space would be required in some of the departments, especially additional stalls and pens in the cattle and swine departments.

On motion, Dr. C. L. Martin was empowered to construct all needed stalls, pens, etc., required by superintendents of departments, and also to build a fence, gates, etc., in front of the entrance way to the fair grounds, and that the executive board would pay towards the same twenty dollars.

On motion, adjourned to Tuesday, 7:30 P. M., at which time the board convened, and on each evening during the fair, adjusted all matters of differences which arose, giving such directions as seemed important, and adjourned *sine die*, on Friday evening, after auditing numerous claims and the payment of premiums.

DECEMBER MEETING.

STATE AGRICULTURAL ROOMS,
December 4, 1877.

As provided by the by-laws and pursuant to notice given by the secretary under the constitution, the executive committee met in the rooms of the society at 7: 30 P. M., December 4, 1877. Quorum present.

In the absence of the president and secretary, Vice-President Clark took the chair and Vice-President Bryant was elected secretary *pro tem.*

The object of the meeting was stated by the president to be a settlement with the treasurer, comparing his vouchers with the books of the secretary, and other business of a general nature.

F. J. Blair, the treasurer, presented his report, showing a financial exhibit of the society for the fiscal year ending December 4, 1877, and which may found in the volume of Transactions for 1877–8, under the head of Society Meetings.

A full and complete examination and comparison was made and the report was unanimously approved.

The secretary laid before the board a communication from the secretary of the Rock County Agricultural Society, relative to certain claims of that society, and the State Agricultnral Society voted to settle on the basis proposed — each to withdraw the claim against the other.

Voted, that the thanks of the board be extended to the retiring president, secretary and other members, for the faithful manner in which they had always performed the duties to which they had been assigned.

On motion, the board adjourned *sine die.*

FEBRUARY MEETING.

STATE AGRICULTURAL ROOMS,
MADISON, *February* 4, 1878.

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 A. A. Boyce, Harrison Ludington, Satterlee Clark, R. D. Torrey, J. S. Dore and additional members Eli Stilson, W. W. Field, C. L. Martin, G. H. Daubner, C. Hazen, H. C. McDowell, Treasurer Cyrus Miner and Secretary Geo. E. Bryant.

President N. D. Fratt in the chair.

Reports of superintendents were read to the board.

By vote, W. W. Field was appointed a delegate to represent this society in the National Agricultural Convention to be held at Washington, February 19, 1878.

Ex-President Eli Stilson offered the following resolution:

Resolved, That this society require the fixing of the grounds, including buildings, pens, stalls and other fixtures, and an ample supply of water for the state fair, free of charge to this society, and free of any extra condition of admitting the members of the local society, except on usual terms and rates.

Which was unanimously adopted.

Adjourned till 9 o'clock, A. M., Tuesday.

TUESDAY, *February* 5, 9 A. M.

Voted, that the chair appoint a committee of five to locate the fair for 1878.

Chair appointed as such committee, H. Ludington, Satterlee Clark, Cyrus Miner, A. A. Boyce and Eli Stilson.

Satterlee Clark, Harrison Ludington and H. C. McDowell were elected anditing committee.

Voted, that the fair be held from the 9th to 13th of September, 1878.

Voted, that the premium for Devons be for best exhibition, not less than five head, and that no person take more than one premium: 1st premium, $60; 2d, $40; 3d, $25. Galloways, best exhibition, not less than five head, $40. Holstein, same as Galloways.

Voted, that the general regulations be changed so that there be a superintendent of grounds.

Voted, that the herd books of the several breeds of cattle shall be the evidence of purity of blood.

Voted, that in the class for field machinery, and articles for agri-

cultural purposes, the committee of review consist of one competent person.

Voted, that in the class for roadsters, the premium be reduced to the same amount as in other classes for horses.

On motion, adjourned *sine die.*

MADISON, WIS., *March* 1, 1878.

To GEO. E. BRYANT, *Sec'y Wisconsin State Agricultural Society:*

I am directed by the committee appointed in February to locate the state fair for the year 1878, to inform you that the same is located at the Society's grounds in Madison.

Your obedient servant, HARRISON LUDINGTON, *Chairman.*

SOCIETY MEETINGS.

ELECTION OF OFFICERS.

JANESVILLE, *September* 13, 1877.

In response to requirements of the constitution, and of due notice by the secretary, the life members of the Wisconsin State Agricultural Society convened in the court house at 8 o'clock P. M., to elect officers for the ensuing fiscal year. President Stilson in the chair.

The president stated that the society was convened for the purpose of electing officers for 1878, and other constitutional work. He also made brief remarks, declining to be a candidate for president again, and stated that he was authorized to say that the present secretary, W. W. Field, and treasurer, F. J. Blair, would not be candidates for renomination for their respective offices.

Secretary Field read the constitutional amendment, which was submitted at the previous annual meeting.

Mr. C. L. Martin moved that a committee of nine be appointed to recommend candidates for the offices for 1878, one to be appointed by the president from the state at large, and one to be named from each congressional district by the life members present from each such district. Adopted.

The following committee was appointed:

State at large, J. P. C. Cottrill, Milwaukee.
1st district, C. R. Gibbs, Whitewater.
2d district, Wm. T. Leitch, Madison.
3d district, W. W. Field, Boscobel.

4th district, F. J. Blair, Milwaukee.
5th district, R. T. Graves, Ripon.
6th district, R. D. Torrey, Oshkosh.
7th district, John S. Dore, Neillsville.
8th district, not represented.

The committee retired, and after a lengthy consideration of the subject, submitted the following report:

For President — N. D. Fratt, Racine.

Vice Presidents —

1st district, J. S. Partridge, Whitewater.
2d district, A. A. Boyce, Lodi.
3d district, J. H. Warren, Albany.
4th district, H arrison Ludington, Milwaukee.
5th district, Satterlee Clark, Horicon.
6th district, R. D. Torrey, Oshkosh.
7th district, John S. Dore, Neillsville.
8th district, John T. Kingston, Necedah.

For Secretary — Geo. E. Bryant, Madison.

For Treasurer — Cyrus Miner, Janesville.

Additional members of the Executive Committee — C. L. Martin, Janesville; H. C. McDowell, Oconomowoc; H. P. Hall, Madison; George H. Daubner, Brookfield; W. W. Field, Boscobel; Isaac Stevenson, Marinette; Chester Hazen, Ladoga.

Mr. Martin moved that the report of the committee be accepted and adopted. Which motion prevailed, and the president declared the nominees unanimously elected for the respective positions named, for the year 1878.

On motion of Mr. Martin, a vote of thanks was tendered to the retiring officers for the efficiency with which they had discharged the duties of their respective offices.

On motion, the society adjourned *sine die*.

ANNUAL MEETING.

STATE AGRICULTURAL ROOMS,
MADISON, *December* 5, 1877.

As required by the constitution, the Wisconsin State Agricultural Society met in their rooms in the capitol at 3 o'clock P. M. Vice President Clark in the chair. Quorum present. President Clark stated that the object of the meeting was for the general transaction of business as authorized by the constitution.

F. J. Blair, the treasurer, presented his annual report, showing the financial condition of the society for the fiscal year ending December 4, 1877, bearving the approval of the executive board.

STATE AGRICULTURAL ROOMS,
MADISON, December 4, 1877.

REPORT OF THE TREASURER *of the Wisconsin State Agricultural Society, For the year ending December* 4, 1877. *Approved by the auditing committee and a committee appointed by the society, and the vouchers deposited in the office of the Secretary.*

The treasurer of the Wisconsin State Agricultural Society would respectfully report to the executive board, the financial transactions of the society for the year ending December 4, 1877, as follows:

RECEIPTS.

Cash on hand December 5, 1876	$93 19	
Cash of state treasurer	2,000 00	
Gate fees	10,428 83	
Entry fees and life memberships	1,498 75	
Ground rent	1,602 80	
Advertising	90 00	
Milwaukee Chamber of Commerce, special premium on wheat	50 00	
Plankinton & Armour, Milwaukee, special premium on swine	25 00	
Layton & Co., Milwaukee, special premium on swine	25 00	
James Vick, Rochester, N. Y., special floral premium	40 00	
Borrowed money	4,500 00	
Land sold	100 00	
Rent of fair ground	70 00	
Discount on Jones & McLaughlin's bill	73	
		$20,524 30

EXPENDITURES.

For premiums	$10,561 00	
Office expenses, including postage, express and freight charges	272 20	
Executive board expenses	218 00	
Printing and advertising	338 50	
Superintendents, marshal and assistants	1,169 85	
Clerks	323 55	
Police, labor and watchmen	464 07	
Livery and omnibus hire	106 50	
Hay and straw	721 53	
Music	150 00	
Salary of secretary, including $500 on salary of 1876.	2,300 00	
Dinner tickets	339 80	
Medals	57 22	
Borrowed money paid	1,067 00	
Silver plate	363 00	
Miscellaneous, including orders Nos. 2, 4, 28, 50, 56, 156, 164, 184, 189, 190, 192, 194, 238, 239, 269, 270, 281, 296, 297, 310, 336, 338, 342, 348, 356, 364, 376, 445, 447, 449, 450, 452, 458, 462, 465, 468, 534, 557, 558	911 06	
		$19,363 28
Balance on hand		$1,161 02

Respectfully submitted, F. J. BLAIR, *Treasurer.*

On motion, a committee of three was appointed by the chair to examine the treasurer's report, consisting of Simeon Mills, W. T. Leitch and A. J. Ward.

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

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.

SIMEON MILLS,
W. T. LIETCH,
A. J. WARD,
Committee.

Vice President Clark submitted the following amendment to the constitution:

Amend subdivision 1 of article V of the constitution, entitled "Of meetings and elections," so that it shall read as follows: "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 9 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.

On motion, adjourned *sine die*.

WARRANT ACCOUNT OF THE SECTETARY.

Number of orders issued for the year ending December 4, 1877, the amount and object of each, and the name of the person to whom issued.

No.	*To whom and for what issued.*	*Amount.*
1	H. C. McDowell, expense account	$7 00
2	W. M. Ormond, general work	36 60
3	Peter Michel, premium	4 00
4	S. S. Hills, use of scales	15 00
5	R. S. Houston, premium	10 00
6	Eli Stilson, services and expenses	22 50
7	L. Zeimer, premium	6 00
8	E. W. Keyes, P. M., postage stamps	15 00
9	W. W. Field, salary 4th quarter 1876	500 00
10	J. F. Antisdel, premium	15 00

No.	*To whom and for what issued.*	*Amount.*
11	Geo. E. Bryant, expense account	$2 25
12	P. O. Johnson, premium	5 00
13	D. W. Vail, premium	12 50
14	David Whitehead, premium	9 00
15	H. B. Roberts, premium	7 50
16	Israel B. Cross, premium	5 00
17	A. E. Brown, premium	4 00
18	Wm. Miller, premium	7 50
19	Best, Cheever and Pierce, premium	5 00
20	John H. Paul, premium	38 70
21	John H. Paul, premium	6 30
22	U. S. Ex. Co., charges	4 00
23	E. W. Keyes, P. M., postage stamps	10 00
24	Geo. W. Webber, premiums	100 00
25	C. T. Bradley, premium	42 50
26	J. D. Wood & Co., premium	3 00
27	C. Roys, premium	27 50
28	Blœdel & Mueller, silver badges	16 24
29	O. P. Philbrook, premium	5 00
30	Edward King, premium	37 50
31	J. J. Norton, clerk	7 00
32	J. C. Kiser, premium,	7 50
33	V. Lowe, premium	16 25
34	C. H. Greenman, premium	7 00
35	A. A. Boyce, expense account	10 00
36	Sat. Clark, expense account	10 00
37	N. D. Fratt, expense account	20 30
38	Chester Hazen, expense account	16 00
39	H. C. McDowell, expense account	14 10
40	Ike Stevenson, expense account	26 00
41	Geo. H. Daubner, expense account	17 00
42	C. L. Martin, expense account	12 50
43	Chester Hazen, premium	14 00
44	Smith & Gates, premium	10 00
45	E. W. Keyes, P. M., box rent	2 50
46	Louis Mathers, preminm	10 00
47	Eli Stilson, premium	190 00
48	E. W. Keyes, P. M., postage stamps	15 00
49	Eli Stilson, expense account	13 10
50	C. P. Chapman, abstract	20 00
51	Geo. E. Bryant, expense account	2 50
52	J. F. Antisdel, premium	15 00
53	J. C. Mitchem, premium	22 50
54	Geo. H. Daubner, premium	45 00
55	O. H. Philbrook, premium	5 00
56	Barker and Griffith, commission on loan	105 00
57	Geo. Banning, premium	9 00
58	J. D. Van Doren, premium	43 00
59	Wm. Reed, premium	21 00
60	Gould Nursery Co., premium	14 50
61	Gould Brothers, premium	17 50
62	C. Gibson, premium	27 50
63	Mrs. C. J. Wilkins, premium	12 50
64	P. Putnam, premium	8 00
65	James Lewis, premium	32 00
66	Jonathan Stoddard, premium	52 50
67	C. M. Clark, premium	15 00
68	Wm. Kitzrow, premium	38 25
69	Geo. Harding, premium	55 00
70	Geo. W. Ringrose, premium	17 75
71	Hiram Conover, premium	17 50
72	Mrs. C. H. Root, premium	8 00

No.	*To whom and for what issued.*	*Amount.*
73	Peter Davy, premium	30 00
74	James G. Clark, premium	100 00
75	Leon Howard, premium	4 50
76	Mrs. C. C. Kingsley, premium	8 25
77	Miss Marcella Mitchell, premium	5 00
78	Chas. Lenhardt, premium	3 50
79	Thomas Irving, premium	15 00
80	Mrs. W. P. Stowe, premium	25 00
81	H. L. Hazlett, premium	7 00
82	Geo. E. Bryant, expense account	10 60
83	C. W. Walker, premium	7 50
84	A. H. Hart, premium	11 50
85	E. and J. Smith, premium	70 00
86	J. Johnson, premium	56 00
87	Mrs. E. R. Copeland, premium	12 50
88	S. S. Herrington, premium	5 00
80	Geo. W. Doubleday, premium	87 50
99	W. W. Woodard, premium	5 00
91	L. J. Hook, premium	15 00
92	E. D. Lewis, premium	8 75
93	Isaac Anthony, premium	7 50
94	A. B. Medbury, premium	140 00
95	Richard Richards, premium	65 00
96	J. W. Thomas, premium	5 00
97	Hugh Williams, premium	17 50
98	James McNee, premium	7 50
99	Geo. Lawrence, Jr. premium	60 00
100	Wm. F. Smith, premium	47 50
101	L. K. Cogswell, premium	5 00
102	F. C. Curtis, premium	18 50
103	W. W. Ellsworth, premium	44 00
104	B. B. Olds, premium	4 25
105	H. H. Greenman, premium	5 00
106	Miss Emily T. Smith, premium	24 00
107	J. M. Smith, premium	19 00
108	Geo. P. Peffer, premium	38 75
109	Miss Kate Peffer, premium	13 75
110	James Magson, premium	28 50
111	Jacob Fisk, premium	7 50
112	James Ozanne, premium	11 75
113	H. Rhodes, premium	5 00
114	L. Gridley, premium	6 50
115	L. L. Kellogg, premium	9 00
116	N. N. Palmer, premium	7 00
117	F. S. Lawrence, premium	8 75
118	N. Coffin, premium	8 50
119	P. A. Van Vranken, premium	10 75
120	S. A. Fox, premium	35 00
121	E. S. Hammond, premium	50 00
122	Frank Boyd, premium	50 00
123	Eugene Jeffrey, premium	28 00
124	Michael Ferrick, premium	5 00
125	J. W. Eddy and M. Park, premium	20 00
126	S. B. Smith, premium	12 50
127	E. B. Thomas, premium	12 00
128	H. D. Gardner, premium	10 75
129	D. Huntley, premium	18 50
130	G. Richards, premium	10 00
131	John Jeffers, premium	34 00
132	J. J. Smith & Sons, premium	15 00
133	James Webster, premium	7 50
134	Robert Thomas, premium	12 50

No.	To whom and for what issued.	Amount.
135	John Ballack, premium	7 50
136	H. S. Durand, premium	135 50
137	L. Woodworth, premium	2 50
138	Reuben Strong, premium	5 00
139	Stephen Bull, premium	75 00
140	J. B. Johnson, premium	5 50
141	M. N. Seward, premium	7 50
142	G. Nicholson, premium	5 00
143	E. C. Lewis, premium	197 50
144	J. C. Corrigan, premium	7 50
145	D. T. Pilgrim, premium	80 00
146	Notbohm Bro.'s, premium	5 00
147	Boyce & Son, premium	23 50
148	Dexter Curtis, premium	15 00
149	Wm. Finlayson, premium	5 50
150	C. H. Greenman, premium	7 00
151	Chester Hazen, premium	14 00
152	J. C. Kiser, premium	7 50
153	Robert Ogilvie, premium	60 00
154	John H. Paul, premium	45 00
155	Luther Rawson, premium	112 00
156	W. W. Field, expenses and bills paid	18 50
157	C. Daft, premium	400 00
158	A. A. Hammer, premium	125 00
159	C. T. Hackbarth, premium	10 00
160	V. Lowe, premium	10 25
161	W. W. Field, salary first quarter	450 00
162	A. A. Boyce, expense account	13 90
163	Racine Silver Plate Co., silver plate	363 00
164	L. F. Wergin, lantern	1 00
165	F. W. Loudon, premium	13 00
166	Geo. W. Webber, premium	100 00
167	Wm. Wallace, premium	2 00
168	Mrs. S. Fischel, premium	3 00
169	Milwaukee Boiler Co., premium	2 50
170	J. D. Gasner & Co., premium	42 50
171	E. P. Richardson, premium	2 75
172	E. W. Keyes, P. M., box rent	2 50
173	E. B. Benton, premium	5 00
174	Blœdel & Mueller, medals	67 22
175	Wm. Miller, premium	7 50
176	P. McGeough, premium	40 00
177	H. B. Roberts, premium	7 50
178	E. W. Keyes, P. M., postage stamps and wrappers	50 00
179	A. E. Foote, premium	2 00
180	Hiram Smith, premium	10 00
181	Am. Ex. Co., express charges	4 95
182	Edmund King, premium	37 50
183	H. B. Sherman, premium	15 00
184	E. B. Bolens, posters	35 00
185	C. T. Bradley, premium	42 50
186	C., Mil. & St. Paul R. R. Co., freight	4 40
187	E. W. Keyes, P. M., stamps and postals	50 00
188	E. W. Keyes, P. M., box rent	2 50
189	Pryor & Co., directory	3 00
190	W. W. Field, expense account and bills paid	23 90
191	U. S. Ex. Co., express charges	7 10
192	C. H. Hamilton & Co., card board	20 83
193	Am. Ex. Co., express charges	29 30
194	Wm. Hartert, work and cartage	30 00
195	E. W. Keyes, P. M., postage stamps	25 00
196	Riverside Printing Co., posters	95 00

No.	*To whom and for what issued.*	*Amount.*
197	E. W. Keyes, P. M., stamps and wrappers	25 00
198	V. Barrenger, premium	50 00
199	Frank E. Fellows, clerk	31 50
200	J. W. Fleck, premium	50 00
201	Mrs. Fanny Vilas, clerk	28 00
202	Miss Ella Field, clerk	28 00
203	E. E. Cook, premium	17 00
204	Patrick Daily, ...police	2 00
205	Edward Connell....do	4 00
206	F T. Natton....do	2 00
207	Peter Lanahan .....do	2 00
208	J. W. Hayden .....do	8 00
209	J. J. Palmer.....do	8 00
210	A. E. Dunbar.....do	8 00
211	Wm. Tobin .....do	10 00
212	Wm. Palmer .....do	8 00
213	F. L. Warren.....do	8 00
214	E. W. Drakeley.....do	10 00
215	J. Hicks .....do	12 00
216	F. D. Stone .....do	8 00
217	E. W. Palmer .....do	8 00
218	Edward James .....do	8 00
219	L. Taylor .....do	8 00
220	J. B. Plumer .....do	8 00
221	G. W. Clapp .....do	8 00
222	J. H. Smith .....do	6 00
223	C. B. Fuller, premium	150 00
224	M. Gilbert, police	6 00
225	J K. Striker, police	6 00
226	A. K. Cutts, police	6 00
227	J. E. Calkins, police	10 00
228	F. J. Blair, loan paid	1,067 00
229	M. L. Baldwin, assistant superintendent	21 00
230	C. Robinson, police	8 00
231	J. H. Warren, superintendent	28 00
232	J. W. Bates, assistant superintendent	8 75
233	R. D. Torrey, superintendent	53 25
234	Edgar Torrey, assistant superintendent	31 25
235	Wm. Storm, clerk	15 00
236	T. Swenson, clerk	18 00
237	S. H. Hall, clerk	17 50
238	E. J. and Wm. Lindsay, engine	50 00
239	Harris Manufacturing Co., sundries	15 60
240	L. B. Cutting, labor, etc	17 [illegible]
241	A. A. Boyce, superintendent	44 00
242	Jervis Bemis, assistant superintendent	28 00
243	G. W. Bemis, assistant superintendent	28 00
244	E. Bemis, general work	16 00
245	J. G. Calkins, police	2 00
246	Allen Brazee, watchman	14 00
247	J. B. Duncan, premium	35 00
248	Wm. Reed, police	4 00
249	Wm. Harper, watchman	10 00
250	Chester Hazen, superintendent	28 00
251	J. Stoddard, assistant superintendent	17 50
252	Geo. Harding, premiums	61 00
253	Wm. Wagstaff, watchman	10 00
254	Robert Ogilvie, premiums	107 00
255	Wm. Ogilvie, premiums	95 00
256	Miss Lizzie Jewell, premium	8 00
257	J. W. Wood, premium	92 75
258	J. W. Wood, premium	20 00

No.	*To whom and for what issued.*	*Amount.*
259	Mrs. Wm. Paul, premium	9 50
260	H. W. Leaner, gate attendant	17 50
261	A. Robinson, gate attendant	17 50
262	J. Charnley, gate attendant	17 50
263	Reuben North, gate attendant	17 50
264	R. R. Fellows, gate attendant	17 50
265	L. Barrett, gate attendant	17 50
266	Wm. Jeffers, gate attendant	17 50
267	N. D. Pratt, superintendent	31 35
268	Sat. Clark, superintendent	62 50
269	Sat. Clark, bills paid	17 99
270	Frank Pfeifer, water	9 00
271	P. Lanahan, labor	2 00
272	N. Mower, premium	15 00
273	J. C. McKesson, premiums	400 00
274	P. Howland, premium	4 00
275	H. B. Dale, premium	20 00
276	M. Cummings, premiums	4 00
277	J. B. McLean, premium	2 50
278	Mrs. J. C. Sanborn, premium	4 00
279	Thomas Bowles, premium	65 00
280	Wm. Warden, premium	27 00
281	H. C. McDowell, bills paid	29 00
282	R. Booker, premium	35 00
283	S. A. Tenney, premium	30 00
284	Geo. H. Daubner, assistant superintendent	36 00
285	Geo. H. Daubner, premium	130 00
286	Geo. Stephenson, premium	46 00
287	A. Sherman, labor and hauling	6 00
288	Joseph O'Malley, premium	30 00
289	Humes Brothers, premium	5 00
290	T. J. Anderson, premium	15 00
291	Smock Brothers, premium	15 00
292	J. J. Tschudy & Son, premium	16 00
293	C. Miner, hay	77 50
294	Geo. P. Pepper, premium	65 50
295	E. D. Lewis, watchman	10 00
296	Smith & Bostwick, sundries	1 61
297	Carpenter & Gowdy, wood	$12 55
298	M. Honeysett, premium	11 00
299	A. S. Bell, premium	4 00
300	Robert Morton, premium	10 00
301	G. Adams, premium	230 00
302	J. W. Flack, premium	335 00
303	Daniel Williams, clerk	17 50
304	H. C. McDowell, superintendent	36 00
305	J. F. Bemis, premium	3 00
306	R. W. Sutliff, premium	3 00
307	V. Bassenger, premium	25 00
308	Byron Parker, premium	2 50
309	Mrs. A. A. Boyce, premium	4 00
310	G. M. Hanchett, hardware	21 21
311	J. V. Palmer, premium	125 00
312	Byron Parker, premium	2 50
313	Mrs. J. H. Balch, premium	2 00
314	Eli Stilson, premium	375 00
315	E. P. Ray, premium	13 00
316	O. L. De Forest, premium	33 00
317	Wm. Findlayson, watchman and premium	13 00
318	Mrs. J. A. Cunningham, premium	4 00
319	F. J. Blair, treasurer	24 00
320	J. H. Balch, assistant secretary	60 00

No.	*To whom and for what issued.*	*Amount.*
321	Mrs. A. D. Smith, premium	6 00
322	Mrs. S. M. Hadley, premium	2 00
323	Mrs. M. Halverson, premium	4 00
324	E. B. Heimstreet, premium	16 00
325	A. H. Main, assistant treasurer	50 00
326	Mrs. W. M. Battle, premium	4 00
327	Daniel Smith, premium	45 00
328	John Land, gate attendant	2 00
329	Mrs. J. W. Sale, premium	2 00
330	Wm. Hemmens, labor	10 50
331	C. L. Martin, superintendent	32 00
332	Sat. Clark, help in manuf. dept., as per vouchers	123 50
333	Geo. W. Wylie, assistant marshal	22 00
334	A. H. Main, help in treas. dept., as per vouchers	115 50
335	James Clark & Co., premium	13 75
336	John Watson & Co., ice	88
337	H. Featherstone, police	12 50
338	F. W. Holden, water	43 25
339	S. H. & A. E. Joiner, premium	77 00
340	A. Sherman, forage	41 50
341	C. W. Jackman & Co., livery	84 50
342	C. L. Martin, bills paid as per vouchers	34 00
343	S. G. Williams, premium	5 00
344	L. B. Cutting, labor, etc	7 77
345	M. C. Bushnell, clerk	17 50
346	Edgar Stilson, watchman	12 00
347	J. W. Baker, assistant superintendent	21 00
348	J. L. Lee, cartage hay and water	25 00
349	Miss Morrison, premium	5 00
350	Chester Hazen, premium	133 00
351	D. McCullock, premium	7 00
352	J. G. Carr, premium	13 00
353	Mrs. E. L. Walsh, premium	14 00
354	C. H. Gordon, hay	23 92
355	Gazette Printing Co., printing	18 00
356	C. L. Martin, bills paid	18 74
357	T. H. Nelson, livery	12 00
358	Wm. Horne, assistant marshal	$33 00
359	Wm. Horne, premium	4 00
360	Mrs. Thomas Little, Premium	15 00
361	John Little, premium	62 00
362	H. Griswold, hay	11 78
363	C. E. Rosenthal, premium	75 00
364	Hackley & Eldridge, brush and comb	1 10
365	Ed. Howell premium	18 00
366	Mrs. J. H. Balch, premium	2 00
367	R. T. Pember, premium	8 00
368	Albert Warner, premium	5 00
369	D. S. Randall, premium	9 00
370	B. B. Woodbury, premium	7 00
371	Rogers & Hutchinson, painting sign	2 50
372	J. H. Taylor, police	15 00
373	J. F. Drake, police	15 00
374	J. J. Comstock, police	10 00
375	Geo. J. Kellogg, superintendent	32 00
376	Geo. J. Kellogg, bills paid	14 91
377	Mrs. M. Baldwin, premium	2 00
378	L. L. Kellogg, premium	25 00
379	A. G. Tuttle, premium	23 50
380	R. M. Fenner, labor, etc	18 00
381	F. L. Tappan, premium	5 00
382	Mrs. E. A. Case, premium	4 00

No.	*To whom and for what issued.*	*Amount.*
383	Miss Nellie Fathers, premium	2 00
384	Thomas Kirk, premium	10 00
385	C. Coggswell, straw	118 09
386	C. H. Gordon, hay	75 24
387	J. T. Cutler, premium	24 00
388	A. D. Whitmore, premium	4 00
389	C. P. Goodrich, premium	40 00
390	E. and J. Smith, premium	176 00
391	David Atwood, printing, etc.	87 50
392	W. T. Leitch, assistant ticket agent	17 50
393	F. W. Case, watchman	8 00
394	Robert Nichols, police	8 00
395	Geo. W. McDougal assistant marshal	33 00
396	Miss Ella Field, premium	6 00
397	D. W. Curtis, police	4 00
398	W. W. Fidld, salary as secretary 2d and 3d quarters	900 00
399	O. G. Merrill, premium	6 50
400	N. W. Dean, premium	10 00
401	J. C. Davis, premium	31 00
402	Wm. Reed, premium	34 00
403	John A. Gilman, premium	15 00
404	A. Warren, police	8 00
405	J. C. Plumb, premium	17 00
406	Geo. E. Bryant, marshal	24 00
407	John Reiner, posting bills	1 50
408	D. Huntley, premium	10 00
409	E. W. and J. J. Van Doren, premium	72 00
410	Wm. Kitzrow, premium	49 50
411	W. W. Woodard, premiam	8 00
412	D. T. Pilgrim, premium	48 00
413	J. H. Pilgrim, premium	5 00
414	G. B. Mackey, premium	15 00
415	Geo. E. Bryant, preminm	19 00
416	Geo. Jeffers, premium	60 50
417	Wm. Welch, premium	2 50
418	Geo. R. Horne, premium	11 00
419	B. S. Hoxie, premium	$10 00
420	Milwaukee Industrial School, premium	6 00
421	Miss Emily T. Smith, premium	15 50
422	J. M. Smith, premium	37 00
423	American Express Co., express charges	2 30
424	Mrs. C. H. Root, premium	23 00
425	F. E. Adams, premium	8 00
426	Robert Drakeley, police	6 00
427	James Clough, premium	30 00
428	S. L. Hart, premium	4 00
429	Miss Josie Phillips, premium	9 00
430	C. S. Cleland, premium	20 00
431	George Cleland, premium	17 00
432	R. P. Allen, premium	25 00
433	Mrs. J. P. Williams, premium	4 00
434	Mrs. C. H. Webster, premium	8 00
435	Mrs. D. A. Whittier, premium	8 00
486	Mrs. O. S. McAllister, premium	2 00
437	Mrs. M. E. Woodstock, premium	4 00
438	Wm. Squire, premium	5 00
439	W. Cannon, premium	3 00
440	Mrs. A. C. Bates, premium	7 00
441	W. C. and J. V. Hugunin, premium	27 00
442	Eli Stilson, per diem as president	148 00
443	Eli Stilson, expense account	46 35
444	C. L. Martin, bills paid as per vouchers	52 75

No.	*To whom and for what issued.*	*Amount.*
445	Henry Lauvil, posting bills	1 00
446	Wm. Winkley, premium	4 00
447	Britton, Kimball & Co., use of furniture	10 00
448	Bower City Cornet Band, music	150 00
449	H. D. McKinney, lumber	61 83
450	C. L. Martin, ticket office	20 00
451	Peter Schmitz, premium	2 00
452	Fifield Bros., lumber	32 15
453	F. S. Lawrence, premium	57 00
454	Allen & Hicks, printing	3 00
455	Ed. Howell, premium	4 00
456	Fernandez & Co., printing	4 00
457	L. Antisdel, premium	18 00
458	Jones & Laughlin, shafting	36 82
459	Mrs. James Sutherland, premium	6 00
460	Mrs. G. C. Bissell, premium	1 00
461	Clough & Frederick, livery	10 00
462	Myers House, board and office rent	31 50
463	Mrs. G. H. Stowe, premium	9 00
464	Mrs. E. E. Blanchard, premium	6 00
465	City of Janesville, sprinkling streets	20 00
466	Mrs. J. P. Thomas, premium	2 00
467	E. E. Edington, premium	2 00
468	David Ward Wood, address	35 00
469	I. N. Chamberlain, premium	13 00
470	E. W. Fisher, premium	10 00
471	Mrs. D. A. Beale, premium	1 00
472	F. W. Loudon, premium	25 00
473	L. M. Ballou, premium	2 50
474	L. K. Cogswell, premium	10 00
475	C. B Fuller, premium	60 00
476	Wm. Harper, police	8 00
477	Allen Brazee, police	8 00
478	A. L. Boynton, premium, 1876	30 00
479	Thomas Irving, premium	10 00
480	Dexter Curtis, premiums	175 00
481	N. N. Palmer, premiums	24 00
482	Henry Bryant, police and use of horse	28 00
483	Julius Baldwin, premium	2 00
484	R. Boyce & Son, premiums	35 00
485	James Mason, premiums	56 00
486	B. F. Larkin, police	8 00
487	D. W. Vail, premium, 1876	12 50
488	John H. Paul, premiums	90 00
489	R. Covert, premiums	20 00
490	N. D. Williams, premiums	15 00
491	C. E. Cook, premiums	48 00
492	Carl Reese, premium, 1876	10 00
493	Wm. Reid, premiums	5 00
494	J. C. Kiser, premiums	125 00
495	Geo. W. Ringrose, premium duplicate for No. 70	17 75
496	James O'Malley, premiums	22 50
497	Fred. Keebler, premiums	11 00
498	D. Huntley, premiums	9 50
499	Wm. Welch, police	8 00
500	G. B. Huntington, premiums	12 00
501	R. W. Brown, premiums	18 00
502	Democrat Co., printing	6 50
503	Mrs. E. G. Fifield, premium	2 00
504	James Ozanne, premium	23 00
505	O. P. Freeman, premium	9 00
506	J. L. Freeborn, premium	4 00

No.	*To whom and for what issued.*	*Amount.*
507	David McLay, premium	58 00
508	Warren Collins, premium	2 00
509	L. A. Fox, premium	20 00
510	U. S. Ex. Co., Ex. charges	2 15
511	M. J. Cantwell, printing	20 50
512	Hiram Gooder, premium	50 00
513	Chester Hazen, premium	13 00
514	F. M. Grady, police	6 00
515	Mrs. Fanny Vilas, premium	10 00
516	B. F. Fowler, premium	29 00
517	O. Cook, premium	20 00
518	E. H. Palmer, premium	3 00
519	James McNee, premium	48 00
520	J. Johnson, premium	105 00
521	Mrs. Robert Boyd, premium	26 50
522	B. B. Olds, premium	23 50
523	W. T. Smith, premium	75 00
524	J. M. Cobb, premium	81 00
525	H. S. Durand, premium	128 00
526	H. O. Bailey, premium	20 00
527	Miss Kate Peffer, premium	34 00
528	E. W. Keyes, P. M., box rent	2 50
529	H. T. Harper, premium	3 00
530	Allen Stetson, premium	44 00
531	Mrs. A. H. Caldwell, premium	17 50
532	Peter Davy, premium	50 00
533	Milton Horticultural Society, premium	10 00
534	W. W. Field, expense account and paid bills	30 05
535	Robert Jones, premium	23 00
536	Mrs. Geo. Warple, premium	2 00
537	Cook, Brown & Co., premium	3 00
538	C. A. Plumb, premium	2 00
539	Andrew Scott, premium	2 00
540	Mrs. J. R. Richmond, premium	2 00
541	Henry Gray, premium	$10 00
542	Peter McVean, premium	12 00
543	Mrs. E. R. Copeland, premium	34 00
544	J. Auld, premium	9 00
545	D. M. Aspinwall, premium	14 00
546	C. Roys, premium, 1876	27 50
547	Mrs. R. Armington, premium	2 50
548	Mrs. E. Niquit, premium	4 00
549	Hook Brothers, premium	29 00
550	W. W. Field, salary, fourth quarter	450 00
651	Daniel Campbell, premium	230 00
552	Mrs. A. S. Phelps, premium	2 00
553	Ambrose Warner, premium	17 00
554	Chas. M. Clark, premium	20 00
555	Am. Ex. Co., express charges	3 55
556	F. J. Blair, dinner tickets paid	339 80
557	F. J. Blair, sundry bills paid	9 05
558	W. W. Field, ex. acct. and postage stamps	4 65
559	E. & J. Smith, premium	5 00
	Total amount of orders issued by the secretary	$19,334 53
	Amount of orders Nos. 234, 331, 334, 339, 356, 358, 363 and 365 of 1876, paid by the treasurer	62 50
	Amount of orders Nos. 3, 70, 206, 529, 538 and 559 of 1877, not received by the treasurer at the close of the fiscal year December 4, 1877	33 75
	Total amount of orders paid by the treasurer	$19,363 28

EXHIBITION OF 1877.

OPENING ADDRESS.

By ELI STILSON, President.

Fellow Citizens and Members of the State Agricultural Society: It becomes my duty to-day to formally open the twenty-fourth annual exhibition of this society. I shall endeavor to be brief in my remarks to-day. This being the first year in the new century of American independence, we hope it may be the beginning of a new era in American agriculture. The last quarter of the past century did more than the first three quarters, for agriculture in this country. Manufactures, and the mechanic arts, the strong right arm of agriculture, struck out boldly for improvement, and provided the long wanted machinery and implements for this industry.

Let your minds for a moment grasp and fathom this improvement, and you will then better understand the inducements that there have been for progress in agriculture. The farmer of to-day, if he will avail himself of the improvements which are at his command and all the experience of the most successful farmers which have become the common stock of all, can now accomplish more reproduction than the labor of three farmers could fifty years ago. The intellect of the inventor has stimulated the intellect of the operator, and caused a demand for more intelligent labor. Not only this, but the greatest of all problems that have ever engaged the attention of scientific and practical men yet remains but partially solved, and that is, How shall the soil be made to produce greater crops and not exhaust or impair its fertility? The chemists, the botanists, the geologists, the scientific, practical and observing farmers, have all lent their aid, and still the problem is only partially solved. Cost and transportation are a bar to commercial fertilizers to a greater part of the state, and yet the demand for increased production is inexorable. When the reaper went forth to gather the bountiful

harvest of 1877, the visible supply of wheat would have scarcely furnished bread for the people of the United States for thirty days, while that of the farmers might have been good for sixty days more.

Scarcely ever have the American farmers' granaries been so completely exhausted as they were before the harvest began this season. The stringency of the hard times had compelled them to sell their supplies down close. This fact will have much to do in sustaining the price of the present crop, and with the short crop in Europe, will assure us a good demand for all our surplus. With a surplus of 70,000,000 bushels for export, after replenishing our empty storehouses and granaries, we have abundant reason to thank Divine Providence that our country is not like famine-stricken India, where the clouds refuse to give rain, and the ground is dried and parched, and lean, gaunt, hungry famine devours the people.

Our other products for export and for home consumption are equally satisfactory. Within a short period there has been added to our exports another commodity, that of dressed beef in refrigerator ships, and it is assuming great importance and value. Beef had become so dear in the English market that the poor man was rarely able to buy it, and it cost as much to buy the rich man's roast as it cost five hundred years ago to buy an ox. When we turn our attention to the mechanic arts which society has introduced to foster and provide, the outlook is equally encouraging. In agricultural implements, America is master of the world. Our implements and machinery stand unrivalled for their adaptation to the purposes for which they are intended. The pride of the proud Briton is aroused when he sees, not only our machinery and implements, but some of our manufactures, not only contesting successfully in the markets of the English colonies and dependencies, but also in England, proffered for public favor and sale. Take the American watch, whose movements are as near perfect as skill can make them, and they are now sold in English markets. Switzerland, that country whose liberties in its alpine fastnesses have withstood the convulsions of Europe for hundreds of years, and the rise and fall of empires, whose cheap labor has produced cheap watches that have controlled the markets of Europe and America, now stands terror stricken, not by the invasion of her mountain fastnesses by the armies of America, but by her machinery made watches. The cry of that country is now wafted to our ears over

wide ocean billows from its green valleys and cities beneath the snow capped peaks, and eternal glaciers, "What shall we do? If we adopt American machinery, we shall only produce more watches to depress prices still further."

Let us go in retrospect view to the Centennial, and as we enter the hall of operative machinery, let us stop and view the giant Corliss engine, which drives eleven acres of machinery, and as we contemplate its vast power and perfection, we bow our heads in respect to American genius and enterprise. But let us pass on in view of the operative machinery and manufactures, and we find America standing shoulder to shoulder with the foremost in the useful. Let those whose privilege it was to visit that wonderful exhibition recall the emotion as they stood and contemplated, in wonderful admiration, the operations in the different branches of this department.

I will illustrate, by a single incident, the wisdom of that principle of political economy that seeks to import the manufacturer and his operatives, bringing the consumer and producer together and making a home market for our products. Here we find an industry that has recently been added to our list and employing operatives by the thousand. Not only so, but we find that the largest firm in England, in this line, is that of J. & P. Coats, who also employ nearly 2,000 hands in Rhode Island, are manufacturing their machines in America to send to England to manufacture their thread for the English market; another triumph of American genius.

As we pass on and study that wonderful exhibition — the Centennial — the useful, the artistic and the wonderful exhibits of the different nations here represented, we are forced to the conclusion that America occupies a proud position in the front rank of useful productions at least. The bunting for your proud emblems of our national liberties is now an American product. At the breaking out of the rebellion, every yard of bunting that floated in the breeze over this land, and protected our commerce on the seas, was the product of foreign looms. This national humiliation now no longer suffered.

Wherever that proud emblem now floats, and protects forty millions of free people, it is truly American in its manufacture as well as in its emblem.

We will return to the strictly agricultural class. On us depends that future of agriculture. If we adopt all the modern improvements, and seek for all the information within our reach, and apply ourselves vigorously to our calling, we shall succeed. We must often converse with each other, and gain all the information we can, connected with our calling. These social gatherings at our fairs are of the highest usefulness. And, as it is my fixed determination to retire at the close of this term from the position I now occupy, let me beseech those that shall come after us to see to it that no unwholesome influences shall be allowed to come in and destroy and pervert their usefulness. I speak thus warningly from the large number of communications that I have received, offering large sums of money for rent for gambling and games of chance on our grounds, and some have even the audacity to offer to take the State Agricultural Society in as partner in their gambling hells!

These warnings are not given without good cause, for from the great number of applications for rent, they must be meeting with success somewhere. God grant that agriculture may ever refuse to take blood money of the gambler.

As progressive agriculture requires a better education, more intelligent and closer habits of reasoning, and of observation and thinking; and as we have called to our aid agricultural societies, agricultural conventions, agricultural colleges, and scientific and educated men, what new aid can we introduce? I answer, that of the state normal schools. While you teach geology, botany and chemistry and the other kindred sciences, go a step farther, and apply these sciences to agriculture, and whether those scholars go forth to teach the farmer's sons in the country school house or the village school, not a term will be taught but what the coming farmer will be there, and if, in the ever changing vicissitudes of human life, happy will it be for that teacher if in the future he should find himself possessed of a good farm and know how to run it successfully. The attempt to teach agriculture by connecting an agricultural college with the State University, is like attempting to build a house and beginning at the top and building downwards. That institution is beyond the reach of the great mass of those who are to be the future farmers of this state. Lay the foundations for the application of science to agriculture in your state normal schools and your district schools, and then you rear this structure

from the foundation upwards, instead of from the top downwards, you will thus bring within the reach of the son of the poorest farmer of the state the means to enable him to compete with the sons of those in abler circumstances, and to obtain a practical agricultural education. How many of you who stand here with me to-day, and as we look over these undulating and beautiful productive prairies of old Rock and the surrounding counties, and from the interior and northern part of the state, and of those who are not here to-day, but are with us in sentiment, will say that we will pass their farms in the state of Wisconsin, one of the brightest gems in this noble galaxy of states, to our successors, unimpaired in production. I have so often called the attention of the officers and employees to the duties that lay before us, that I will not now repeat it, but will proclaim this state fair open to the public. It is yours to enjoy.

REPORTS OF SUPERINTENDENTS.

DEPARTMENT B.— CATTLE.

A. A. BOYCE, SUPERINTENDENT.

The exhibition of cattle in the different classes in this department was undoubtedly the fullest yet made at your annual fairs This was more noticeable from the fact that the entries were wholly made by citizens of Wisconsin.

In Class 8 — *Short-horns.* — The breeders of this state vied with each other in placing on exhibition a large number of animals of marked excellence. They are to be congratulated upon the success they have attained and the bright prospect for ample rewards in the future.

In Class 9 — *Devons.*— There were five herds of not less than six animals in each herd on exhibition. Although the beautiful Devon is overshadowed by the stately short-horn, they have their admirers, and by many, their breeding is made a specialty. For working oxen, the Devons and their different crosses are unequaled. The fine large red oxen of Connecticut and New England owe their

great excellence to their Devon blood, and when there shall be a demand for working oxen to aid the settlers in clearing the vast forests in Northern Wisconsin, the Devon will come to the front.

Class 10 — *Ayrshires.* — The entries in this class were numerous, nearly all the animals showed careful and intelligent breeding. The great and increasing dairy interests of this state make this breed of cattle one of the most valuable, particularly for the cheese dairy, and the fine show of Ayrshires at the last fair at Janesville, is evidence of the increasing attention being paid to their breeding.

Class 11 — *Jerseys.* — In this class, the number and excellence of the animals entered showed that the interest in this deservedly popular dairy breed was unabated. They will always find a place where rich milk, the best cream, and "gilt edged butter" are appreciated.

Holsteins. — Another breed of dairy cattle claims our attention. A herd of choice animals of the celebrated Holstein or Dutch cattle — the largest of the dairy breeds, were placed on exhibition by Mr. O. E. Merrill of Beloit, who, I believe, is the first one to introduce this, by many believed, to be "the coming" dairy stock to the farmers of Wisconsin. I recommend that a class be made for Holsteins, and that they be placed on equal footing with the other dairy breeds.

Class 12 — *Galloways.* — The well known herd of hornless black cattle owned by Mr. Peter Davy, of Dodge county, were again on exhibition. This quiet, gentle race of cattle attract deserved attention wherever shown.

GRADES. — The number and excellence of the animals of the different classes of grades on exhibition attest the wisdom and economy of breeding only to pure bred males, and here let me reiterate the recommendation of my predecessor in this department, Gen. George E. Bryant, "that no animal in the thorough bred classes should receive a premium unless its name, number and volume of herd-book in which the same is recorded be given." And I believe the best interests of stock breeders and all would be subserved, were the same rule applied to the sires of grades in the different classes.

Your superintendent tenders his thanks to those who assisted him in his department; to the judges in the different classes, for the prompt and impartial manner in which they discharged their

duties; to the exhibitors, one and all, for their uniform kindness, courtesy and ready acquiescence in all his suggestions and requirements.

DEPARTMENT C. — SHEEP.

CHESTER HAZEN, SUPERINTENDENT.

In making a report of this department, it is gratifying to be able to state that the exhibition of sheep, though not perhaps as large in numbers as at some of our preceding fairs, yet in point of excellence, was fully up to that of any previous exhibit of this association.

The American Merinos were well represented, and the stock shown in this department would scarcely have been excelled by any state in the Union.

The Longwools were out in strong force, and the exhibit was far better in point of numbers and merit than at any previous fair.

South Downs. — This class was tolerably well filled with good sheep, but not as much competition as either of the other classes. When we take into consideration the fact that competition was confined to this state alone, the breeders and wool growers of Wisconsin have just reason to feel proud, and in my opinion every inducement possible should be extended to advance the interests of this branch of industry.

There was on exhibition at our last annual fair, a very fine flock of American Merino sheep, from Vermont, with some very excellent specimens of this favorite breed, which should be favorably recommended to our western breeders of fine wool sheep, which could not compete for premiums under our present rules.

There was also a very fine flock of Cotswolds from Canada, which we recommend favorably to breeders of long wooled sheep.

DEPARTMENT D.— SWINE.

CHESTER HAZEN, SUPERINTENDENT.

The exhibition in all classes in this department was full, and running over. It was undoubtedly the largest and best exhibition of swine ever exhibited in this state. Not less than seven hundred

(700) swine were entered for competition. Included in the large breeds was the Poland Chinas, which outnumbered all others combined, which seems to be conclusive evidence that they are the favorite breed for the majority of our pork-raising farmers. Next comes the Chester White, which were lightly represented, although there were some very fine specimens. Next, the middle breed Berkshires, of which there was a large show, and many superior animals.

The small breed were made up from the Suffolk, Essex, etc., which made a good show in this class.

There is perhaps no stock that is generally raised by the common farmers of our state, in which there has been so much improvement within the past few years as there has been in swine. They have been improved from the long-nosed, long-legged, gaunt racers, or prairie sharks, as they used to be called, to the fine shaped, light-boned, thick-meated models of perfection of hogs that we now see in our show-pens and on almost every farm in the state.

As the importance of the pork crop increases, more conveniences should be provided at our annual fairs, in the line of pens to exhibit in.

PREMIUMS AWARDED.

DEPARTMENT A. — HORSES.

CLASS 1 — *Roadsters.*

Best stallion, 4 years old and over, David Campbell, Madison	$30 00
Second best, G. Adams, Racine	15 00
Best stallion, 3 years old and under 4, J. W. Flack, Markesan	20 00
Second best, Thos. Kirk, Janesville	10 00
Best stallion, 2 years old and under 3, R. Covert, Clinton	10 00
Best stallion, 1 year old and under 2, Robert Jones, Raymond	8 00
Second best, Geo. R. Horne, Whitewater	4 00
Best sucking stallion foal, Robert Jones, Raymond	5 00
Second best, Murray Bros., Clinton	3 00
Best brood mare, 4 years old and over, with foal by her side, Samuel Tenney, Durham Hill	20 00
Second best, Robert Jones, Raymond	10 00
Best filly, 3 years old and under 4, G. B. Mackey	15 00
Second best, R. Covert, Clinton	10 00
Best filly, 2 years old and under 3, David Smith, Walton	10 00
Second best, Richard Booker, Whitewater	5 00
Best filly, 1 year old and under 2, James T. Cutter, Emerald Grove	6 00
Best sucking filly foal, Samuel Tenney	6 00
Second best, James T. Cutter, Emerald Grove	3 00

CLASS 2 — *Horses for Agricultural Purposes.*

Best stallion, 4 years old and over, H. O. Bailey, Caldwell's Prairie	$20 00
Second best, Thos. Irving, Mukwanago	10 00
Best stallion, 3 years old and under 4, James T. Cutter, Emerald Gr.	15 00
Second best, B. B. Woodbury, Johnstown	7 00
Best stallion, 2 years old and under 3, Thos. Bowles, Janesville	8 00
Second best, R. Boyce & Son, Oregon	4 00
Best stallion, 1 year old and under 2, A. Warner, Johnstown Center	5 00
Second best, H. T. Harper, Orfordsville	3 00
Best sucking stallion foal, Wm. Menzies, Rock Prairie	4 00
Second best, Andrew Scott, Janesville	2 00
Best brood mare, 4 years old and over, with foal by her side, Wm. Menzies, Rock Prairie	15 00
Second best, D. L. Randall, Johnstown Center	7 00
Best filly, 3 years old and under 4, Peter McVean, Juda	12 00
Second best, David Smith, Milton	6 00
Best filly, two years old and under 3, J. V. Hugunin, Janesville	8 00
Second best, R. Boyce & Son, Oregon	4 00
Best filly, 1 year old and under 2, R. Boyce & Son, Oregon	5 00
Second best, J. V. Hugunin, Janesville	2 00
Best sucking filly foal, John Little, Janesville	5 00
Second best, John Little, Janesville	3 00
Best stallion and five of his colts at 4 years of age or under, John Little	25 00

CLASS 3 — *Draft Horses*, (Norman).

Best stallion 4 years old and over, Thos. Bowles, Janesville	$20 00
Second best, Wm. Warden, Minn. Junction	10 00
Best stallion 3 years old and under 4, John A. Gilman, Sparta	15 00
Second best, Geo. Cleland, Janesville	7 00
Best stallion 2 years old and under 3, F. E. Adams, Beloit	8 00
Second best, S. S. Hart, LaPrairie	4 00
Best stallion 1 year old and under 2, Wm. Warden, Minn. Junction	6 00
Second best, Wm. Warden, Minn. Junction	3 00
Best sucking stallion foal, A. J. Van Doren, Fisk's Corners	4 00
Best brood mare 4 years old and over with foal by her side, A. J. Van Doren, Fisk's Corners	15 00
Best filly, 3 years old and under 4, Thos. Bowles, Janesville	12 00
Second best, Josias Auld, La Prairie	6 00
Best filly 2 years old and under 3, J. V. Hugunin, Janesville	8 00
Second best, J. V. Hugunin, Janesville	4 00
Best filly one year old and under 2, Wm. Warden, Minn. Junction	4 00
Best sucking filly foal, Wm. Warden, Minn. Junction	4 00
Second best, E. W. Van Doren, Fisk's Corners	2 00
Best stallion and five of his colts at 4 years of age or under, Thos. Bowles, Janesville	25 00

CLASS 4 — *Draft Horses* (Clydesdales and others).

Best stallion 4 years old and over, D. McLay, Elm Grove	$20 00
Second best, Robert Ogilvie, Madison	10 00
Best stallion 3 years old and under 4, A. Mowers, Clinton	15 00
Second best, D. McCulloch, Milton Junction	7 00
Best stallion 2 years old and under 3, R. T. Pember, Johnstown Center	8 00
Second best, Robert Morton, Johnstown	4 00
Best stallion 1 year old and under 2, D. McLay, Elm Grove	6 00
Best sucking stallion foal, Robert Ogilvie, Madison	4 00
Second best, D. L. Randall	2 00
Best brood mare 4 years old and over, with foal by her side, Robert Ogilvie, Madison	15 00
Second best, D. McLay, Elm Grove	7 00
Best filly, 3 years old and under 4, Wm. Menzies, Rock Prairie	12 00
Second best, Robert Norton, Johnstown	6 00
Best filly, 2 years old and under 3, Robert Ogilvie, Madison	8 00
Second best, Alex. S. Bell	4 00
Best filly, 1 year old and under 2, Wm. Menzies, Rock Prairie	4 00
Best stallion and five of his colts, at 4 years of age or under, D. McLay, Elm Grove	25 00

CLASS 5 — *Matched Horses and Mares.*

Best pair carriage horses or mares, not less than 15½ hands, Chas. S. Cleland, Janesville	$20 00
Second best, Henry Gray, Milton Junction	10 00
Best pair roadsters, H. B. Dale, Oshkosh	20 00
Second best, Dexter Curtis, Madison	10 00

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

Best gentleman's roadster for single harness, 4 years old and over, Gilbert Adams, Franksville	$30 00
Second best, N. D. Williams, Whitewater	15 00

CLASS 7 — *Horses for Speed.*

THREE-MINUTE PURSE, $400.

First, J. C. McKesson, "Billy Barsteder"	$200 00
Second, C. B. Fuller, "Anna B."	125 00
Third, J. W. Flack," "Northern Light"	75 00

TWO-FORTY PURSE, $400.

First J. W. Flack, "Northern Light"	$200 00
Second, J. V. Palmer, Sparta, "Winona Belle"	125 00
Third, C. E. Rosenthal, "Ashton Boy"	75 00

TWO-FIFTY PURSE, $400.

First, J. C. McKesson, "Billy Barsteder"	$200 00
Second, C. B. Fuller, "Anna B."	125 00
Third, Dexter Curtis, Madison, "Lady Hess"	75 00

STALLION RACE (OPEN TO ALL), $400.

First, Daniel Campbell, "Herod"	$200 00
Second, G. Adams, "Swigart"	125 00
Third, V. Basenger, Racine, "Gov. Hayes"	75 00

COLT RACE — 4 YEARS OLD AND UNDER 5 — $200.

First, J. W. Flack, "Northern Light"	$100 00
Second, G. Adams, "Rosa Bellen"	60 00
Third, Richard Booker, "Richard First"	40 00

DEPARTMENT B. — CATTLE.

CLASS 8. — *Short Horns.*

Best bull 4 years old and over, Dexter Curtis, Madison	$25 00
Second best, Eli Stilson, Oshkosh	15 00
Best bull 3 years old and under 4, Eli Stilson, Oshkosh	25 00
Second best, J. C. Kiser, Oregon	15 00
Best bull 2 years old and under 3, Geo. Harding, Waukesha	25 00
Best bull 1 year old and under 2, Dexter Curtis, Madison	25 00
Second best, Eli Stilson, Oshkosh	15 00
Best bull calf over 6 and under 12 months old, Eli Stilson, Oshkosh.	10 00
Second best, Geo. Stephenson, Darlington	6 00
Best bull calf under 6 months old, J. C. Kiser, Oregon	10 00
Second best, Geo. Harding, Waukesha	6 00
Best cow 4 years old and over, Geo Ssephenson, Darlington	20 00
Second best, Geo. Stephenson, Darlington	10 00
Best cow 3 years old and under 4, E. & J. Smith, Rochester	20 00
Second best, Eli Stilson, Oshkosh	10 00
Best heifer 2 years old and under 3, Eli Stilson, Oshkosh	20 00
Second best, Eli Stilson, Oshkosh	10 00
Best heifer 1 year old and under 2, Eli Stilson, Oshkosh	20 00
Best heifer calf over 6 and under 12 months old, Eli Stilson, Oshkosh	10 00
Second best, E. and J. Smith, Racine	5 00
Best heifer calf under 6 months old, Geo. Harding, Waukesha	10 00

CLASS 9. — *Devons.*

Best exhibition not less than six head, Wm. T. Smith, Elkhorn	$75 00
Second best, Hiram Gooder, Rochester	50 00

CLASS 10. — *Ayrshires.*

Best bull 3 years old and over, Joseph Johnson, Hartland	$20 00
Second best, A. Stetson, Honey Creek	10 00
Best bull 2 years old and under 3, Chester Hazen, Ladoga	20 00
Second best, Jas. McNee, Emerald Grove	10 00
Best bull 1 year old and under 2, Joseph Johnson, Hartland	20 00
Second best, Allen Stetson, Honey Creek	10 00
Best bull calf over 6 and under 12 months old, Jas. McNee, Emerald Grove	10 00
Second best, Jas. McNee, Emerald Grove	5 00
Best bull calf under 6 months old, Chester Hazen, Ladoga	10 00
Second best, Joseph Johnson, Hartland	5 00
Best cow, 3 years old and over, Joseph Johnson, Hartland	15 00
Second best, Chester Hazen, Ladoga	10 00
Best heifer, 2 years old and under 3, Chester Hazen, Ladoga	15 00
Second best, Chester Hazen, Ladoga	10 00
Best heifer, 1 year old and under 2, Joseph Johnson, Hartland	15 00
Second best, Chester Hazen, Ladoga	10 00
Best heifer calf, over 6 and under 12 months old, Tscheudy & Son, Monroe	6 00
Second best, James McNee, Emerald Grove	3 00
Best heifer calf under 6 months old, Allen Stetson, Honey Creek	6 00
Second best, Chester Hazen	3 00

CLASS 11 — *Jerseys.*

Best bull, 3 years old and over, Edmund King, Whitewater	$20 00
Second best, N. N. Palmer, Brodhead	10 00
Best bull, 2 years old and under 3, H. S. Durand, Racine	20 00
Best bull, 1 year old and under 2, J. M. Cobb, Beloit	20 00
Second best, Chester Hazen, Ladoga	10 00
Best bull calf over 6 and under 12 months old, George E. Bryant, Madison	10 00
Best bull calf, under 6 months old, Edmund King, Whitewater	10 00
Second best, N. N. Palmer, Brodhead	5 00
Best cow, 3 years old and over, H. S. Durand, Racine	15 00
Second best, H. S. Durand, Racine	10 00
Best heifer, 2 years old and under 3, H. S. Durand, Racine	15 00
Second best, H. S. Durand, Racine	10 00
Best heifer, 1 year old and under 2, J. M. Cobb, Beloit	15 00
Second best, J. M. Cobb, Beloit	10 00
Best heifer calf, over 6 and under 12 months old, George E. Bryant, Madison	6 00
Second best, George E. Bryant, Madison	3 00
Best heifer calf, under 6 months old, J. M. Cobb, Beloit	6 00
Second best, H. S. Durand, Racine	3 00

CLASS 12 — *Galloways.*

Best exhibition, not less than six head, Peter Davy, Monterey	$50 00

CLASS 13 — *Grade Short Horns.*

Best cow, 4 years old and over, John Little, Janesville	$15 00
Second best, E. & J. Smith, Rochester	10 00
Best cow, 3 years old and under 4, E. & J. Smith, Rochester	15 00
Second best, L. K. Cogswell, Beloit	15 00
Best heifer, 2 years old and under 3, John Little, Janesville	15 00
Second best, E. & J. Smith, Rochester	10 00
Best yearling heifer, E. & J. Smith, Rochester	15 00
Second best, E. & J. Smith, Rochester	10 00

Best heifer calf over 6 months old, J. N. Chamberlain, Beloit..... 6 00
Second best, J. N. Chamberlain, Beloit..... 3 00
Best heifer calf, under 6 months old, E. & J. Smith, Rochester..... 6 00

CLASS 14 — *Grade Jersey.*

Best cow, 3 years old and over, Edmund King, Whitewater..... $10 00
Second best, Edmund King, Whitewater..... 5 00
Best heifer, 2 years old and under 3, Edmund King, Whitewater... 10 00
Second best, Edmund King, Whitewater..... 5 00
Best yearling heifer, Edmund King, Whitewater..... 10 00
Second best, Edmund King, Whitewater..... 5 00

CLASS 15 — *Grade Ayrshire.*

Best cow, 3 years old and over, Jas. McNee, Emerald grove $10 00
Best heifer, 2 years old and under 3, Jas. McNee, Emerald Grove ... 10 00
Best yearling heifer, Allen Stetson, Honey Creek..... 10 00

CLASS 17 — *Herds.*

SHORT HORNS.

Best bull and 4 cows or heifers over two years old, Eli Stilson, Oshkosh..... $80 00
Second best, J. C. Kiser, Oregon..... 50 00

AYRSHIRES.

Best bull and 4 cows or heifers, 2 years old, Chester Hazen, Ladoga. $50 00
Second best, Joseph Johnson, Hartland..... 30 00

JERSEYS.

Best bull and 4 cows or heifers, over 2 years old, H. S. Durand, Racine..... $50 00
Second best, J. M. Cobb, Beloit..... 30 00

SWEEPSTAKES.

Best bull of any age, Eli Stilson, Oshkosh..... $50 00
Second best, J. C. Kiser, Oregon, ... 30 00
Best cow or heifer of any age, Dexter Curtis, Madison..... 40 00
Second best, J. C. Kiser, Oregon..... 20 00
Best cow and three of her calves, owned by exhibitor, Chester Hazen, Ladoga..... Silve plate, 40 00
Best Bull and three of his get, owned by exhibitor, Eli Stilson, Oshkosh..... Silver plate, 40 00
Best bull and four heifers, under 2 yeas old, Eli Stilson, Oshkosh.... 80 00
Second best, E. & J. Smith, Rochester..... 50 00
Best four calves bred and owned by exhibitor, E. & J. Smith, Rochester..... 40 00
Second best, Eli Stilson, Oshkosh..... 30 00

DEPARTMENT C. — SHEEP.

CLASS 18. — *American Merinos.*

Best buck 2 years old and over, John H. Paul, Genesee..... $20 00
Second best, O. Cook, Whitewater..... 10 00
Best buck 1 year old and under 2, John H. Paul, Genesee..... 15 00
Second best, Geo. Cleland, Janesville..... 10 00

Best pen three buck lambs, John H. Paul, Genesee..... 10 00
Second best, C. M. Clark, Whitewater..... 5 00
Best pen three ewes 2 year old and over, J. H. Paul, Genesee..... 20 00
Second best. C. M. Clark, Whitewater..... 10 00
Best pen three ewes 1 year old and under 2, J. H. Paul, Genesee.... 15 00
Second best, O. Cook, Whitewater..... 10 00
Best pen three ewe lambs, J. H. Paul, Genesee..... 10 00
Second best, C. M. Clark, Whitewater..... 5 00
Best exhibition, J. H. Paul, Genesee..... Diploma.

SWEEPSTAKES.

Best buck and his cleansed fleece, with ten of his get, J. H. Paul, Genesee..... Silver plate, 15 00

CLASS 19. — *Long Wool.*

Best buck 2 years old an over, Robert Ogilvie, Madison..... $20 00
Second best, Geo. Harding, Waukesha..... 10 00
Best buck 1 year old and under 2, Robert Ogilvie, Madison..... 15 00
Second best, J. V. Malley, Waunakee..... 10 00
Best pen three buck lambs, Robert Ogilvie, Madison..... 10 00
Second best, Geo. Harding, Waukesha..... 5 00
Best pen three ewes 2 years old and over, J. V. Malley, Waunakee.. 20 00
Second best, S. A. Fox, Waukesha.....
Best pen three ewes 1 year old and under 2, Robert Ogilvie, Madison 15 00
Second best, S. A. Fox, Waukesha..... 10 00
Best pen three ewe lambs, Robert Ogilvie, Madison..... 10 00
Second best, Geo. Harding, Waukesha..... 5 00
Best exhibition sheep, Robert Ogilvie, Madison..... Diploma.

CLASS 20. — *Downs.*

Best buck, 2 years old and over, Geo. H. Daubner, Brookfield Center. $20 00
Second best Tscheudy & Son..... 10 00
Best buck, 1 year old and under 2, Geo. H. Daubner, Brookfield C'r. 15 00
Second best, Geo. H. Daubner, Brookfield Center..... 10 00
Best pen three buck lambs, Geo. H. Daubner, Brookfield Center..... 10 00
Second best, Geo. H. Daubner, Brookfield Center..... 5 00
Best pen three ewes, 2 years old and over, Geo. H. Daubner, Brookfield Center..... 20 00
Second best, Geo. H. Daubner, Brookfield Center..... 10 00
Best pen three ewes, 1 year old and under 2, Geo. H. Daubner, Brookfield Center..... 15 00
Second best, Geo. H. Daubner, Brookfield Center..... 10 00
Best pen three ewe lambs, Geo. H. Daubner, Brookfield Center..... 10 00
Second best, Geo. H. Daubner, Brookfield Center..... 5 00
Best exhibition sheep, Geo. H. Daubner..... Diploma.

DEPARTMENT D. — SWINE.

CLASS 21. — *Large breeds, including Poland-Chinas, Chester Whites and others.*

Best boar, 2 years old and over, T. J. Anderson, Monroe..... $15 00
Second best, Ambrose Warner, Whitewater..... 10 00
Best boar, 1 year old and under 2, B. T. Fowler, Heart Prairie..... 10 00
Second best, Humes Bros., Monroe..... 5 00
Best breeding sow, 2 years old and over, B. T. Fowler, Heart Prairie 15 00
Second best, Hook Bros., Oregon..... 10 00

Best breeding sow, one year old and under 2, R. Boyce & Son, Oregon	10 00
Second best, R. W. Brown, Albion	5 00
Best breeding sow, with litter of pigs, not less than four, Hook Bros., Oregon	15 00
Second best, E. P. May, Fort Atkinson	10 00
Best boar pig, over 6 months and under 1 year old, W. W. Woodward, Good Hope	8 00
Second best, G. B. Huntington, Edgerton	4 00
Best sow pig, over 6 months and under 1 year old, G. B. Huntington, Edgerton	8 00
Second best, R. Boyce & Son, Oregon	4 00
Best boar pig, under 6 months old, R. W. Brown, Albion	8 00
Second, Hook Bros., Oregon	4 00
Best sow pig, under 6 months old, R. Boyce & Son, Oregon	8 00
Second best, B. T. Fowler, Heart Prairie	4 00

Middle Breeds — Including Berkshires.

Best boar, 2 years old and over, David Smith, Milton	$15 00
Second best, Wm. Ogilvie, Madison	10 00
Best boar, 1 year old and under 2, James Magson, Walworth	10 00
Best breeding sow, 2 years old and over, Wm. Ogilvie, Madison,	15 00
Second best, James Magson, Walworth	10 00
Best breeding sow, 1 year old and under 2, James Magson, Walworth,	10 00
Second best, H. S. Durand, Racine	5 00
Best breeding sow with litter of pigs, not less than four, Wm. Ogilvie, Madison	15 00
Second best, David Smith, Milton	10 00
Best boar pig, over 6 months and under 1 year old, Allen Stetson, Honey Creek	8 00
Second best, Wm. Ogilvie, Madison	4 00
Best sow pig, over 6 months and under 1 year old, James Magson, Walworth	8 00
Second best, David Smith, Milton	4 00
Best boar pig, under 6 months old, Wm. Ogilvie, Madison	8 00
Second best, James Magson, Walworth	4 00
Best sow pig, under 6 months old, Wm. Ogilvie, Madison	8 00
Second best, James Magson, Walworth	4 00

Small Breeds, Essex, Suffolk and others.

Best boar, 2 years old and over, S. H. & A. E. Jonier, Janesville	$15 00
Second best, E. W. Van Doren, Ripon	10 00
Best boar, 1 year old and under 2, E. W. Van Doren, Ripon	10 00
Second best, S. H. & A. E. Joiner, Janesville	5 00
Best breeding sow, 2 years old and over, S. H. & A. E. Joiner, Janesville	15 00
Second best, Geo. Stephenson, Darlington	10 00
Best breeding sow, 1 year old and under 2, S. H. & A. E. Joiner, Janesville	10 00
Second best, E. W. Van Doren, Ripon	5 00
Best breeding sow with litter of pigs, not less than four, Smock Bros., Monroe	15 00
Second best, E. W. Van Doren, Ripon	10 00
Best boar pig, over 6 months and under 1 year old, S. H. & A. E. Jonier, Janesville	8 00
Second best, S. H. & A. E. Jonier, Janesville	4 00
Best sow pig, over 6 months and under 1 year old, E. W. Van Doren, Ripon	8 00
Second best, S. H. & A. E. Joiner, Janesville	4 00
Best boar pig, under 6 months old, S. H. & A. E. Joiner, Janesville.	8 00
Second best, Edward Howell, Brooklyn	4 00
Best sow pig, under 6 months old, S. H. & A. E. Jonier, Janesville..	8 00
Second best, E. W. Van Doren, Ripon	4 00

SPECIAL PREMIUMS

OFFERED BY MESSRS. PLANKINGTON & ARMOUR AND LAYTON & CO., PORK PACKERS, MILWAUKEE.

Best boar of any age, Wm. Ogilvie, Madison	$10 00
Bast sow of any age, James Magson, Walworth	10 00
Best six pigs under 8 months old, R. W. Brown, Albion	5 00
Best boar and sow of any age and breed, with five pigs not over 8 months old, Wm. Ogilvie, Madison	25 00

DEPARTMENT E—POULTRY.

CLASS 22.

ASIATIC.

Second best trio Black Javas, C. E Cook, Union, Ill	$1 50
Best trio Light Brahmas, Peter Howland, Janesville	2 50
Second best, Peter Howland, Janesville	1 50
Best trio Dark Brahmas, C. E. Cook, Union, Ill	2 50
Second best, Dr. Wm. Horne, Janesville	1 50
Best trio Partridge Cochins, Dr. Wm. Horne, Janesville	2 50
Second best, O. E. Merrill	1 50
Best trio Buff Cochins, C. E. Cook, Union, Ill	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best trio White Cochins, L. M. Ballow, Beloit	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best trio Irish Blue, Geo. R. Horne, Whitewater	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best trio Brown Red, Wm. Welch	2 50
Best trio Black Breasted Red Game, Jas. B. McLean	2 50
Second best, C. E. Cook, Union, Ill	1 50
Second best trio Pyle, C. E. Cook, Union, Ill	1 50
Best trio Game, any variety, Byron Parker, Janesville	2 50
Second best, Geo. R. Horne, Whitewater	1 50

DORKING.

Best trio Silver Gray, C. E. Cook, Union Ill	$2 50
Best trio Plymouth Rocks, J. N. Chamberlin	2 50
Second best, J. N. Chamberlin	1 50

SPANISH.

Best trio Black Spanish (white face), C. E. Cook, Union, Ill	$2 50
Best trio White Leghorns, D. Huntley, Appleton	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best trio Brown Leghorns, W. P. Armington, Janesville	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best trio Silver Spangled Hamburgs, C. E. Cook, Union, Ill	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best trio Golden Spangled Hamburgs, C. E. Cook, Union, Ill	2 50

FRENCH.

Best trio Houdans, C. E. Cook, Union, Ill	$2 50
Second best, Finner	1 50

POLISH.

Best trio Black Polish, white crests, C. E. Cook, Union, Ill	$2 50
Second best, C. E. Cook, Union, Ill	1 50
Second best trio White Polish, C. E. Cook, Union, Ill	1 50

BANTAM.

Best trio Golden Seabright, C. E. Cook, Union, Ill	$2 50
Second best, Geo. R. Horne, Whitewater	1 50
Best trio B. B. Red Game, C. E. Cook, Union, Ill	2 50
Second best, Geo. R. Horne, Whitewater	1 50
Best trio Silver Duckwing, C. E. Cook, Union, Ill	2 50

TURKEYS.

Best pair Bronze, C. E. Cook, Union, Ill	$2 50
Best pair common, C. E. Cook, Union, Ill	2 50

WATER FOWLS.

Best pair Rouen ducks, C. E. Cook, Union, Ill	$2 50
Best pair African geese, C. E. Cook, Union, Ill	2 50
Best pair Aylesburg ducks, C. E. Cook, Union, Ill	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best pair Rouen ducks, W. C. Hugunin	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best pair Black Cayuga ducks, C. E. Cook, Union, Ill	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best pair Muscovy ducks, W. C. Hugunin	2 50
Second best, C. E. Cook, Union, Ill	1 50
Best and greatest variety poultry shown by one person, C. E. Cook, Union, Ill., silver plate	10 00
Best exhibition fancy pigeons, Geo. C. MeLean, Janesville, silver plate	5 00

DEPARTMENT F. — AGRICULTURE.

CLASS 23. — *Field Products.*

Best spring wheat (club), D. T. Pilgrim, West Granville	$5 00
Second best, J. C. Davis, Oshkosh	3 00
Best spring wheat (Rio Grande or China tea), J. W. Wood, Baraboo.	5 00
Second best, J. C. Davis, Oshkosh	3 00
Best spring wheat (fife), D. T. Pilgrim, West Granville	5 00
Second best, J. C. Davis, Oshkosh	3 00
Best Odessa or other variety, J. W. Wood, Baraboo	5 00
Second best, A. J. Phillips, West Salem	3 00
Best white winter wheat, J. B. Duncan, Baraboo	5 00
Second best, J. W. Wood, Baraboo	3 00
Best rye, Wm. M. Squire, Fulton	5 00
Second best, J. F. Bemis	3 00
Best white oats, J. W. Wood, Baraboo	5 00
Second best, J. W. Wood, Baraboo	3 00
Best black oats, D. T. Pilgrim, West Granville	5 00
Second best, R. W. Sutliff, Rock	3 00
Best barley, J. C. Davis, Oshkosh	5 00
Second D. T. Pilgrim, West Granville	3 00
Best buckwheat, J. W. Wood, Baraboo	5 00
Second best, J. C. Davis, Oshkosh	3 00

Best flax seed, J. C. Davis, Oshkosh	5 00
Second best, D. T. Pilgrim, West Granville	3 00
Best hops (sack), N. W. Dean, Madison	5 00
Second best, D. T. Pilgrim, West Granville	3 00
Best timothy seed, J. W. Wood, Baraboo	5 00
Second best, Josias Auld	3 00
Best clover seed, J. H. Pilgrim, West Granville	5 00
Second best, D. T. Pilgrim, West Granville	3 00
Best peas, D. Huntley, Appleton	5 00
Second best, J. W. Wood, Baraboo	3 00
Best beans, D. T. Pilgrim, West Granville	5 00
Second best, Mrs. Cannon	3 00
Best dent corn, white, J. C. Davis, Oshkosh	5 00
Second best, J. W. Wood, Baraboo	3 00
Best dent corn, yellow, Ambrose Warner	5 00
Second best, Simon Antisdel	3 00
Best flint corn, white, J. C. Davis, Oshkosh	5 00
Best flint corn, yellow, N. W. Dean, Madison	5 00
Second best, O. L. DeForest, Janesville	3 00
Best exhibitton field products, J. Wood, Baraboo ..... Silver plate	25 00
Second best, D. T. Pilgrim, West Granville .... Silver plate	15 00

SPECIAL PREMIUM BY MILWAUKEE CHAMBER OF COMMERCE.

Best bushel winter wheat, J. B. Duncan, Baraboo	$25 00
Best bushel spring wheat, J. W. Wood, Baraboo	25 00

CLASS 24. — *Garden and Vegetable Produce.*

Best Early Rose potato, J. G. Carr, Milton Junction	$3 00
Second best, D. T. Pilgrim, West Granville	2 90
Best any other variety early potatoes, E. W. Palmer, Fitchburg	3 00
Second, Mrs. F. M. Vilas, Madison	2 00
Best half bushel peach Blows, E. P. May, Ft. Atkinson	3 00
Second best, F. W. Loudon, Janesville	2 00
Best any other variety late potatoes, J. W. Wood, Baraboo	3 00
Second best, Ambrose Warner, Whitewater	2 00
Best Yellow Nansemond sweet potatoes, J. M. Smith, Green Bay	3 00
Second, J. W. Wood, Baraboo	2 00
Best Red Bermuda sweet potatoes, J. M. Smith, Green Bay	3 00
Best four quarts Lima beans, J. F. Wiley	3 00
Second best, J. M. Smith, Green Bay	2 00
Best blood turnip-beets, J. M. Smith, Green Bay	3 00
Second best, O. L. DeForest, Janesvile	2 00
Best long blood beets, Edwin Howell, Harmony	3 00
Second best, O. L. DeForest, Janesville	2 00
Best Mangel Wurzel, C. Hazen, Ladoga	3 00
Second best, J. W. Wood, Baraboo	2 00
Best Red Wethersfield onions, J. W. Wood, Baraboo	3 00
Second best, Edwin Howell, Harmony	2 00
Best Yellow Danvers, J. M. Smith, Green Bay	3 00
Second best, J. W. Wood, Baraboo	2 00
Best any other variety onions, Edwin Howell, Harmony	3 00
Second best, J. W. Wood, Baraboo	2 00
Best Drumhead cabbage, J. M. Smith, Green Bay	3 00
Second best, R. P. Allen	2 00
Best three Winningstadt cabbage, Geo. Jeffrey, Smithville	3 00
Second best, J. W. Wood, Baraboo	2 00
Best Long Orange carrots, J. W. Wood, Baraboo	3 00
Second qest, J. M. Smith, Green Bay	2 00
Best horn carrots, O. L. DeForest, Janesville	3 00
Second best, J. W. Wood, Baraboo	2 00

Best head cauliflower, J. W. Wood, Baraboo	3 00
Second best, J. W. Wood, Baraboo	2 00
Best ten heads celery, J. M. Smith, Green Bay	3 00
Second best, J. L. Freeborn, Milton	2 00
Best twelve ears early sweet corn, O. L. DeForest, Janesville	3 00
Second best, Geo. Jeffrey, Smithville	2 00
Best twelve ears late sweet corn, D. M. Aspinwall	3 00
Second best, O. L. DeForest, Janesville	2 00
Best sample egg plant, Geo. Jeffrey, Smithville	2 00
Second best, J. M. Smith, Green Bay	1 00
Best six watermelons, Edwin, Howell, Harmony	3 00
Best six nutmeg melons, J. G. Carr, Milton Junction	3 00
Second best, Edwin Howell, Harmony	2 00
Best Parsnips, J. M. Smith, Green Bay	3 00
Second best, O. L. DeForest, Janesville	2 00
Best twelve large red peppers, J. L. Freeborn, Milton	2 00
Second best, R. P. Allen	1 00
Best peck vegetable oysters, J. W. Wood, Baraboo	2 00
Second best, J. M. Smith, Green Bay	1 00
Best six Hubbard squashes, Geo. Jeffrey, Smithville	3 00
Second best, J. M. Smith, Green Bay	2 00
Best tomatoes, O. L. DeForest, Janesville	3 00
Second best, R. P. Allen	2 00
Best flat turnips, J. M. Smith, Green Bay	3 00
Best rutabagas, O. L. DeForest, Janesville	3 00
Second best, Peter Schmitz	2 00
Best exhibition by professionals, not less than fifteen varieties, O. L. DeForest, Janesville	10 00
Second best, J. M. Smith, Green Bay	5 00
Best exhibition by nonprofessionals, not less than 15 varieties, J. W. Wood, Baraboo	10 00
Second best, Edwin Howell, Harmony	5 00

CLASS 25.— *Products of the Flouring Mill, Dairy and Apiary.*

FLOUR.

Best barrel winter wheat flour, James Clark & Co., silver plate	$15 00
Best barrel spring wheat flour, E. P. May, Fort Atkinson, silver plate	15 00
Second best, James Clark & Co., silver plate	10 00

BUTTER — FARM MADE.

Best twenty pounds made in June, Mrs. Thomas Little, Janesville	$15 00
Second best, Mrs. E. W. Fisher, Orfordsville	10 00
Third best, C. P. Goodrich, Fort Atkinson	5 00
Best twenty pounds made at any other time, C. P. Goodrich, Fort Atkinson	15 00
Second best, Mrs. E. L. Walsh, Milton	10 00
Third best, A. H. Downing, Fort Atkinson	5 00

BUTTER — CREAMERY.

Best twenty pounds made in June, James Clough, Edgerton	$15 00
Second best, C. P. Goodrich, Fort Atkinson	10 00
Best twenty pounds made at any other time, James Clough, Edgerton	15 00
Second best, C. P. Goodrich, Fort Atkinson	10 00
Third best, O. E. Merrill	5 00

CHEESE.

Best two cheese made in June, S. Littlefield, Plymouth	$15 00
Second best, Charles Gibson, Lind	10 00
Third best, Chester Hazen, Ladoga	5 00
Best two cheese made in August, Hiram Conover, Plymouth	15 00
Second best, B. S. Hoxie, Cooksville	10 00
Third best, S. Littlefield, Plymouth	5 00

PRIVATE DAIRY.

Best two cheese made at any time, Simon Antisdel, Afton	$15 00

SAMPLES OF HONEY AND SUGAR.

Best ten pounds honey, D. M. Aspinwall, Farmington	$5 00
Second best, Emily T. Smith, Green Bay	3 00
Best extracted honey, Emily T. Smith, Green Bay	3 00
Best Italian bees, D. Huntley, Appleton	5 00
Best ten pounds maple sugar, D. M. Aspinwall, Farmington	5 00
Best gallon maple syrup, J. B. Duncan	5 00

CLASS 26. — *Household Products.*

BREAD AND CAKE.

Best loaf graham bread, Mrs. James Sutherland	$3 00
Best loaf white bread, hop yeast, Mrs. Wm. Paul	3 00
Best loaf white bread, milk raising, Mrs. James Sutherland	3 00
Best loaf Indian bread, Mrs. J. G. Carr, Milton Junction	3 00
Best sponge cake, Mrs. C. H. Root, Ripon	2 00
Best pound cake, Mrs. C. H. Root, Ripon	2 00
Best jelly cake, Mrs. C. H. Root, Ripon	2 00
Best gold and silver cake, Mrs. J. G. Carr, Milton Junction	2 00
Best fruit cake, Mrs. J. G. Carr, Milton Junction	2 00
Best and largest exhibition articles of above sorts, Mrs. J. G. Carr, Milton Junction	Silv. Medal.

SEALED AND PRESERVED FRUITS AND PICKLES.

Best canned peaches, Mrs. C. H. Root, Ripon, silver plate	$2 00
Best canned plums, Mrs. A. C. Bates, Janesville, silver plate	2 00
Best canned currants, Miss Carrie Plumb, Milton, silver plate	2 00
Best canned tomatoes, Mrs. C. H. Root, Ripon, silver plate	2 00
Best canned gooseberries, Mrs. C. H. Root, Ripon, silver plate	2 00
Best canned raspberries, Mrs. C. H. Root, Ripon, silver plate	2 00
Best canned strawberries, Mrs. C. H. Root, Ripon, silver plate	2 00
Best canned grapes, Mrs. A. C. Bates, Janesville, silver plate	2 00
Best canned blackberries, Mrs A. C. Bates, Janesville, silver plate	2 00
Best canned pears, Mrs. C. H. Root, Ripon, silver plate	2 00
Best preserved peaches, Mrs. C. H. Root, Ripon, silver plate	2 00
Best preserved plums, Mrs. C. H. Root, Ripon, silver plate	2 00
Best preserved apples, Mrs. C. H. Root, Ripon, silver plate	2 00
Best preserved watermelons, Mrs. C. H. Root, Ripon, silver plate	2 00
Best preserved grapes, Mrs. A. C. Bates, Janesville, silver plate	2 00
Best apple butter, Mrs. C. H. Root, Ripon, silver plate	2 00
Best raspberry jam, Mrs. C. H. Root, Ripon, silver plate	2 00
Best blackberry jam, Mrs. C. H. Root, Ripon, silver plate	2 00
Best crab apple jam, Mrs. C. H. Root, Ripon, silver plate	2 00
Best sour pickled cucumbers, Mrs. C. H. Root, Ripon, silver plate	2 00

Best pickled mangoes, Mrs. C. H. Root, Ripon, silver plate	2 00
Best pickled peaches, Mrs. C. H Root, Ripon, silver plate	2 00
Best pickled pears, Mrs. C. H. Root, Ripon, silver plate	2 00
Best pickled watermelon, Mrs. C. H. Root, Ripon, silver plate	2 00
Best sweet pickled cucumbers, Mrs. C. H. Root, Ripon, silver plate.	2 00
Best sweet pickled apples, Mrs. A. C. Bates, Janesville, silver plate.	2 00
Best tomato catsup, Mrs. C. H. Root, Ripon, silver plate	2 00
Best cucumber catsup, Mrs. J. P. Thomas, silver plate	2 00
Best and largest exhibition articles above specified, in glass jars, Mrs. C. H. Root, Ripon, silver plate	5 00

DEPATMENT G.—FRUITS AND FLOWERS.

CLASS 28.—*Fruit by Professional Cultivators.*

APPLES.

Best variety, not to exceed fifty, G. P. Peffer, Pewaukee	$10 00
Second best, A. G. Tuttle, Baraboo	7 50
Third best, N. N. Palmer, Brodhead	5 00
Best ten varieties adapted to the northwest, Wm. Reid, North Prairie	7 00
Second best, A. G. Tuttle	5 00
Third best, G. P. Peffer	3 00
Best five varieties adapted to the northwest, J. C. Plumb, Milton	3 00
Second best, A. G. Tuttle	2 00
Third best, G. P. Peffer	1 00
Best variety winter, not to exceed twenty, G. P. Peffer	5 00
Second best, N. N. Palmer	3 00
Third best, Wm. Reid	2 00
Best five varieties winter, A. G. Tuttle	3 00
Second best, Wm. Reid	2 00
Third best, G. P. Peffer	1 00
Best ten varieties large and showy, G. P. Peffer	5 00
Second best, F. W. Loudon, Janesville	3 00
Third best, A. G. Tuttle	2 00
Best plate Red Astrachan, G. P. Peffer	1 00
Best plate Duchess of Oldenburg, A. G. Tuttle	1 00
Best Plate St. Lawrence, J. C. Plumb	1 00
Best plate Fameuse, A. G. Tuttle	1 00
Best plate Utter, J. C. Plumb	1 00
Best plate Plumb's Cider, J. C. Plumb	1 00
Best plate Seek no Further, G. P. Peffer	1 00
Best plate Willow Twig, G. P. Peffer	1 00
Best plate Ben Davis, G. P. Peffer	1 00
Best plate Talman Sweet, G. P. Peffer	1 00
Best plate Golden Russet, G. P. Peffer	1 00
Largest apple, G. P. Peffer	1 00
Heaviest apple, F. W. Loudon	1 00

PEARS.

Best display of varieties, G. P. Peffer	$3 00
Best three varieties, G. P. Peffer	2 00
Best Flemish Beauty, G. P. Peffer	2 00

PLUMS.

Best and greatest variety, G. P. Peffer	$3 00
Best Miner, J. C. Plumb	2 00
Second best, G. P. Peffer	1 00
Best native or wild, G. P. Peffer	1 00

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

GRAPES.

Best display varieties, Wm. Reid	$10 00
Second best, L. L. Kellogg, Janesville	7 50
Third best, F. W. Loudon	5 00
Best ten varieties, L. L. Kellogg	7 50
Second best, F. W. Loudon	5 00
Third best, Wm. Reid	3 00
Best five varieties, L. L. Kellogg	3 00
Second best, Wm. Reid	2 00
Third best, F. W. Loudon	1 00
Best three varieties, J. C. Plumb & Son	3 00
Second best, L. L. Kellogg	2 00
Third best, F. W. Loudon	1 00
Best two varieties, J. C. Plumb & Son	2 00
Second best, Wm Reid	1 00
Best single variety, F. W. Loudon	2 00
Second best, Wm. Reid	1 00
Best three bunches Concord, Wm. Reid	2 00
Second best, F. W. Loudon	1 00
Best three bunches Delaware, Wm. Reid	2 00
Second best, F. W. Loudon	1 00
Best single variety, quality to rule, F. W. Loudon (Delaware)	3 00
Second best, N. N. Palmer (Worden)	2 00
Best show foreign, G. P. Peffer	3 00

CRABS.

Best and greatest variety named, Wm. Finlayson, Mazomanie	$3 00
Second best, A. G. Tuttle	2 00
Third best, G. P. Peffer	1 00
Best plate Hyslop, L. L Kellogg	1 00
Best plate Transcendant, D. M. Aspinwall, Farmington	1 00
Best plate Seedling, J. C. Plumb (Lake Winter)	2 00
Second best, G. P. Peffer (Belleflower)	1 00

SWEEPSTAKES.

Best collection of all kinds, G. P. Peffer (147 kinds)	$7 50
Second best, L. L. Kellogg (50 kinds)	5 00
Third best, Wm. Reid	3 00

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

APPLES.

Best display of varieties, Geo. Jeffrey, Smithville	$10 00
Second best, B. B. Olds, Clinton	7 50
Third best, James Ozanne, Somers	5 00
Best ten varieties adapted to the northwest, Geo. Jeffrey	7 00
Second best, D. Huntley, Appleton	5 00
Third best, B. B. Olds	3 00
Best show ten varieties, large and showy, Geo. Jeffrey	5 00
Second best, James Ozanne	3 00
Third best, B. B. Olds	2 00
Best five varieties adapted to the northwest, Geo. Jeffrey	3 00
Second best, B. B. Olds	2 00
Third best, James Ozanne	1 00

Best variety winter, Geo. Jeffrey	5 00
Second best, James Ozanne	3 00
Third best, B. B. Olds	2 00
Best five varieties winter, B. B. Olds	3 00
Second best, James Ozanne	2 00
Third best, Geo. Jeffrey	1 00
Best plate Red Astrachan, B. B. Olds	1 00
Best plate Duchess of Oldenburg, Geo. Jeffrey	1 00
Best plate Fameuse, D. Huntley	1 00
Best plate St. Lawrence, B. B. Olds	1 00
Best plate Plumb's Cider, D. Huntley	1 00
Best plate Seek no Further, Geo. Jeffrey	1 00
Best plate Talman Sweet, Mark Honnisett, Center	1 00
Best plate Golden Russet, B .B. Olds	1 00
Best plate Ben Davis, B. B. Olds	1 00
Largest apple, Geo. Jeffrey	1 00
Heaviest apple, Geo. Jeffrey	1 00

PEARS.

Best display varieties; Geo. Jeffrey	3 00
Second best, D. T. Pilgrim, West Granville	2 00
Third best, James Ozanne	1 00
Best three varieties, Geo. Jeffrey	2 00
Second best, James Ozanne	1 00
Best Flemish Beauty, D. T. Pilgrim	2 00

PLUMS.

Best and greatest variety, D. T. Pilgrim	3 00
Second best, Geo. Jeffrey	2 00
Third best, Mark Honnisett	1 00
Best Miner, Mark Honnisett	2 00
Best native or wild, C. C. Fisher, Centre	1 00

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

GRAPES.

Best display of varieties, F. S. Lawrence, Janesville	$10 00
Best ten varieties, F. S. Lawrence	7 50
Best five varieties, F. S. Lawrence	3 00
Best three varieties, F. S. Lawrence	3 00
Second best, Mark Honnisett	2 00
Best two varieties, F. S. Lawrence	2 00
Best single variety, S. G. Williams, Janesville	2 00
Second best, F. S. Lawrence	1 00
Best three bunches of Concord, F. S. Lawrence	2 00
Second best, Mark Honnisett	1 00
Best three bunches of Delaware, F. S. Lawrence	2 00
Second best, Mark Honnisett	1 00
Best single variety, quality to rule, S. G. Williams	3 00
Second best, F. S. Lawrence	2 00

CRABS.

Best and greatest variety named, D. T. Pilgrim	$3 00
Second best, J. Baldwin, Brooklyn	2 00
Third best, Geo. Jeffrey	1 00
Best plate Hyslop, C. C. Fisher	1 00
Best plate Transcendent, C. C. Fisher	1 00

SWEEPSTAKES.

Best collection of fruit, Geo. Jeffrey	$7 50
Second best, James Ozanne	5 00
Third best, D. T. Pilgrim	3 00

CLASS 32. — *Seedlings.*

SEEDLING APPLE.

Best, D. M. Aspinwall,	Diploma or $10 00
Second best, G. P. Peffer	5 00

CLASS 33. — *Summer Fruits.*

NURSERY TREES.

Best collection deciduous nursery grown trees, J. C. Plumb & Son.	Diploma.
Best collection of evergreens, J. C. Plumb & Son	Diploma.
Best collection fruit trees, J. C. Plumb & Son	Diploma.
Best collection hardy flowering shrubs, J. C. Plumb & Son	Diploma.
Best collection apple trees, J. C. Plumb & Son	Diploma.

CLASS 34. — *Flowers by Professional Cultivators.*

Best floral design, Wm. Kitzrow, Milwaukee	$5 00
Second best, Mrs. A. H. Caldwell, Janesville	3 00
Best collection cut flowers, Wm. Kitzrow	4 00
Best pyramidal bouquet. Wm. Kitzrow	3 00
Second best, R. P. Allen, Janesville	2 00
Best pair flat bouquets, Wm. Kitzrow	2 00
Second best, Mrs. A. H. Caldwell	1 00
Best bouquet everlasting flowers, Wm. Kitzrow	3 00
Best ten named dahlias, J. C. Plumb	2 00
Second best, Mrs. A. H. Caldwell	1 00
Best display roses, Mrs. A. H. Caldwell	4 00
Second best, Wm. Kitzrow	3 00
Best five named roses, Wm. Kitzrow	3 00
Second best, Mrs. A. H. Caldwell	2 00
Best display verbenas, Wm. Kitzrow	2 00
Second best, Mrs. A. H. Caldwell	1 00
Best show seedling verbenas, R. P. Allen	2 00
Second best, Mrs. A. H. Caldwell	1 00
Best show pansies, Mrs. A. H. Caldwell	1 00
Best show double petunias, Wm. Kitzrow	1 00
Best show gladiolas, Wm. Kitzrow	1 00
Second best, Mrs. A. H. Caldwell	50
Best show greenhouse plants, not less than 50 varieties, Wm. Kitzrow	7 50
Second best, R. P. Allen	5 00
Third best, Mrs. A. H. Caldwell	3 00
Best twenty varieties greenhouse plants in bloom, Wm. Kitzrow	3 00
Second best, R. P. Allen	2 00
Best ten geraniums, Wm. Kitzrow	3 00
Second best, Mrs. A. H. Caldwell	2 00
Best six fuchsias, R. P. Allen	2 00
Second best, Wm. Kitzrow	1 00
Best display flowers of all kinds, raised by exhibitor, Wm. Kitzrow	5 00
Second best, R. P. Allen	3 00
Best display ornamental foliage plants, not more than fifteen varieties, Wm. Kitzrow	3 00
Second best, R. P. Allen	2 00

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

Best floral design, Mrs. F. S. Lawrence, Janesville	5 00
Second best, Mrs. E. R. Copeland, Monroe	3 00
Third best, Miss Kate Peffer, Pewaukee	2 00
Best collection cut flowers, Miss Kate Peffer	4 00
Second best, Miss Emily T. Smith, Green Bay	3 00
Third best, Mrs. E. R. Copeland	2 00
Best and most tastefully arranged basket of flowers, Miss Kate Peffer.	3 00
Second best, Mrs. E. R. Copeland	2 00
Best pyramidal bouquet, Mrs. F. S. Lawrence	3 00
Second best, Miss Kate Peffer	2 00
Best pair round bouquets, Miss Kate Peffer	3 00
Second best, Mrs E R. Copeland	2 00
Best pair flat bouquets, Miss Kate Peffer	2 00
Second best, Mrs. Robt. Boyd, Evansville	1 00
Best bouquet everlasting flowers, Mrs. Robt. Boyd	3 00
Second best, O. P. Freeborn, Milton	2 00
Best display dahlias, not more than twenty varieties, Miss Kate Peffer	3 00
Second best, Mrs. A. A. Boyce, Lodi	2 00
Best ten named dahlias, Miss Kate Peffer	2 00
Second best, Miss Kate Peffer	1 00
Best display verbenas, Mrs. A. A. Boyce	2 00
Second best, Mrs. E. R. Copeland	1 00
Best ten named verbenas, Miss Kate Peffer	2 00
Second best, O. P. Freeborn	1 00
Best show seedling verbenas, Mrs. E. R. Copeland	2 00
Second best, O. P. Freeborn	1 00
Best show asters, O. P. Freeborn	2 00
Second best, Miss Emily T. Smith	1 00
Best show perennial phlox, Miss Kate Peffer	1 00
Second best, Mrs. Wm. Paul, Milton	50
Best show pansies, Miss Kate Peffer	1 00
Second best, Mrs. Robert Boyd	50
Best show double petunias, Mrs. Robt. Boyd	1 00
Second best, Mrs. E. R. Copeland	50
Best show pinks, Mrs. Robt. Boyd	1 00
Second best, Miss Kate Peffer	50
Best show gladiolas, Miss Kate Peffer	1 00
Second best, Mrs. F. S. Lawrence	50
Best show phlox drummondii, Miss Kate Peffer	1 00
Second best, Mrs. E. R. Copeland	50
Best show stocks, Mrs. E. R. Copeland	1 00
Second best, Miss Kate Peffer	50
Best show balsams, Mrs. Robt. Boyd	1 00
Second best, Miss Emily T. Smith	50
Best show greenhouse plants, Mrs. F. S. Lawrence	5 00
Second best, Mrs. S. A. Whittier, Janesville	3 00
Best ten varieties greenhouse plants in bloom, Mrs. S. A. Whittier	3 00
Second best, Mrs. F. S. Lawrence	2 00
Best ten geraniums, Mrs. F. S. Lawrence	3 00
Second best, Mrs. S. A. Whittier	2 00
Best six fuchsias, O. P. Freeborn	2 00
Best display flowers raised by exhibitor, Miss Kate Peffer	5 00
Second best, Mrs. F. S. Lawrence	3 00
Best ornamental foliage plants, not less than ten, Mrs. F. S. Lawrence	3 00
Second best, O. P. Freeborn	2 00

VICK'S SPECIAL PREMIUMS.

Best collection cut flowers, Mrs. E. R. Copeland	20 00
Second best, Mrs. Robert Boyd	10 00
Third best, Miss Emily T. Smith	5 00
Fourth best, O. P. Freeborn	floral chromo.
Best ornamental floral work, Mrs. Robert Boyd	5 00

E. B. HEIMSTREET'S SPECIAL PREMIUMS.

Best collection cut flowers, Miss Gertie Kellogg..... Canary and gilt cage.
Second best, Mrs. E. R. Copeland..... Foot globe and four gold fish.
Largest Sun Flower, Mrs. J. P. Thomas.....Set garden tools.

CLASS 36.

Best exhibition by local horticultural society, Milton Horticultural Society..... $10 00

DEPARTMENT I.—MANUFACTURES.

CLASS 38 — *Stone Cutters' Work, Brick and other Building Material.*

Best specimen drain tile, Cook, Brown & Co., Oshkosh $3 00

CLASS 40 — *Stoves, Furnaces, Hollow Ware and articles of Hardware.*

Best cooking range for families, Chicigo & Erie Stove Co..... $3 00
Best ornamented parlor stove, Chicago & Erie Stove Co..... 3 00
Best display stoves, N. Griswold, Janesville ..... Grand silver medal.
Best horse shoes in variety, E. E. Eddington, Janesville..... 2 00

CLASS 41.— *Silver, Brittannia and Crockery Ware.*

Best display gold and silver electro plating, Racine Silver Plate Co ..... Silver medal.
Best collection glass, china and earthenware, W. G. Wheelock, Janesville ..... Grand silver medal.

CLASS 43.— *Chemical Manufactures.*

Best sample carbonate lead, E. B. Heimstreet, Janesville..... $3 00
Best mineral paint, E. B. Heimstreet, Janesville..... 2 00
Best dyes, E. B. Heimstreet, Janesville 2 00
Best fancy soap, E. B. Heimstreet, Janesville 2 00
Best potash, E. B. Heimstreet, Janesville..... 2 00
Best bicarbonate potash, E. B. Heimstreet, Janesville.....Diploma
Best show perfumery, W. H. Tallman .....
Best show fancy soaps and perfumery, E. B. Heimstreet, Janesville, ... Silver medal.
Best oxide of zinc, E. B. Heimstreet, Janesville..... 3 00

CLASS 44.— *Carriages, Wagon Work, etc.*

Best double carriage, Hodge & Buchholz, Janesville1... Silver plate, $5 00
Best single top buggy, F. P. Wallis & Co., Clinton Junction..... Silver plate, 5 00
..... Silver plate, 5 00
Best single open buggy, Wm. Servis, Sheboygan Falls. Silver plate, 5 00
Best trotting wagon, Hodge & Buchholz, Janesville .... Silver plate, 5 00
Best pleasure wagon, Wm. Servis, Sheboygan Falls.... Silver plate, 5 00
Best double sleigh, Menasha Sleigh Co..... Silver plate, 5 00
Best single sleigh, Wm. Servis, Sheboygan Falls ..... Silver plate, 5 00

Best common farm wagon, J. P. Bullis..... Silver plate, 5 00
Best fancy lumber wagon, Monroe M'f'g Co., Monroe.. Silver plate, 5 00
Best 3-spring and 3-seat wagon, A. C. Fish, Racine... Silver plate, $5 00
Best display hubs, spokes, felloes and other wagon work, Wm. Servis, Sheboygan Falls..... Silver plate, 5 00

CLASS 45. — *Cabinet Ware, Cooperage, etc.*

Best bookcase, J. H. Kinney..... Silver plate, $5 00
Best spring bed bottom, Jerry Bates, Janesville.. ..... Silver plate, 5 00

CLASS 46. — *Leather and Leather Manufactures.*

Best leather Green Bay Leather Co., Janesville..... Silver medal.

HARNESS, ETC.

Best carriage harness, Wm. Sadler, Janesville..... Silver plate, $10 00
Best single harness, Wm. Sadler, Janesville..... Silver plate, 5 00

BOOTS AND SHOES.

Best exhibition sewed boots and shoes, Hall & Nichols, Beloit.....
Silver medal, $10 00

CLASS 48. — *Textile Fabrics, Clothing, etc.*

Best exhibition cotton fabrics, Janesville Cotton Manufacturing Co.,
Silver plate, $10 00
Best exhibition woolen fabrics, McLean Manuf'g Co., Janesville....
Silver plate, 20 00

CLASS 49. — *Domestic Manufactures.*

Best Kersey blanket, Wm. Winkley, Janesville..... $4 00
Best rug of any material; Mrs. E. L. Walsh, Milton..... 4 00
Second best, Mrs. Mary A. Paul..... 2 00
Best fifteen yards rag'carpet, Mrs. Niquet, Whitewater..... 4 00
Second best, Milwaukee Industrial School..... 2 00
Best woolen stockings, Mrs. E. E. Blanchard, Janesville..... 2 00
Second best, Mrs. D. A. Beale, Janesville.. ..... 1 00
Best woolen socks, Mrs. S. A. Tenney, Durham Hill..... 2 00
Best woolen mittens, Milwaukee Industrial School..... 2 00
Best white quilt, Mrs. C. H. Root, Ripon..... 4 00
Second best, Mrs. C. H. Root, Ripon..... 2 00
Best silk quilt, Mrs. M. E. Woodstock, Janesville..... 4 00
Second best, Miss Maria Baldwin, Janesville..... 2 00
Best log cabin quilt, Mrs. J. C. Sanborn, Clinton..... 4 00
Second best, Mrs. F. M. Vilas, Madison..... 2 00
Best patchwork quilt, Mrs. C. H. Root, Ripon..... 4 00
Second best, Mrs. L. L. Balch, Janesville..... 2 00
Best knit counterpane, Mrs. W. M. Battle, Janesville..... 4 00
Second best, Mrs. J. L. Richmond, Whitewater..... 2 00
Best wrought counterpane, Mrs. H. Brayman, Horicon..... 4 00
Second best, Mrs. A. S. Phillips, Edgerton..... 2 00
Second best worsted scarf, Mrs. J. H. Balch, Janesville..... 2 00
Best wrought shawl, Mrs. Wm. Paul..... 4 00
Second best, Milwaukee Industrial School..... 2 00
Best specimen patched mending, Mrs. A. C. Bates, Janesville..... 2 00

DEPARTMENT J.— FINE ARTS.

CLASS 51.— *Works of Art.*

Best portrait in oil, from nature, Mrs. A. C. Bates, Janesville	Silver plate,	$10 00
Second best, Mrs. J. P. Williams	Silver plate,	5 00
Best original landscape in oil, from nature, Mrs. J. P. Williams, Janesville	Silver plate,	10 00
Second best, Mrs. J. P. Williams, Janesville	Silver plate,	5 00
Best historical landscape in oil, from nature, Mrs. J. P. Williams, Janesville	Silver plate,	10 00
Best animal painting in oil, from nature, Mrs. J. P. Williams, Janesville	Silver plate,	2 00
Best fruit painting, in oil, Mrs. G. H. Stowe	Silver plate,	2 00
Best fruit painting in water colors, Mrs. J. P. Thomas	Silver plate,	2 00
Best flower painting in water colors, Mrs. J. P. Thamas	Silver plate,	2 00
Best portrait in crayon from photograph, C. F. Penniman, Janesville	Silver plate,	2 00
Best water color (stipple) photograph, Miss W. A. Simmons, Brooklyn	Silver plate,	10 00
Best oil photograph, Mrs. G. A. Stowe	Silver plate,	10 00
Best specimen carving in wood, Frank Moses, Janesville	Silver plate,	2 00
Best exhibition penmanship, Fellows & King, Janesville	Silver plate,	2 00
Best exhibition by apprentice, C. S. Mack, Johnstown	Silver plate,	2 00

CLASS 52.— *Needle, Shell and Wax Work.*

Best sample plain sewing, Mrs. Rob't Boyd, Evansville	$4 00
Second best, Mrs. G. H. Stowe	2 00
Best crochet or fancy knitting, Mrs. C. H. Root, Ripon	4 00
Second best, Mrs. E. G. Fifield, Janesville	2 00
Best cotton tidy, Nellie Fathus, Janesville	2 00
Second best, Mrs. C. H. Root, Ripon	1 00
Best worsted tidy, Miss Ella Field, Madison	2 00
Second best, Mrs. G. C. Birsell, Janesville	1 00
Second best embroidered slippers, M. Morrison	2 00
Best worsted embroidery, Mrs. N. Halverson	4 00
Second best, Mrs. C. H. Webster	2 00
Best embroidered chemise, Lizzie Jewell, Janesville	4 00
Second best, Mrs. S. A. Tenney, Durham Hill	2 00
Best crochet chemise, Mrs. J. P. Williams, Janesville	4 00
Best raised worsted embroidery, Mrs. C. H. Webster	4 00
Second best, Mrs. Fannie Vilas, Madison	2 00
Best needle work on floss embroidery, Lizzie Jewell, Janesville	4 00
Second best, Mrs. G. H. Stowe	2 00
Best silk embroidery, Miss Minnie Cummings	4 00
Second best, Mrs. G. H. Stowe	2 00
Best chenille embroidery, Mrs. C. E. Blanchard	4 00
Second best, Mrs. E. A. Case, Elkhorn	2 00
Best worsted embroidered chair cover, Mrs. A. C. Bates, Janesville	4 00
Second best, Mrs. J. W. Sale	2 00
Best ottoman cover, Josie Phillips, Janesville	4 00
Second best, M. Morrison, Fond du Lac	2 00
Best sofa cushion, Mrs. Fannie Vilas, Madison	4 00
Second best, Miss Ella Field, Madison	2 00
Best braid work by machine, Warren Collins, Janesville	2 00
Best braid work by hand, Mrs. C. H. Root, Ripon	2 00
Second best, Mrs. G. H. Stowe	1 00

Best work in wax, Mrs. A. S. McAllister	2 00
Best work in feathers, Josie Phillips, Janesville	2 00
Best bead work, Mrs. C. H. Webster, Janesville	2 00
Second best, Mrs. A. C. Bates, Janesville	1 00
Best farmer's wreath, Mrs. S. M. Hadley, Janesville	2 00
Second best, Miss Mattie J. Bullard, Evansville	1 00
Best spatter work, Mrs. J. P. Thomas	2 00
Best exhibition hair work, Mrs J. A. Cunningham, Janesville	4 00
Second best, Mrs. G. H. Stowe	2 00
Best lamp mat, Mrs. E. A. Case	2 00
Second best, Miss Josie Phillips	1 00
Best toilet set, Mrs. A. D. Smith	4 00
Second best, Mrs. A. D. Smith	2 00
Best work on perforated paper, Miss Ella Field, Madison	2 00
Second best, M. Morrison, Fond du Lac	1 00

DEPARTMENT K.— NATURAL HISTORY.

CLASS 53.

Best collection illustrating birds of Wisconsin, Frank L. Tappan, Janesville	Diploma.
Best collection insects of Wisconsin, F. L. Tappan, Janesville	Diploma.

STATE

AGRICULTURAL AND HORTICULTURAL CONVENTIONS,

Held at Madison, February 5th to 8th, 1878.

[Under the auspices of the State Agricultural and State Horticultural Societies.]

TUESDAY, 8 P. M.

The convention met in the Assembly Chamber, and was called to order by the Hon. N. D. Fratt, president of the State Agricultural Society, who delivered the following

ADDRESS.

Assembled as we are at the capital of our state, representative men gathered from all localities, to discuss the industrial interests of the farm, with its many adjuncts of stock and dairy; the garden with its varied interests of flowers and fruit; the workshop and its valuable products, we cannot too carefully consider the responsibility of our position. To our organizations a host of valued and important details are committed, in promoting the best interests of the great producing classes, and providing as far as possible for that progress in all which the genius of this progressive age so eminently demands; it is with much satisfaction, too, that amid the great financial revulsions that are sweeping over the land, involving in their destructive course the fortunes of many other classes, that we can turn with such confident assurance to the steady fortunes of the industrious and prudent producing classes. Such evidences of the safety and prosperity maintained by labor and skill, even under adverse circumstances, cheer the heart of in-

dustry in all callings, and serve to strengthen the confidence which ever should be reposed in all truly industrial pursuits.

The great problem now before us for solution, as we enter upon the labor and enterprise of another year in the history and management of our several organizations, seems to be, what shall be done to advance the best interests of all the producing classes? To our societies, they very naturally look for council and encouragement, and to furnish this in the best manner, let all unite, let a cordial welcome meet every agent that can help us in our great enterprise, and a place be assigned to the thoughtful and studious theorizer, who studies, and thinks, and plans, and looks ahead from causes to consequences, from facts to results. He very properly has his position among us, and that should be an honored one in our council or at festive boards. His is the ever important duty of waking up thought, making inquiry, suggesting reasons, finding out causes, furnishing processes, and as far as mere theory can do it, presenting remedies in the important enterprises which so nearly concern all classes. But here he stops, and his labors would come to a most inglorious end if another and a more effective agent did not enter the field and carry out and project his plans and give form and substance to his theories and suggestions. It is here that the efficient character of the practical man presents itself to be the final master of the whole situation. Clearly allied to the man of theories, almost identical in many respects with him is the experimenter whose whole life has been one continual inquiry, who goes about as a walking and working interrogation point, with all his energies bound up in a succession of *whys*, *hows*, *wheres*, and *whens*. He no sooner notices a fact, or a process, than his mind commences the task of sounding it to its lowest foundation, seeking the why? the how? or the when? or all of them at once, and to no class of men does the world owe more than to these experimenters and theorizers. It is very seldom that these men are able to profit by their own labor; many and many a blight, and plague, and misfortune, which has fallen with destroying effect upon our best material interests, has been counterchecked and the remedy furnished by means of his incessant experiments. Assign him his place, an important one, listen to his questions and as far as possible, assist him by answering his queries, and he will ever prove a valuable auxiliary.

But we cannot all be experimenters, nor is it at all desirable

that we should be. After him must come the energetic worker, with a sound head, a well informed and well balanced judgment, with strong industrious hands, to utilize and carry out the results of inquisitive experiments, nor should we ever overlook, in the great crowd of valuable co-workers, the ornamenter or beautifier in all the great and useful products of nature. The all wise author of all things, has every where set before man, beauty in all its varied and graceful forms; the thrifty grain waves its pliant green leaves and nods its graceful head freighted with its rich promise of the future harvest, in golden beauty to the passing breeze. The luxuriant corn raises its golden tassels to the sunlight, whilst down among its broad leaves it hangs out its silken banners; the humble flax is crowned with the blue eye of beuty, and the autumn brings the wealth of a valued crop, and so in all departments, nature ever presents to her votaries, gems of beauty to gladden the eye, and cheer the heart; and this seems ever to admonish man, the master and proprietor of all this goodly heritage, that he too should ever pay a proper regard to the beautiful in all his arrangements, ever as a subordinate to the useful, but never to be lost sight of. Hence he who has an eye and a taste for the beautiful should ever be listened to with care and attention, and his council treasured up, but here again comes in the effective and manly worker, to whose iron will and strong arms all beauty must ever be indebted for its realization and actual presentment. Nor should we ever neglect the efficient help of the many gifted speaker who from time to time present to us the careful result of much thought and study, and impart wisdom and instruction in well digested forms. Year after year, addresses are made to us, replete with practical ideas and suggestions; year after year the records of our transactions are printed in well filled volumes, abounding in useful facts, the results of culture thought and experience, and still we come back to the great fundamental tact that all rests upon the broad shouldered, the hard handed, and the level headed practical man, the man who knows how to appreciate a good idea when he sees or hears it, and who has the strength and courage to reach forth and grapple with any and all obstacles, and subjugate them to his will and use.

The great and final agent of all progress in the several departments, then, we find to be, the man to whom it is ever one and the

same thing to know what ought to be done, how it ought to be done, and to plunge in with all the force of his nature and do it. And this brings us once more to the problem with which we set out, viz.: What shall be done to advance the best interests of all the producing classes? And to this, a suggestive and immensely practical inquiry may with great propriety be added: Have the various societies which we represent, and for whose progress and management we are to some extent responsible, done all that practical men, thoroughly in earnest, should be expected to do, to utilize the valuable suggestions, to realize the desirable theories which have so often been presented to us? If not, then the proper aim and scope of our associations have been realized in but an imperfect manner, and it behooves us at once to seek for a remedy. Let this, then, be the end and aim of our labors during the coming year. Let our motto be, "prove all things, and hold fast to that which is good."

APPROVED SYSTEM OF EXPERIMENTAL FARMING.

BY PROF. T. C. CHAMBERLIN, STATE GEOLOGIST.

Gentlemen of the Wisconsin State Agricultural Society: The views which I purpose to present this evening will be such as present themselves to my mind in the study of the agricultural resources of our state in connection with the geological survey. It was not my intention to present these views in any public manner, but having presented them to some of my agricultural friends, by whom they have been received with interest, I have thought it might not be amiss to present my views rather as suggestions than as matter of conclusion. I have thought that whatever might be your opinion concerning the main propositions, some of the facts upon which they are based might not be without interest. I will introduce what I have to say by a few general statements of a theoretical nature, although the conclusions at which I have arrived have come in the opposite order, from the observation of fact.

Farming, so far as it is a science, embraces two classes of fact, the one of a general and fundamental nature, the other of a local nature. The first class is that which relates to the soil cultivated,

to the chemical and physical forces and material that enter into the process of agriculture, of climatic conditions and of all those general elements which enter into the problem of agriculture wherever practiced. These are fundamental in their nature, and general in their application. They are true of farming wherever practiced. These constitute fundamental agricultural science. The other class of facts relate to the application of these fundamental principles and truths to the special localities in which the experiment of farming may be tried. To illustrate; to know the botanical nature, the chemical elements of a plant, and that a certain amount of heat is necessary for its growth are facts of the first class and are true of plants wherever raised, but to know that the plant is, or is not, adapted to this state, is a question which belongs to the second class or local agricultural science. An experimenter, too, having to determine science, so far as it relates to farming, if he covers the whole ground, must take cognizance of these facts. If the experiments are directed to determining fundamental agricultural science, they must necessarily fall under the general principles of scientific investigation.

To determine the tendency of any general principle, it is often necessary to carry it to an extreme, and hence experiments directed to this end must be exceptional in their conditions, must be surrounded by certain circumstances which will eliminate other elements. It is very much as it is in the science of medicine — the specific and exact effect of any drug is determined by its effects when used in excessive quantities. The beneficial effects of strychnine are determined from its effects when taken in poisonous quantities. It is so in the problem of agricultural science. To determine the effect of any theory or principle it is necessary to carry it to a certain extreme so that its effects may be seen. Hence experiments that have reference to this featue of agricultural science are often somewhat beyond those methods which are applicable to farming in general. Farms devoted to this work are not remunerative. We could not expect them to be so, if they are to develop this class of facts and of principles.

If, on the other hand, experiments are directed to develop the *application* of these fundamental truths and principles to special locations, those experiments must be tried in the locations to which the adaptation is to be made, or in situations that are similar in

their conditions. An experimental farm located here in Madison may develop successfully the application of general truths of agricultural science to this location and to others similarly situated, but it does not follow that these principles would be applicable in all counties. They would not be so applicable.

There are then two classes of experiments that fall within the range of the functions of experimental farms (1) to develop the fundamental principles and (2) to determine the application of these principles to special localities. It seems a necessary inference that these different localties and a different areas, presenting various conditions, require that the experiments must be adapted to those conditions, and that is the fundamental principle upon which the proposition here advanced is based. But enough of theoretical considerations.

In an examination of the soils, the native vegetation, and of the climatic conditions of the state, it is apparent that considerable diversity exists. There are areas of the state which are distinct from each other in the soils which they present, and to a less degree in the climatic conditions which affect them. I may briefly outline the main districts of this class. In so districting them I do not mean to assert from the general facts presented that they are in every way applicable to each particular locality. Soils vary considerably, but at the same time there are large areas over which there is a prevalent class. The first of these districts to which I wish to call your attention is that which is known as the red clay district, bordering on Lake Michigan.

The western boundary may be said to start about Milwaukee and following the Milwaukee river northward gradually diverge from the lake, until, in Manitowoc county, it surmounts the kettle range it recurves towards Lake Winnebago, passing south of Fond du Lac whence it curves westward into the valley of the Fox river, thence northward in the Wolf river valley. The red clay here becomes impregnated with the sandy soil. This character of this soil will be found described in the transactions of this convention for the years 1874 and 1875. While a clayey soil, it contains a large calcareous element and a subordinate amount of sandy material. It is a somewhat marly clay. Its native constitution is of the most stable character. It is a new soil geologically though this does not imply that it is necessarily richer than others. This soil is improved

by cultivation; it has become enriched by time. This constitutes a well marked area, and is also subjected to peculiar climatic influences. It is within the range of the lake winds, and the climatic conditions which are presented are very different from those of other portions of the state.

In the southeastern part of the state, is a belt adjoining that just described, which is closely allied to it in character, being of a heavy and marly clay nature, but has different origin, and differs somewhat from it in constitution. Their capabilities will usually be found quite similar. Bordering that area, and occupying the south-central portion of the state, including Madison, we have an extensive area, over which the soil is varied in its character, consisting of prairie and sandy loams and marl clays. The vegetation of the red clay district consists mainly of heavy hardwood forests. That of the region under consideration is chiefly prairie and oak openings and forests. When subject to the same climatic influences, and it is scarcely necessary to describe the soil to an intelligent audience of agriculturists, when you have carefully described the vegetation which covers it.

In the southwest portion of the state we have an area over which the drift has never been spread, and whose soil is derived directly from the decomposition of the underlying rock. These last two areas as well include some patches of sandy soil, and some of other classes of soil. In the central portion of the state is a crescent-shaped sandy area, that has its southern margin near the great bend in the Wisconsin river, and its main northern limit near the next bend above. It narrows to the northeast and northwest. It is a false idea that all the northern part of the state is sandy.

We have also in Oconto county some sandy areas that are to be grouped with this, but the great mass of the northern part of the state does not belong to this district. It is a problem of great importance to determine what we shall do with this sandy area; how we shall prevent it from becoming more barren than nature has left it, and so producing bad effects upon the adjoining districts. North of this sandy area is an extensive district, occupied by a kind of loamy or clayey sandy soil, varying from a sandy soil which is somewhat barren in its nature, to a clayey soil which is somewhat stiff and adhesive in its nature. This occupies all the northern part of the state except a limited portion bordering on Lake

Superior and the sandy areas of land which I have already mentioned. It is covered by a dense growth of forest, chiefly hard wood and hemlock, though a considerable portion of the area is covered by pine. On the borders of Lake Superior there is an red clay district analogous to that of Lake Michigan and of similar geological formation. It is, however, somewhat more sandy, somewhat less calcareous, and so better adapted to that latitude. From the foregoing outline we see that there are several distinct soil districts within the state having different capabilities, and from this, then, I infer that if there is any value in agricultural experiments and in agricultural farms, it is necessary for you to determine what character of crops are adapted to the several areas.

The diversity between these several districts is so great that what is adapted to one is often quite illy suited to another, and a different selection of crops and of stock and the use of different methods are necessary to secure the best results. The system which I propose is based upon these indisputable facts.

The following is a brief outline of the plan:

1. The present farm to be devoted to the development of the general principles of agricultural science, and of those facts and methods that are equally applicable to all parts of the state, without regard to local peculiarities. Its relation to the University with its laboratories and scientists, especially fit it for this important work. By relieving it of other classes of work and specializing its functions, its results, I apprehend, would be more satisfactory to those having it in charge, and to the people of the state.

2. Local experimental farms established in each of the important soil-districts of the state, whose special object shall be to determine *what is adapted to that particular region, and how to make farming remunerative in that special district, with its peculiar conditions.* The practical success of farming depends upon the *adaptation* of crops and methods to the kind of soil, climate, market, means of transportation and similar circumstances that affect the raising and disposal of the crop; and it is to be the special function of these local farms to determine what is so fitted to each region.

3. These local experimental farms to be devoted to deciding questions of practical importance, such as the choice of varieties of grain, grass, or fruit, of methods of cultivation, of the manner of

disposing of the crop, and of breeds of stock, where several kinds are known to be fairly well adopted to the region, but not equally so. The trials should not include everything that could be experimented upon but only that which may fairly be expected to be paying to average farms, the object being to ascertain what is most paying, because best adapted to the region.

4. These local farms should be placed in the hands of experienced practical farmers, who have demonstrated their capacity both to conduct experiments and to make farming profitable.

5. The farms should be of moderate size, and fairly but not expensively equipped. The outfit should be such as might be within the reach of an average prosperous farmer.

6. The director of the central farm should sustain an advisory relationship to the superintendents of the local farms, but under such advice the latter should be allowed large discretion in the management of their farms.

7. All chemical and other special scientific work to be done by the Agricultural College.

8. The local farms to be centers of observation for their district upon all subjects relating to agricultural interests, with a view to thoroughly ascertaining, and, so far as possible, mapping out the resources of the state and furnishing a reliable basis for the comparison of experiences in different parts of the state.

9. The local farms should be self-sustaining. This, of course, is not an essential feature of the system, and might not be possible in every individual case. The special value of this requirement, it is thought, would lie in the fact that it would confine the experiments to what would be practicable to average farmers who will, of course, adopt only that which is likely to be profitable.

The foregoing, which is merely a rough outline, is submitted, not as a final and mature judgment, but as a suggestion for your consideration, hoping that it may involve something that may be of value.

[The preceding subject was presented extemporaneously, and the stenographer's report is quite incomplete and inaccurate.]

W. W. Field — I would like to ask Prof. Chamberlin a question. I would like to have his opinion upon the raising of cereals, stock-farming, or any of those particular branches of industries, in the different areas he has described.

Prof. Chamberlin — I wish to enunciate a principle of practice in reference to these subjects. The only ideas which I feel at liberty to advance are those ideas which are germain to my investigations. As to advising you what is best, in reference to your profession, I must, in accordance with this principle, confine myself to those suggestions which grow out of my investigation in my own department. I desire not to extend my suggestions beyond that which is legitimate to my profession.

J. W. Wood — In the course of years, in the course of time, and in the course of experimenting, it will be found that some style of farming is better adapted to different areas than any other, and the people who live thereon will find that there is no better land for certain agricultural purposes than the land on which they live. It is a question well worthy of your attention, and one which is well worthy of the great state of Wisconsin to engage in. We must establish these farms in order to develop the methods which would be best adapted to bringing up the capacity of these different parts of our state. We know that we have immense tracts which are unprofitable, and that they will remain so for years to come, and yet it would be wisdom on the part of our legislators and on the part of the men who are interested in our progress as a state to do whatever they can for the purpose of hastening the development of these tracts, and I think the professor is eminently wise in his suggestions, and that we might profitably follow them out. Some of the marsh lands might be made profitable by the cultivation of cranberries, and I would like to hear suggestions on this point from some of the gentlemen in the convention.

Mr. Kellogg — We know from experience that the belt of red clay along the lake shore for a number of miles will give us some fruits that we cannot raise in the central part of the state, where the soil is sandy. On that red clay land in the northwest, we cannot raise apples. If our geologists would tell us the geological formation, where we can grow the best fruits, we would like to compare it with our practical experience. The high lands of Baraboo give us the best exhibitions. The front of Lake Michigan gives us our best pears. I would like to call out some suggestions from the gentlemen here present, but probably at some other time they will come up in connection with the geological survey.

Mr. Plumb — Will you give us some of the details of your plan for the experimental farms, the subject of the lecture.

Prof. Chamberlin — The general idea is that there should be established on each of the soil-districts of the state an experimental farm to determine what *is practically adapted to that particular region*, the object not being the development of agricultural science, but of those practical methods that are adapted to the particular location. I endeavored to outline very briefly some of the characteristics which I thought should attach to such a farm. Those I submitted merely as suggestions, and subject to modifications, but it was my thought that those farms would be essentially *representative farms*. They should not be ideal farms. They should not be furnished with everything that money can furnish; with every appliance that might seem desirable, but with those appliances which *an average, industrious and prosperous farmer could supply to himself*. The buildings should be constructed with a due regard to all the conveniences and sanitary laws which attach to the farm. The house should be the representative of a good farmer's house, not, of course, necessarily a model for every farmhouse, but should be adapted *to use*, and should be such as would be within the reach of every prosperous farmer.

The out-buildings should be such as are practically within the reach of farmers, and in the planning and construction of these, reference should be had to *economy and convenience*, and with regard to the best results. The farms should not be very large, because I do not consider that such are desirable in general. A farm should be such in size as can be managed by an average farmer with very little of hired help, because, in my judgment, the employment of large numbers of hired men is not usually found profitable on a farm, nor is it desirable. The farms, therefore, would be in themselves, inexpensive, and therefore, the plan does not contemplate any notable draft upon the public funds. In the conduct of those farms, it was my thought that the experiments should be confined to those which are already known to be *approximately* practical. If, for instance, the direction is that of the subject just now under discussion, strawberry culture, the methods should be adapted to the several regions; the selection of varieties should be such as have been suggested here as being reasonably good ones, so that a reasonably profitable result might be expected from the introduction or trial of those varieties.

The object should not be to try every variety — leave that to a

farm that is devoted specially to such subjects. And so of all the other crops, the attempt being to settle these close questions of choice between varieties and methods that determine success or failure on the average farm, and not to settle the whole question of agricultural science. The work will then be directed *specifically* to the *application* of agricultural facts and known principles, to the development of the art of farming under the various local conditions presented in the state. I did not anticipate that the matter would receive the attention it has, but in view of it, if I may be allowed to make a suggestion, it would be that a committee of five, or seven, representing the different sections of the state, be appointed by the convention to take the matter under consideration and present the results of their deliberations at some future meeting of the convention.

Mr. Kellogg — Will the professor state whether they should be self-supporting?

Prof. Chamberlin — It was my thought that they should be. If they were not, they could not properly represent the practical aspects of successful farm-management. If they didn't pay, they certainly would not be successful as model practical farms.

Mr. Plumb — Under the care of the state, or as private farms?

Prof. Chamberlain — The state should have unlimited control of them.

Prof. Daniells — While we are upon this subject, I would like to say a few words. I am somewhat acquainted with the history of experimental farms, more so, perhaps, than a great many; having paid more attention to the subject in regard to where they have been self-supporting, either in this country or in Europe, where there has been anything approximating to self-supporting farms. There is the case of J. B. Laws; he furnishes the money and the other man, Mr. Gilbert, does the experimental work.

Mr. Wood — Is not the farm self-supporting?

Prof. Daniells — There is not an example where there is a self-supporting farm. There is a wonderful combination of capital and brains, and the state itself should bear the burden of expense as far as the experimental farms are concerned.

Mr. Wood — It (the Laws farm) is not dependent upon the government.

Prof. Daniells — One man furnishes the money and the other

man furnishes the experiments, and so far from it being a source of revenue, it does not begin to pay. I had no idea of objecting to the plan in regard to the cost. The State University does not begin to pay it way, as we all know. The state gives its money and gets it back indirectly. I was only replying to the point which Prof. Chamberlin made with regard to these experiments. It is an impossibility to conduct these experiments in any way which will be at all satisfactory without great expense. If you are not familiar with conducting the experiments, you will be surprised at the amount of expense there is in it. An experiment is good for nothing if it is not accurate; everything must be measured and weighed if the experiment is to be of any value. It takes more time than any of you would think.

Prof. Chamberlin — I have tried to guard myself upon one or two points, and especially in relation to indicating that this plan proposed to take away from the existing farm any of the functions that I thought it desirable to retain. It would, in my judgment, rather exalt than detract from it, so that I don't think that the professor could suppose that there is any ground for his objecting to the plan on account of any connection or relationship with the existing farm. That farm, in my plan, was to be the means of doing the higher work of developing fundamental facts and principles. Its function would be to carry its experiments out to their full extent, to their extreme limits, so as to determine with the utmost exactness possible in the nature of the case, all those fundamental principles and facts which underlie the science, and those experiments, as I then stated, would be more or less expensive, and could not be expected to be remunerative.

If I understand — and I will concede that the professor is very much more familiar with the facts than I am — if I understand the situation of existing experimental farms, they are devoted largely to such experiments, but not exclusively so. They are hampered more or less by the current opinion that they should show remunerative results. If they were confined exclusively to what I have indicated, they would not be thus hampered by public opinion, nor would they be hampered by those experiments which are directed to the application of their results. I think it is the experience of many farmers that they may know very closely what they are doing, just how much seed they are putting into the ground and how

much crop they are taking off, without its involving any considerable increase of expense in the conduct of their farms. The practical experimental farms proposed will have this advantage, they are not obliged to meet the taxes of the farm, nor the original outlay on the farm; but the farm being given, the managers are only required to make it pay its own expenses; and if an intelligent practical farmer cannot take a farm already equipped, and conduct his experiments so that he should know just what he puts in and what he takes out, and make it remunerative, it would appear doubtful whether farming was a profitable business on the whole.

Mr. Miller — I quite agree with most of the suggestions of the professor. I am a poor hand at farming, but I have tried a good many experiments. There is no doubt that these farms should be run by practical farmers.

Mr. Wood — The fact is that all these different districts are at present peopled by farmers that are succeeding and making money and getting rich in every one of these tracts. These districts cover the richest as well as the poorest portions of the state. It is a question of difficult solution to go into the Wisconsin river valley and make farms a paying institution, and if I were going, I should certainly want the state of Wisconsin to back me, if not the general government, and I don't think I should want to go on any less backing than that. You know that our state is settled by men of all nationalities, and I know that I have seen men doing very well where I could not do well because I could not follow their way of living, and I have read a story in connection with certain Norwegian families. They raised everything they could and then they sold everything they could get anything for, and that system of farming would succeed pecuniarily on our poorest acres. I do not propose to be in opposition at all to this movement, but at the same time we want to look at both sides of the question. In Germany experiments are conducted under the auspices of the government, but they perform experiments that are entirely beyond the reach of the practical farmer. While the experiments of Law and Gilbert, which are no doubt the most valuable the world can furnish, are not supported by the government, I was not aware until Prof. Daniells told us that they were not self supporting. He must be a large minded man that would see such expense extending over a life time.

Mr. B. F. Adams — I am learning everything in regard to this plan which Prof. Chamberlin has indicated, and I must say that I think his ideas in regard to self-supporting farms is capital. One gentleman remarked a few minutes ago that all of his experiments more or less were the results of study. It shows some results and shows a balance on the right side. The experiments should be such as would be beneficial. I am not sure but that is entirely practical, but the farmers themselves know best about that, as they are experimenting all the time. Experimenting is somewhat expensive, more so than ordinary operations, but still it does seem to me that a farm could be made self supporting. I believe that the gentleman who addressed us a few moments ago could make it self-supporting and carry on and perform those experiments under the direction of Prof. Daniells. It might be necessary to give him the privilege of managing some portion of the farm in his own way in making it productive in these branches of agricultural industry which are known to pay a good fair price. I think as agriculturists we should endeavor to nourish this idea which is thrown out for our consideration.

Mr. J. M. Smith — Prof. Daniells and I are warm personal friends. I hate to say a word against him, but I must protest against his idea that no experimental farm can be made to pay. If it cannot be made to pay, I cannot see what farming is good for. A good many people in Wisconsin make it pay; they raise and educate their families, and some of them do it very well. If I understand Prof. Chamberlin, his idea is to make the farm a scientific farm in the literal acceptation of the term. That is just what we have been trying to do for a good many years in a small way. I know that it has paid me, and I know that it has supported me and my family comfortably and nicely, and I know that it has paid its way. I know there are men that I can pick out in this state that would go onto such a farm and they would make it pay. If they would not, I should say that the mistake was in the manager and not in the farm. I am sure that experimental farming can be made to pay, and I do say that if a man shows sufficient alacrity and intelligence and perseverance, that the results in the future will be eminently satisfactory, and I believe that if the matter is taken in hand in the manner that Prof. Chamberlin suggests, that it can be made to pay.

Prof. Daniells — I do not contradict it at all. When we come to practical farming, I say that such a farm can be made to pay.

Mr. Robbins — This experimental farm at Madison does not do us any good in our locality. I am trying an experiment on my own hook. I am feeding 125 hogs and 60 or 70 head of cattle, and I am paying 35 cents a bushel for corn, and am paying the money. I cannot raise corn enough. Prof. Chamberlin says my soil is the oldest soil in the state of Wisconsin. The question I wish to learn is this? Can I sell pork at three and a half cents a pound on my farm, and can I pay thirty-five cents to the bushel for corn?

Mr. Boyce — You can make it just even.

Mr. Robbins — I am trying the experiment myself. Hay is worth five dollars a ton. The question is whether you would pay it or not; my land has got to be fertilized, it has got to be enriched. It cannot be enriched by raising grain. I cannot raise oats short of twenty cents a bushel. I want some one to tell me what I had better do under the circumstances. Had I better keep on feeding my corn during the winter?

Mr. Jackson — You had better sell your stock.

Mr. Robbins — I think I should have sold my stock last fall and rented my farm. Three or four years ago I seeded to grass; I made that a pretty good success. I have now two tons of hay per acre where I had but one before. I sowed five tons of plaster on a hundred acres of ground. I am satisfied with that year. If you can tell me here just what I can pay for corn, and what I can sell my pork and steers for on my farm, to make it profitable, I shall be paid for coming up here. I must raise stock; I can't raise small grain, and must pay my hired help. Let us put these experimental farms on the different soils of the state, and let the professors at Madison come and conduct those experiments, and not be confined to this locality.

Mr. Plumb then offered the following resolution:

Resolved, That this convention recommend the careful consideration of the proposition of Prof. Chamberlin for the establishment of "experimental farms" in the different geological districts of the state.

Resolved, That this convention instruct the appointment of a committee of seven to consider the whole matter and report at the next session of this convention; that said committee be appointed by the presidents of this joint convention, representing the State Agricultural and State Horticultural Societies, and that these presidents be members *ex-officio* of the committee.

Mr. Allen — I wish to offer an amendment, by inserting the

words "self-sustaining." The object is to find whether the work of farming can be proved to be self-sustaining and experimenting at the same time; how much experiment can properly be practiced upon a self-sustaining farm. I do not regard this as a proposition for an experimental farm; I suppose it to be some general plan upon which the intelligent farmer can come to some conclusion so that we can understand how much we are to accomplish.

Mr. Wood.— No man ever went on to farm, unless with the intention to make it self-sustaining. Whether it is self-sustaining, can only be determined after the results of years of labor. If the state of Wisconsin should purchase a farm and put upon it all the appurtenances that belong to it and, tell me, we want you to go on that farm and it shall be self-sustaining. I should say, I don't know whether I could make it self-sustaining or not, that comes afterwards. The resolution would then be, that we shall establish a self-sustaining farm that shall be beneficial to all.

Mr. Plumb.— The object seems to me that it will hamper this committee. We had better leave the matter with the committee to decide.

Mr. Boyce — The having a self-sustaining experimental farm in any district is not the great object. The object is, to determine, by experiments, what fruits, grain and manure are applicable to this district. That, one man should do what a thousand men, all the inhabitants of the district, are trying to do, and he could do it to better advantage. I do not think that successful results would be accomplished of these experimental farms, if in the beginning they were compelled to be self-sustaining.

Mr. Allen — This committee should be appointed to represent the different localities of the state, and should visit the farms where they have been successful, and where not; the committee should report to the convention next year the result of their examination and observation, and then we shall have something to act upon. It may be that my farm, if I should stock it to sheep, would be remunerative.

Mr. Walker — I have no objection to these farms, if they are going to be self-sustaining, but I do not believe it is any use getting up such a farm, because there are men experimenting in all parts of the state, who will arrive at the right results.

Mr. Field. — So far as the amendment is concerned I do n't think

it is material at all whether it is adopted or not. As to the resolution, I have no objection that I know of to its passage, and yet I would not want to vote for a resolution that should commit me to the ideas advanced by Prof. Chamberlin. I believe in an experimental farm; I believe in the farm we have now doing something *more* for the benefit of agriculture before we establish any thing more. I think the university farm has done a good deal; I think it has done all it could do with the means at its disposal, but I do not think there has ever been an instance where an experimental farm has been self-sustaining.

Mr. Clark. — Had not they any means?

Mr. Field. — Not being a member of the board, I am not able to answer the gentleman's question. I believe that Prof. Daniells, who is at the head of the department could answer that question.

Prof. Daniells. — If the gentleman wishes, I will do so.

Mr. Field — It matters not, perhaps, in relation to this matter that is now under consideration. You cannot place a cent of money at their disposal and you are not going to travel around and expend your money to ascertain these facts. You can ascertain, by correspondence and various other ways, certain facts which will be of benefit to this convention. I think it is well enough that the resolution should be adopted. It does not commit any one to the scheme or idea advanced by Prof. Chamberlin that we should establish a separate and independent farm.

Mr. Isaac Adams — I rise to ask a question of my friend, Mr. Robbins. He states that the experiments made at University farm are of no advantage to him whatever, and that he is conducting his own experiments at the present time. I would like to know this (as experiments need time always), whether he is conducting that experiment in a way or in a manner which shall approximate towards correctness so that he may be able, at the end of his experience, to tell us another year whether it pays to do just what he is doing.

Mr. Robbins — I think I can tell whether I am losing by the operation or making by it.

INDUSTRIAL SOCIETIES.

BY HON. R. D. TORREY, WINNEBAGO COUNTY.

By the term industrial, is meant all organizations that have for their object the encouragement of industry, as well as the perfection of the products of industry.

I am well aware that the term agriculture really covers nearly all branches of industry, such as tillage of the soil, husbandry, stock raising, and the like, but as the tendency is to apply the term only to tillage of the soil, I have chosen the term industrial not in contradistinction but to cover all.

I do not propose to go back of the history of our own country in this paper, not caring for the date or place of the organization of industrial associations prior to the first one here.

I might allude to the one organized in Eden, however, and tell you how smoothly it run until its principal patrons, becoming dissatisfied because they could not have *all* the premiums, were actually guilty of pilfering, and that some of their descendants have, while they have kept up the organization, been guilty of the same practice, though in a more genteel manner, but I will not, for it is not the purpose of this paper to criticise or find fault, but rather to offer brief suggestions intended to encourage the formation and growth of industrial societies.

From the books of the department of agriculture at Washington, we find that there were in the United States and Territories July 4, 1876, or at the close of our first century of national life, 1,893 industrial societies reporting to this bureau. Of this number New York has the most, 153; Iowa, 144; Ohio, 138; Illinois, 133; Kansas, 103; Indiana, 99; Pennsylvania, 94; Missouri, 86; Wisconsin, 81; Georgia, 77; Massachusetts, 74; Michigan, 70; Maine, 62; Tennessee, 55; Connecticut, 47; Minnesota, 43; Texas, 41; Virginia, 36; Nebraska, 35; Kentucky, 33; Utah, 33; Maryland, 27; North Carolina, 27; Vermont, 25; New Jersey, 23; New Hampshire, 24; Arkansas, 16; California, 16; Alabama, 14; Mississippi, 11; West Virginia, 11; Delaware, 10; South Carolina, 10; Washington Territory, 10; Louisiana, 9; Oregon, 7; Rhode Island, 6; Colorado and Florida, 5 each; Idaho, 4; Dakota, 3; Montana, Indian Territory and District of Columbia, 1 each.

According to the same authority, the first society organized in the United States was "The Society for the Promotion of Agriculture," in Philadelphia, 1785; the next was at Boston, 1792, and the third at Charleston, 1795. These are the three oldest societies in this country, and are still in active operation, two of them holding annual fairs. One cannot help congratulating them on the near approach of their one hundredth anniversary, and also reflect on the influence for good that they have sent forth over at least their respective states. Dividing the time into decades, we find that from 1776 to 1786, one society was organized:

1786 to 1796	2
1796 to 1806	1
1806 to 1816	2
1816 to 1826	12
1826 to 1836	13
1836 to 1846	65
1846 to 1856	308
1856 to 1866	328
1866 to 1876	1,161

Thus it will be seen that nearly two-thirds of all the societies in the United States have been organized within the last ten years, and it must be apparent to any one that the influence exerted by these societies has given to all branches of agriculture in that time an advance far in excess of all the remaining ninety years of the century combined — more intelligent farmers and farmers farming intelligently as well as profitably.

But coming to our own state, we find eighty-one societies reporting, and of these the oldest are Walworth, Washington and Kenosha county agricultural societies, organized in 1850. Then follows the State and Columbia county societies in 1851. Then the State Horticultural Society in 1853:

1850 to 1855	13
1855 to 1860	11
1860 to 1865	4
1865 to 1870	27
1870 to 1876	26
Total	81

As in the case of the United States, so in Wisconsin, about the same proportion, or two-thirds nearly, have organized in the last

decade, and here at home is the fact especially marked, viz.: That all industrial societies are doing very much to strengthen and perfect all laudable efforts to develop the varied industries of the state. This is being accomplished by provoking a healthy rivalry among producers to excel all other competitors; among manufacturers and artisans, to place on the market and on exhibition as well, only the *best*, for whether on the market or not, there is a desire, and I believe commendable in all, to bear off the blue ribbon. But this is not all; the conventions, the meetings, monthly, quarterly or annually like this, are working indescribable benefits to all who will avail themselves of the advantages they afford, but more of this further on, and if our state shall advance in the next ten years as rapidly and safely as it has in the past ten years, then we shall have reason to congratulate ourselves on the position we shall take among our sister states. Now the question arises, What is the best method to accomplish this object? My answer is, give us more industrial clubs and societies, call them by whatever name you will, only let the object be improvement in all departments of industry; let them be as numerous at least as the townships in the state. But some will say, we have now too many such societies, more than can exist, to say nothing of having a healthy, vigorous organization. If it were said we are in danger of having too many fairs or exhibitions, then there might be some force in the argument. But is it necessary, or even wise, that all such societies should hold fairs? I think not. Are fairs necessary to the success of such organizations? Certainly not. What are fairs but the outgrowth, the fruitage of such meetings as this, we are in no danger of having too many farmers' clubs, horticultural societies, stock associations, dairymen's associations, agricultural societies, only let all these, and all other industries that go to make up the wealth of the state, have perfect organizations and frequent meetings. But again, I do not mean to be understood that the farmers, as such, should have separate organizations from the horticulturist or the stock grower, but these should be combined, as far as is possible, in such organizations, as all such interests are identical. At meetings of such societies more dependance should be placed on the members themselves to make them interesting, and less on outside help, for there is not an intelligent farmer, or farmer's wife or daughter in the state, but is able to present some thought that will

be of benefit to all the members. And right here permit me to say, that the women of Wisconsin, the farmers' wives and daughters, have not heretofore taken, nor have they been assigned to that prominence in agricultural organizations and society meetings to which their relations to the industries of the state entitle them. But whenever they have been so assigned, they have given to the state some of the finest thought, which if improved upon can but result in great good to all who read. Without thought of making invidious distinction, let me ask who can read the papers of Mrs. Ayres or Mrs. Huntley on home, as published in the society's volumes of transactions, without at once determining that his home shall be more like home, and who will compute the influence for good such papers exert? How many hearthstones have been made brighter and home circles happier by articles like these? Give us more of them.

But, as already intimated, it is not, or should not be so much the object to hold fairs, as for mutual aid in perfecting the effort of industry. Fairs are not necessary to the success of enterprising communities, they are but the evidence of the interest we take in the highest state of agriculture; the aggregation of specimens, showing the results of the season's labor. A convincer for the man of thought, energy and thrift to publish to the world, the best evidence of the correctness of his method of growing grain, vegetables, fruit and flowers, or the breeding of stock, and, generally speaking, the perfection of the exhibit or the degree of perfection is also evidence of how much study and thought has been put in with labor in the product. We think fairs are not so essential to the development and prosperity of industrial interests as are meetings of the character of this annual convention. We do not wish to be understood as opposing fairs, but to do away with the objection that we are in danger of having too many societies, because fairs cannot be sustained. Given any industrial organization of whatever name that holds frequent meetings for discussion, and you will find the results to be the best of fairs; in the nature of the case the fairs will come naturally and easily.

Fairs are enjoyable and profitable, if rightly conducted, but not essential, but thorough organization is. Do we object on account of time and expense necessary to be given? Great expense is not necessary, is not advisable, but the time we give or devote in this

direction in meetings for the interchange of thought and for discussion of topics in this direct interest, of comparing notes and data gathered from actual experience, is so much capital well invested. If such organization existed in every town in the state, with frequent meeting, then the annual conventions of the State Agricultural and Horticultural Societies instead of being but moderately attended, would be the meeting of the masses of men and women, earnest and eager in their efforts to contribute to the success of intelligent labor. Then on with the work of organization, whether it be agricultural or horticultural, farmers' club or granges, dairymen or stock growers, or any other name, only let the object be improvement and the greatest possible good to all, rich or poor, who may come under their influence. So much in a general way. But as to the best plan of organization, so as to secure permanency and create an interest that shall be lasting, and not spasmodic, and that shall as well be constantly increasing, many ways will doubtless suggest themselves, but it would seem advisable that clubs should be formed in each township, that should be in direct harmony and sympathy with a county organization of like kind, and this, in turn, with the state society, the former should hold meetings at least once in each month, and the county quarterly, while the state should be annual, and at all should there be the freest discussion possible of all questions that are directly in interest with industry, or that effect industry in any way.

"In union there is strength;" with union and harmony combined, any interest, with effort, will be successful, and when that effort is for the advancement of that which is the foundation of national as well as state prosperity and happiness, the result can only be satisfactory to the true lover of his country. It would seem that in the way indicated is then the surest way to complete union and harmony and success. There would seem to be no need for defense against the question of having too many such societies, farther than has been shown in this paper, but in conclusion I will quote from an editorial of a prominent agricultural paper, the Rural World, wherein the editor says "that our agricultural societies, clubs and kindred associations have been of immense benefit to the people and country is almost universally conceded. The advantages of such organizations, properly managed, are too apparent and generally acknowledged to require argument. They have done and are

doing much to encourage and facilitate improvement in modes of culture and management, and also to introduce improved live stock and labor-saving implements and machinery. The fairs and shows of the various societies throughout the land (comprising agriculture, horticulture and all kindred branches), when managed as they should be, cannot fail to prove interesting, instructive and profitable to both exhibitors and spectators. The trials of implements, and valuable experiments made by or under the auspices of our own state and other prominent agricultural societies, have proved of great use and benefit to the farming community. It is the duty and interest of every one engaged in any branch of agricultural production to aid in fostering and sustaining these associations. If there are errors in management, the better way is to attend the meetings and fairs and aid in righting whatever may be wrong, rather than to stand aloof and complain of what one's presence and influence might have prevented. We thoroughly believe in agricultural societies, clubs, etc., and that great benefits are derivable from their exhibitions, trials, investigations and discussions. The press of the country should encourage every organization designed to promote the agricultural interest, and can perhaps best do this by commending what is clearly right and condemning whatever is wrong in management." And I will add to the press, all persons, public or private citizens, it is for the common interest of *all*, to use every legitimate means to encourage every organization designed to promote the industrial interests of the state.

W. W. Field — The senator states that two-thirds of the industrial societies have been organized within the last ten years. This is a very significant fact. It is a fact worth remembering. It is a fact worthy of study what has caused so many of the industrial societies of the country to be organized within the last ten years. Has it not been largely due to the fact that previous to that time there was very little interest felt in the cause of industrial education? Within the last decade these industrial influences have spread from neighbor to neighbor, from school district to school district, from town to town and from county to state, and if we farmers expect to keep pace with other professions in this speedy age we must advance ours by education and take every possible means of discussing these questions.

I think, perhaps, there is no business or profession which is of the same importance as farming. When I speak of farming I mean all branches which belong to farming. I mean horticulture, I mean stock raising — I mean every possible branch which is pursued by the agriculturist. Perhaps there is no one profession which has been so much neglected as farming. Many people to-day think that education, or in other words, book learning, in an agricultural life, is of but very little consequence. Why, it is just what you see published in our volume of transactions every year that our common farmers want; it is the experience of men from various parts of the state who come to these conventions and give us their experience, of men from various parts of the state who have been farming for years. There is a very great demand for this agricultural report. There is now so great a demand, that we cannot supply one-fourth of the copies that are wanted I believe it goes largely into the hands of those who need it. I believe in this Augustan age, when the people are becoming more enlightened upon the topics that are so necessary, not alone to our civilization but to our education, that a great movement is being made, and that our state shall stand forth triumphantly in the future on the highest pinnacle of fame as an agricultural state. I believe that our State Agricultural Society has taken pains to distribute this volume which undoubtedly disseminates, and which in the future will continue to disseminate, these broad principles of education, agriculturally.

Mr. Wood. — We are assembled here to-night for the purpose of listening to and discussing subjects which are of vital importance to us all, and we ought to feel proud that we have an opportunity of discussing these questions as intelligent farmers.

Senator Anderson. — There are a great many granges in Dane county, and I am one of those who think that encouragement should be given to the farmers and agriculturists of this state. I will state for the benefit of those who are not acquainted with the grange society, that 25,000 have been organized, farmers meeting weekly. Now gentlemen, those organizations are not composed of a few farmers sitting around the country store, but they are organized under a good system. We have the farmer, his wife, their sons and daughters, meeting together for good. It seems to me that the grange is the grandest and best order for the farming community ever formed.

Senator Torrey — I desire to make a few observations in reference to certain points in my paper. Call them what you will, farmers' clubs or granges, it makes no difference to me. I might have made the grange more prominent, but I don't know anything about the secret work of the grange, neither will they let me (laughter). That is just what I am puzzled about, but if they will let me into the grange I will try and speak more intelligently upon the subject, but unfortunately for me I am barred. I do recognize the truth of the remarks that the grange has done much, and the patrons of husbandry have accomplished much in the direction indicated. They are bringing more thought to the aid of labor, and they are shaping the destinies of this country, say what you will, and they are shaping it in the right direction. (Applause.)

Mr. J. M. Smith — I want to call my friend's attention to the fact that in our part of the state, we have some clubs which are termed farmers' clubs. They are respectable organizations, and I have been connected with them for a long time, and I know they are doing much good. I will give you the history of one to which I belong. It is about four or five years since I joined it. Last spring we thought we would reorganize. A few friends met at my house and completed the organization, and we held meetings monthly during the season. We held them out of doors, and as a rule our gatherings were very largely composed of farmers. We discussed agricultural subjects and the results of our labor the previous year. The subject of discussion at one of our meetings was potatoes; at another one, the best method of cultivating small fruits. Those meetings brought together a great many farmers, their wives and children, and they became well acquainted with each other; there were no quarrels or dissensions in their midst. The meetings were exceedingly interesting. We agreed in our meetings that our profession was a learned one; at the same time we distributed the Agricultural volumes. During the last year those meetings have been more frequently held, until they have become notorious throughout that part of the state. I had a large number of the Horticultural Society's reports. I sent for more, and got them and distributed them, and I have not enough yet; but as fast as I get them, I will go on distributing them. The result has been that there has been more land cleared within my county within the last six months than was ever cleared before in

five years. At the last meeting at which I was present, last Saturday, the society passed a resolution instructing the secretary to correspond directly with the department of agriculture at Washington and procure as many reports as possible and have them sent directly to the society for distribution instead of through members of congress. I don't want to say a word against the Grangers; if you can make them more efficient than the farmers' club, do so; if you cannot make a grange efficient, organize a farmers' club, and as brother Torrey says, "let us have one."

Secretary Bryant—I am glad to learn that there is one farmers' club in the state that is prosperous, and is doing good. I have heard of one other, in Rock county, that has been productive of much good. The farmers' club in my town was a failure; my wife declared it a nuisance, because it was at its meetings that our son learned to chew tobacco. At the Grange, my family have passed many pleasant and profitable hours.

Mr. Wood—In an argument, there are always two sides to a a question, and I wish to correct one statement that Mr. Anderson has made, in ascribing the increase of intelligence, in these days, of the farmers, to the influence of the Grange. Any man familiar with the history of the Grange, knows that it was organized some years before this great uprising, and that it failed to challenge public attention, and that it was not until we had commercial disasters, the low prices, the high transportation charges, and the like, that agitated the public, and which suggested to the leaders of the Grange that they might, upon that wave of popular uprising, present a bold front before the public, and attempt to bring itself into notoriety.

We, as a farmers' club, are open to the whole community; there is nobody shut off. We had, at the time of this uprising, established our reputation. The question was presented, shall we join the grange, and how? We had to commence by paying fifteen dollars, or something like that, and after that came a box of something which was represented as grange secrets, which we must all pledge our sacred honor to keep, and, by the way, they were not secrets, they were artificial toys. They were to be kept like a little girl's doll baby. We were to pledge ourselves forever; and further, we found there were lines drawn. I have two boys but the youngest must stay out. They went together to the club and the youngest,

who wished to enjoy the entertainment, was told that he must stay at home. "It is a secret, you must wait until you get a little older. We have learned to make money where we never did before. You must not ask questions." We found that we had to be pretty smart in order to get into the grange. We felt a total disgust with the whole arrangement, and we said we would go on with our club.

I have gone often to the doors of the grange and asked what was going on inside. "Well it is a convention or meeting of farmers." "Well I will go in." "No sir, you cannot go in." "Well I am a farmer and I am interested in agriculture, and I would like to go in and learn something." "We have secrets in there; families, you know, all have secrets; you must not go in because you would learn these secrets; they are our *sacred* treasures." If I would pay five dollars, then I could be trusted with all these secrets. We are happy to know that in our county the grange has fallen greatly into disrepute. If it had succeeded according to the intention of those who originated it, I believe it would have been the most terrible trades union that has ever been started in this world.

Mr. Stilson — It has been said that the grange has done more to promote the progress of agriculture than any plan which has been devised for years. If so where is the proof? What agricultural conventions they have held have always been held with closed doors. I do not know of any private information that they have communicated to the outside world, while our agricultural societies, all of them publish their transactions which are thrown broadcast over the land. If you wish to get anything that the grange has learned, you must listen with your ear at the keyhole. I am willing you should go on with your grange, but don't attack the agricultural societies. These societies have their origin in farmers' clubs. The popular uprising in Illinois sometime ago originated in farmers' clubs. If my friend's boy learned to chew tobacco, it was because he did not bring some information that was interesting to the cause of agriculture.

Matt Anderson — I knew that my friend Wood was opposed to all secret societies. I attended a grange celebration up in his vicinity, and it was a larger celebration than ever I remember hearing of in that vicinity. I don't think there was ever another such a celebration in his section. I claim that the Patrons of Husbandry not only have set the people to thinking, but that they are

running these agricultural societies. They may not have run the state societies, but they did enforce the Potter law in Wisconsin, and the United States courts have decided that that law is constitutional. When the United States judge decided that law constitutional, he reasoned just the same way as the grangers did. I do not wish to disparage any branch or organization of farmers. I know that a great many people think this secret a terrible thing. I think that all farmers should join the grange, and I have never found any thing wrong in the secret. When we bring together our wives, our daughters and our sons, we have a right to choose our associations. The grangers are in better condition this year than they were last year. There is a great gathering of Patrons in Milwaukee the present week. I have bought sewing machines through the grange, when they were selling in the general market for $80, for half of that price. We have been buying reapers and other implements for much less than outsiders were paying.

The Grange was a strong body in 1868, 1869 and 1870; in 1870 it had between fifteen and twenty thousand organizations in the United States. As Grangers, we have our discussions. There is no other way to enlighten the farmers so well and so thoroughly as the organization called the Grange. Facts are facts; and they have accomplished more than all the agricultural societies, and all your farmer clubs, combined. I am in favor of farmers' clubs, in favor of agricultural societies. I have taken an active part in those societies, and I have also taken part in organizing the Grange believing that it is like our common school system, where the farmers are taught their duty, not only to themselves, but to all other organizations.

Mr. Mitchell — I found the grange one of the most corrupt in its nature that it was ever my fortune to enter. I have belonged to several organizations, and I never got into any organization that could skin so much money out of me as the grange. I soon found myself paying tribute to the head centre at Washington city, for political corruption; for a political corrupting fund, in order to control certain political affairs and schemes, throughout the United States, from the very town chairman up to the president of the United States, and the true principle of agriculture was almost entirely neglected. I yet fail to see where the grangers have accomplished one single point to benefit agriculture, and I am astonished

to see the grange movement run into agricultural meetings. I am really in favor of every agricultural movement in the country. I am in favor of farmer's clubs, they are open to every one; but the grange closes its gate; it is a regular system of grinding money out of the people. They boast a great deal about the Potter law; their glorious law that stopped the building of our railroads. If that law had not been passed, our whole state would have been lined with railroads.

Mr. B. F. Adams—I cannot sit quiet and hear this organization denounced as it has been by some gentlemen on this floor. Is it right for farmers to come here and engage in antagonisms, men belonging to different organizations, all having a common object in view? I cannot conceive what good will come out of it. I believe that all of us are conscious of acting from good motives; then why should we in the heat of debate denounce one organization or another because we happen to belong to different organizations. And now, sir, notwithstanding all that I have heard said by these gentlemen who indulge so largely in ridicule, a very poor argument and indicative of a bad cause—notwithstanding all that they have said with regard to the patrons of husbandry—I tell them—I tell you sir, it will survive their attacks and be honored and respected, as an industrial society, when the names of these blatant defamers will have passed into oblivion. I came to this state at an early day and I have been identified with its interests. I have belonged to several of these industrial associations, and I have believed in the aim they sought, and when gentlemen ask what the patrons of husbandry have accomplished, I am ready to answer. There is no institution its equal to bring together the sons and daughters in a social point of view in the rural community. Its value cannot be estimated in a moral point of view. I do not know what kind of a grange this gentleman belonged to who has just taken his seat. I have traveled somewhat in my adopted state from one end to the other. I have attended different granges, but never in my life have I been brought in contact with such associations as he claims that he has. I have found them honorable and straight forward in their methods of doing business.

The expense of belonging to the grange has been urged as an objection against it. The expenses are not large; even the initiation fee is only one-fourth of that required by the State Agricultural Society to make a person a life member of the same.

I want to call your attention to the remarks of the ex-president of the State Agricultural Society. He inquires: What has this society done — the Grange? It is only necessary to look over the reports of the industrial societies in order to ascertain what many of them have done. Go where you will among our local societies, and you will find the Patrons of Husbandry are your most active and worthy members, and we will not silently hear the grange misrepresented.

Adjourned to 9 A. M., Wednesday, February 6th, 1878.

WEDNESDAY, 9 A. M.

The convention met in the rooms of the State Agricultural Society. President Fratt in the chair.

The convention was largely attended, most of the counties in the state being represented, and many industrial organizations throughout the state were represented by specially elected delegates.

Secretary Bryant read the following paper, prepared by F. C. Curtis of Rocky Run, who was unavoidably absent.

IMPOVERISHED SOILS AND THEIR RENOVATION.

BY F. C. CURTIS, ROCKY RUN.

My caption would imply that we have impoverished soils, a fact so patent to most of us that it is unnecessary to occupy time in proving their existence; the most important question to us would seem to be the remedy; to discover this we must first try and learn wherein our impoverished soils differ from good soils that never have been cultivated, or those that have been well cultivated, or cultivated in such a manner that they have not been exhausted. If we plow a well cultivated soil we find it loose and pliable; the impoverished or overcropped soil, upon plowing, we will find hard and lumpy — it has not that loose and friable appearance of the well cultivated soil. The impoverished soil requires much more labor to reduce it to the necessary condition to receive the seed, not only

this but we find that drouth has a much worse effect upon our worn soil than it does upon the unimpoverished. Drouths were as severe and frequent when we first settled here as they are now, but I have no remembrance of failure to produce a good crop from that cause while our soil was new, but, late years, we find that we must have frequent and regular rain, or crops will quickly show it. This mode of reasoning would seem to imply that our worn soils are not really impoverished of plant food, but are some way out of mechanical condition, or that frequent rain brings with it the necessary plant food, of which the soil is deficient. There is no farmer that does not know, or would not admit that good barnyard manure, properly applied to a worn soil, will renovate it, but there are few that stop to think how the benefit is produced. There is no doubt that our overcropped lands without manure or rest, by seeding to grass, have become, in a great measure, destitute of plant food, and this destitution has also thrown it out of a proper mechanical condition, and robbed it of its ability to withstand a drouth. If we examine the farmers that occupy these worn lands, we will find that they are in debt, and obliged to raise one more crop of wheat, or, in other words, to continue their wrongful practice of cropping their lands without rotating with grass. If we find a farmer rotating to grass with stock to consume his grass and coarse grains upon the land, we not only find his land in good condition, but we generally find him out of debt.

This over-croping land to grain without rotation to grass is ruinous in the extreme, and will end in complete ruin unless a radical change is made. I am aware that it is difficult to make the change, and difficult even to advise how the change can be made without risking serious loss. Let us suppose a farm of one hundred and sixty acres of land that has been tilled in the usual manner for thirty years; forty acres of it we will seed to clover and timothy, with wheat or oats, as is thought best; upon another forty acres we will draw out all the manure and old straw piles we can find, and plant it to corn; the other eighty acres I am not particular what purpose it is used for. The second year we have forty acres in grass, and will seed another forty to grass, raising forty acres of corn this year. I have said nothing about stock until now, but as you will make me responsible for the disposition of the forty acres of grass, I will begin to direct about the stock. Our forty acres of

grass should produce eighty tons of hay; our corn should be cut up, and, if properly managed, the stalks of which will be equal to forty tons of hay for feed, and about eighty tons of refuse stalks, to be utilized in soaking up the liquid droppings of the stock. We have also, from the other eighty acres, twelve hundred bushels of oats, and probably eighty tons of straw for bedding, to make the stock comfortable, and also to sponge up their liquid droppings.

Now we must have from forty to sixty cows, and good, comfortable stable room for them. Just how to manage them I have not time to state, but must refer you to my way of doing it, described in the two last volumes of our transactions. I maintain, however, if these cows are properly managed, and sufficient number of hogs are kept to eat the sour milk or whey, that the selling product should yearly exceed $2,000. You will now remember that we had about three hundred and fifty tons of dry material raised from the farm, that has been fed to the stock and utilized in soaking up the liquid droppings of the stock, and if properly done, will produce about one thousand loads of good manure, sufficient to give a good coating for the next forty acres of corn. This rotation is designed to be: grass two years, mowing it the first year, pasturing it the next, corn the next, and the fourth year seeding to grass with small grain, the manure to be applied to the corn ground.

The fifth year we begin to see the results of our labors. Upon breaking up tame sod that has been in grass two years and the sod has begun to rot, we find the land has changed its appearance from a hard lumpy consistence to a lively friable soil; that the numerous grass roots have drawn sustenance from the depths below and atmosphere above, and in their decay now yield up to the growing corn their rich stores of plant food. The friable change in the soil has been brought about by the mechanical action of the grass roots in their growth, and this friable condition will be found to much lessen the necessary labor of cultivating the crop, and prove an assurance against drouth to a great extent, as well as insuring a good crop of corn, and a great benefit to the following crops. Should this policy be continued it would not be long before the soil under consideration would exceed in fertility its condition as received from the hand of nature. I am aware that there are difficulties in the way of this happy result, but it can be done; muscle and brains can and will do it; while if we continue in the old way

of cultivation, poverty will soon cause a change of owners. Agriculturists of lifelong experience, and consulting the records of ages, tell us that the most fertile lands cannot be cultivated without deterioration unless they are kept in grass half of the time, and stock kept upon the farm sufficient to consume the grass. I assume that all forms of animal and vegetable life are the products of the earth and air; that upon reaching maturity, or the end of its allotted existence, decomposition takes place, faster or slower, according to its exposure to warmth and moisture, and if sufficiently exposed to fire, combustion takes place, and the inorganic or earthy portion remains as others, while that which came from the air floated off into the atmosphere, to return again in dews, rains, etc., for the creation of new matter. This proposition must be plain to every one that gives it a thought, and shows the inexhaustible riches of the atmosphere to all, a source "as free as air;" but it can be drawn upon and utilized only by rules of natural laws; these laws we have violated by throwing away these riches when we had them in hand, or stored up in our soil. Then let us in future avail ourselves of the advantages with which nature has so richly endowed us, and allow no waste to be laid to our charge.

Mr. Field — That paper contains much food for thought. But is it possible for us, living where we do, to utilize all this waste in the manner mentioned by Mr. Curtis. I have urged in the conventions which have met here so often, that all of these wastes of manure which are going into the atmosphere and making it impure, as each and every one of you can see, if you use your proper faculties, can observe in passing through the streets of our city, be saved, and the same is true on almost every farm throughout the country. There is a great deal of this valuable rich plant food being wasted It is running off into the water courses and being carried to the Gulf, or it is going into the atmosphere and producing diseases. How are we going to stop it? We can stop a great deal on our farms; we ought to save it. I think this material should be utilized in some way, put upon the land. There is enough wasted in each and every one of our large cities, annually, to fertilize in the richest manner, many thousands of acres of lands, and it is so much wealth thrown away.

Mr. Palmer — I fully indorse Mr. Curtis' idea of rotating. That

has been my practice for several years. I have a farm of two hundred and sixty acres. I am growing clover mostly. I have practiced a different plan of rotation, keeping longer to grass. The hay is much better the second and third year, and it makes better pasture, especially if we grow clover and timothy. When I grow clear clover I plow the second year. I take a crop of hay and a crop of seed and then plow.

Mr. Hazen — I indorse Mr. Curtis' plan of renovating impoverished soil. I apply manure to the surface of my land and I top dress dragging the meadow. I get better returns from the manure that way than by any other plan. An old gentleman, a good many years ago, said to me that when he put manure on the top of his land he always *heard* from it. That has been my experience. I have not plowed under any manure for a good many years. I spread it on the pasture; I keep a large stock, and I find it pays me to pasture good land. It pays me best to pasture the best land. When I plow the pasture the land is too rich to sow small grain upon.

Mr. Field — On what part of your land do you put your manure?

Mr. Hazen — When I seed new land, I top dress it. If I do not do it the first year I do it the next. I don't plow it under. I prefer breaking sod in the fall. My corn was planted the last of May, 1877, and I got a good crop, one hundred bushels of corn per acre. I weighed the crop of one hundred and twelve acres.

Mr. Field — I ask you what time you gathered it and weighed it?

Mr. Hazen — In November.

Mr. Field — How much has it shrunk by this time?

Mr. Hazen — About two pounds to the bushel.

Mr. Field — My experience is that corn picked this year will shrink at least one-quarter before next spring, taking the average corn of the country. That has been my experience, always.

Mr. Hazen — My corn was good and sound.

Mr. Field — It would not shrink as much. Do you plant considerable corn for fodder?

Mr. Hazen — I can raise cheaper fodder in that way than in any other, sowing in drills.

Mr. Field — So you only work the land one way?

Mr. Hazen — You can drag it over thoroughly when it first comes out of the ground. If you have rich land, you need not have any uneasiness.

Mr. Field — I desire to ask Mr. Hazen how far apart he plants his field corn?

Mr. Hazen — Three feet each way, and cultivate both ways.

Mr. Wilson — I differ with our friends about this land getting too rich for small grain. I fell into that error some years ago. I think it is not too rich only in straw. It is not rich in anything else. My land is something in the condition of Mr. Hazen's. It seems to me as though it lacks something. I wish we could get at that lack. It goes down as soon as it gets to twenty-five bushels. I think we are not rich enough in some element, when it will not stand up, and when we say our land is too rich to raise small grain, we make a mistake: it is not rich enough in something.

Mr. Field — Some of our scientists ought to give us that information if they are here.

Mr. Wood — The subject which has been introduced by Mr. Curtis is one of the most important agricultural questions that can possibly agitate the world, and we will do well, as a convention of farmers, to give it careful attention. It is a subject I have given considerable thought. As we look at the history of the world and of the nations that have preceded us, so far as we can observe, the processes of civilization and of agriculture have been exhaustive to the land. Take the whole civilized world and you will find that the soil has gradually become impoverished.

Look at Egypt, which is, perhaps, the oldest cultivated land. We know its remarkable fertility has been kept up through all ages by the overflowing of the Nile, which deposits every year a coating of riches, and as soon as you rise to the top of the hills, it is a perfect waste, a desert, and the desert is constantly encroaching. Take, again, Greece. While there is some fertility still left, it is evident that the progress of civilization is destructive. To combat this view, we have England, an agricultural country for a thousand years, and it is more productive at the present time than it ever was before. What has made it so? Look at the amount of science, of industry and of intelligence that have been brought to bear upon that little island. It is not long since that I read an article in which it was claimed that the bones of the Pharoahs themselves had been spread upon English soil to provide food for its people. We know that mountains of buffalo bones from our western plains have been gathered and ground for fertilization of the soil. It is a fact that the progress of civilization has been destructive.

Take the coal mines for instance. We are exhausting our coal mines and coal has taken a decided rise in England, for there they see the end. What is there in the future for the world? Look at the harvest of whale oil that has been exhausted within fifty years, and though whale ships go now to the polar seas they do not bring to market one-fourth of what they formerly did; this industry is being discontinued. Look at the oil wells of Pennsylvania, which have been so productive; they are diminishing. It is our business to meet this contingency as far as we can. Here we are within twenty or thirty years of the first settlement, and there are thousands of acres where the land is exhausted. I have seen many farm lands deserted. If you find farms which are worn out within twenty-five or thirty years, I ask, whether this is not a question of importance, when this exhaustion threatens ourselves to say nothing of our children and our grand children, because we have followed wasteful systems.

Suppose we say that we can get these commercial fertilizers, the phosphates and apply them to our soil when the supply is limited, and we are not driven to that yet, I think that we should heed the experience of the old countries. The moment that we undertake to come into the market, and purchase these things, there will be a decided rise in them, because the supply of these products is not sufficient to meet the demands of the whole civilized world. I throw these thoughts out because I believe they are important. I believe this paper is important. I believe that we must husband the resources of our country. In respect to this question of the land getting too rich, it is a fact no doubt established both by science and by practice, that there are certain things that are essential to the success of vegetable growth; there may be a soil rich in everything, but with one needful ingredient left out; that must be supplied.

J. B. Laws, the great experimentor in England, delivered an address before a farmers' club on the subject of manure. He took the ground that a ton of manure depended solely on the chemical substances found therein, and that might be contained in it, and that in a ton of good manure, such as English farmers make, there would be less than sixty-one pounds. That is all that is really available and valuable to the plant. It almost shakes our common sense. He said, if he was going to raise a crop, and do the best he could, he should carefully avoid barnyard manure. I read

this to our farmers' club, and they could not believe it. I suppose that one load of this manure would be worth three or four times the value of any that we make. He did not wish to teach that barnyard manure was not valuable; but he wanted to show what the real elements of value were in it, and he showed that it was the chemical substance that it contained.

Mr. Field — I suppose the point is this: If the land is enriched by manure, why cannot he continue to raise good wheat? Why cannot he do that?

Mr. Wood — He can only tell by experiments.

Mr. Field — Cannot the scientific man tell him what to do with that soil?

Mr. Wood — The scientific man who knows can give suggestions.

Mr. Field — Can the chemist tell me whether my soil is exhausted or fertile soil?

Mr. Wood — He might, to a certain extent.

Mr. Field — I said to a scientist in this city, I desire to bring you a little soil from my farm that I know is virgin soil, I can bring you some more that I know is exhausted, now can you tell me which is which?

Mr. Wood — Practice must prove the case.

Mr. Plumb — In the absence of any scientist I wish to say a word. That scientist if he had answered that question would have given you the reason why he could not give the difference. He might have been a scientist and not an analyst. If he was an analyst he would not have answered your question in that manner. He would have said "yes I can tell you to a fraction, the difference in those soils."

Mr. Field — You cannot do it.

Mr. Plumb — I believe you can because we have the tables. Soils, in their native elements are largely of a character which we denominate chemical. In the first place they have their affinities one to the other, and they have their balance. If a soil in its natural constituents loses a certain element necessary to preserve the harmonious working of the chemical affinities in that soil, it has lost its power, and that harmonious balance in these chemical affinities must be so well established that a scientist can hardly tell you what is missing. The work is destroyed; it fails to accomplish its results, and in this constitutes the difference between an exhausted

soil, and one not exhausted. Theoretically, there is no such thing as an exhausted soil; we have not an exhausted soil in the country, but practically, you get pretty near to it. If Professor Chamberlin were here, he could give a solution at once. This is a subject, which last night if he had not been quite so modest, he would have brought out, but he only gave us the outline.

Mr. Bryant — He would not give it to us.

Mr. Plumb — He said it was a question that he would not answer. The question was whether he had any special mode of agriculture to recommend to the farmers — was that it?

Mr. Field — In his description of the different soils, and the desire for a local experimental station, he thought we should have one on every character of that soil. I thought if that was so, he might be able to give us some light upon the subject, and state wherein he thought certain farming should be conducted on that soil; would he give information as to the particular branch of farming to be pursued on any particular branch of soil?

Mr. Plumb — I don't think Professor Chamberlin understood the question in that light. He answered that he could not answer that question as a practical farmer. He said he could not answer it as a scientist, and he declined to answer it, and I think his reasons were good. I believe Professor Chamberlin is on the right track.

Mr. Field — I believe he is too; I wanted an answer to that question, but he was afraid he might make some statement he didn't want to make.

Col. C. E. Warner — I would like to return to the paper last read by Mr. Curtis. Those of you who have seen his honest, earnest face, believe every word he says. I would like to ask farmers whether, in their experience, they are able to live up to the recommendations of that paper. I think it is conceded that our fertilizers are to be such as we can make on the farm, either grain manure or barn yard manure, aside, perhaps, from plaster, which is used quite largely, I think his reasons are good, with regard to the manure that we use on the farms. Mr. Curtis, in his paper, suggests that in five years after taking one of our farms he is able to manufacture one thousand loads of barn-yard manure. I would like to know if farmers are able to make that amount. There are a great many of the farmers of the state present. To put on the land one

thousand loads of manure, would be one hundred days' work for an active man and team. This is a large amount to be furnished from a quarter section of land. With regard to Prof. Chamberlin's proposition, I think it is practicable, and I believe if the state will purchase farms in the state, that men can be found who will be able to run them and make them pay their expenses, and return to the state valuable information.

Secretary Bryant — I have about the same sized farm, and I carry about the same number of cattle that Mr. Curtis speaks of — from fifty to sixty head of cattle, and thirty to forty sheep. I don't think that my loads of manure are more than one-half the number he speaks of. He says one thousand loads. I do not get over four hundred, and I am very careful about saving manure. One little reminiscence about handling manure. Times have changed since I commenced farming. When I bought my farm across the lake, I could get all the manure I wanted in this city for the hauling. Now you have to pay for it. But I met with some difficulty about that. The first winter I carried manure, with two or three teams, all the winter, and the ladies sewing circle of course had something to say about it. They voted something had got to be done; they declared the judge was drawing so much of that nasty stuff, and spreading it over the country that they would get the cholera, and the men must stop it.

Mr. Warner — How much manure do you make, Mr. Boyce?

Mr. Boyce — I probably make as much manure as any man in Dane county. I haul from seventy-five to one hundred tons a year on the home farm. I have something like five hundred acres. If I make one thousand loads I think I am doing very well. No one should run down barn manure unless he uses some process I know nothing of. Doctor Fox, an old settler in this section, said this: "If I had a barn yard like yours I could keep a man drawing manure all the time." I answered, some parts of the year he could not not get in to it. Certainly I would not advise putting a barn yard upon a knoll so as to run the drainage off on to another man's land.

Secretary Bryant — You will recollect that in Mr. Curtis' paper that every particle of this fodder was to be used in soaking up the liquids. He was not attempting to make rotten manure. He said particularly once or twice that this coarse fodder was to be used in gathering up the liquid.

Mr. Clark — I would recommend that lime be used to stiffen straw.

Mr. Hart — My land is a clayey soil, different from my friend's here. I have tried salt several times, and it seems to have no effect. I have tried salt and plaster mixed, and have tried lime, and have seen no benefit. I would like to state here what I have stated before, that I don't go much on theory; if any one will give us practical experience, that is what we want. I will let theory go for more practical knowledge. I am at sea somewhat about this manure question. Some of my neighbors practice after my own style. They do it because Mr Hart does it. I get a pretty good crop, as I said before, straw enough, but it gets down.

BEE CULTURE.

BY G. W. SANFORD, EAST MIDDLETON.

Knowing the misunderstandings which exist in the minds of many otherwise intelligent people with regard to bee culture, I have prepared a few lines on the subject. I am well aware of the prejudice the skilled apiarian has to contend with, especially from those who still believe in and practice the "Brimstone Theory." They think, because they realize only ten lbs. of honey per stock, that the stories told by scientific bee-keepers must be stories indeed, which should find credence in the minds of none, except the originators.

In consideration of these views, I will present you with a few facts relating to my own experience the past summer.

On or about the tenth of May, 1877, I purchased two Italian swarms of bees, which I had handled the year previous, agreeing to pay for them the enormous sum of two handred lbs. of extracted white clover honey. My neighbors thought it was truly an enormous amount, which could never be realized from the bees. However, I was satisfied, and by artificial swarming I increased them to four good swarms, and took from them, during the season, four hundred and seventy lbs. of beautiful extracted honey, the greatest amount taken in one week, being 95 lbs., and 93 lbs. the week pre-

vious, leaving about 150 lbs. for them to winter on. I think I could have done even better, if I had not been obliged to move them a distance of two miles, in the midst of the honey season, losing thereby one of the queens and breaking the combs badly.

Now do not get excited and buy bees as soon as you get home, thinking to get rich all at once, for I know of no way to lose money so fast as to invest in the bee business without first informing yourself as regards the nature and habits of the bees. The scriptures tell us, "The righteous man careth for the life of his beast," and, I think, bees might be included. I know of people who keep bees and complain that they do not work well, and when asked if they have provided anything for their bees to work on, they hardly know what is meant, for they never think that the bees have rights, as much as our sheep and cows, and must have, if a surplus of honey is expected, an abundance of fresh, blooming flowers to work upon, and without which we have no right to expect a surplus of honey.

The plan that I adopt is, to sow, as early as possible, a piece of white English mustard, and in a short time another piece of the same, after which I sow rape seed, and then, still later, buckwheat, which, with the pastures and meadows filled with white alsike and red clover, furnish a continual bloom, and my bees are seldom seen idling away their time for want of something to do.

We often hear the remark, "Bees have n't done well this season." Now, while I acknowledge the season has much to do with the success of the apiary, yet I know good management has more. For with proper management, they will always pay; but if left to themselves, they only pay when we have extra good seasons, and sometimes not then, for they are frequently troubled with the swarming fever, and hang out in large clusters, allowing the best part of the honey season to pass, and here I wish to make a point that will be well to remember: if you would have a surplus of honey, you must not have a surplus of bees. Now, did you ever consider that thousands of pounds of honey are consumed annually by idle, worthless drones. I consider their room better than their company, and cut their heads off before they are hatched, saving a few of the best for use. Another point is, we sometimes have drouths, and the flowers refuse to secrete food for the bees, at such times as by natural instinct they cease breeding, and as the lives of the workers are very

short, the stocks soon become weak and an easy prey to moths, but a little feed given regularly each evening will keep the stocks strong until danger is passed, and you will be well paid for your trouble. Perhaps some would like to know how to control the swarming fever. Our plan is this: give the bees plenty of room, and use the extractor freely. But, says one, what shall I do with my extracted honey after I get it, as the demand is for comb honey. I am well aware of the prejudice that exists against extracted honey, and not without cause, for we know the market has been glutted with Cuba and strained honey, which is a conglomerated mass of dead bees, bee bread, moth worms, larvæ and old bee's wax put into a press and squeezed, the juice of which is sent to market and sold for honey. No wonder that people have formed a dislike for such stuff, and that the very name of extracted honey revives the old taste, and they quickly say, "don't want any." To all such we explain that our honey is taken by the new process, and that not one particle of the above named ingredients is allowed to mix with the honey, and that it is as pure as the bees can gather it.

The question is often asked, is not extracted honey mixed with sugar syrup and otherwise adulterated? It may be after it has left the hands of the apiarian and found its way to the exclusive wholesale dealer. I know of one bottle, in this city, said to contain two pounds of pure honey from a large firm in Chicago, two-thirds of which is syrup, and rather poor at that; it can be had for the sum of one dollar, so says the label. Rather dear, I think. Now, to the seller, we would say, sell nothing but what you can fully recommend and warrant; and to the buyers, buy of none, except from such parties as you know to be responsible.

Mr. Wilson — The extracted honey made by Mr. Sanford is a good article; and I believe if we work on that principle we shall find bee culture a great success.

Mr. Greenman — I do not consider this showing a large one. I know a gentleman that took twenty-four barrels of extracted honey, upwards of three hundred pounds to the barrel, from thirty-two swarms; but, as Mr. Sanford says, strained honey as put up does not find a ready and profitable market.

Mr. Peffer — To be successful in honey making, one must understand the business — 'tis not every man that can get four hundred

pounds of honey from two swarms of bees in one season. I know a young man, a new beginner, who got ninety-two boxes of two pounds to the box, from one swarm of bees; but he had some ingenuity, and a taste for the business.

Mr. Boyce — I use the Kidder hive, but that will get welded together.

Mr. Peffer — Probably you have not got the right distance between the frame. Have you got any guides in the top?

Mr. Boyce — The Kidder frame is made with a level top inside to keep them straight. One of my neighbors told me that I must slip a piece of paste-board in, so they would not get out of the box, but they waxed so fast that I gave it up and let them have their own way.

Mr. Peffer — The proper distance is $\frac{1}{8}$ of an inch I believe. They need that to make a double tier of cells on each end. You have got to have your frame within $\frac{1}{16}$ or $\frac{1}{8}$ of an inch, and if you do that, I don't think you will find any difficulty in keeping your combs straight. If you leave more room they will work a little more on one side than another, and that makes it crooked.

Mr. Boyce — They are invariably crooked with me.

Mr. Tucker — I calculate that with my frames, they would only be about $\frac{1}{16}$ of an inch thick.

Mr. Boyce — Frequently bees will come out every other day, and sometimes for a week or ten days. A neighbor of mine told me of a case where they had swarms every other day for a week.

Mr. Peffer — They are restless; they get out on the platform and go immediately back again. That is generally the case with those that come out every day.

Mr. Boyce — What do you do to stop it?

Mr. Peffer — As soon as you see them go out, open the box.

Mr. Boyce — I ask you if you do not think that it would be more profitable with this strained honey to make small boxes like those you speak of, and let them deposit it all in small boxes.

Mr. Peffer — It is a great deal better in small boxes; I think it is always safer to leave it in small boxes.

Mr. Boyce — Also more saleable.

Mr. Peffer — All the honey in the market now is in small boxes.

Mr. Wilson — Do you think it taxes the energies of the bee more to make honey in these boxes?

Mr. Peffer — I don't think it does. You must understand that of late years we have been using this artificial guide comb.

Mr. Wilson — Do you make your own combs?

Mr. Peffer — No. Always buy my combs.

Mr. Clark — I have seen boxes such as are used in shipping berries, utilized into honey boxes. They will hold about two pounds of honey. I think they put on some 16 or 24 on the top of a hive at a time. The honey was very saleable in those boxes. These do not exceed in the whole cost one-half cent a piece.

Mr. Johnson — It is well known by those engaged in this branch of industry, that they can accumulate honey very fast during some part of the season. I apprehend that location may have much to do with their success, and I would like to have some gentleman answer this question, whether any person, with all the appliances he can bring to bear in the case, can succeed to the extent which has been expressed here, where bees have not access to any timber? Whether it is not essential that they should be located in the timber, or near it? In other words, could you make these great amounts of honey if you lived on the prairie?

Mr. Peffer — Wherever they raise buckwheat. I think they do better on it than they do on clover. That is my experience.

Mr. Smith — Mr. Sanford has told us what he did in the spring and what he did at different seasons of the year, in order to supply food for those bees, saving them the trouble of going away off on the prairie to hunt up food, if any could be found. The linden furnishes a great supply of bee food. There are few sections in southern portions of this state and on the prairies, I think, where it will grow. If we take the pains that Mr. Sanford has taken, and which he speaks of in his paper, I think we have a moderate chance of success in all sections of our state.

Mr. Kellogg — One pound of comb costs the bees twenty pounds of honey, besides the labor of making, hence the utility of the artificial guide comb.

Secretary Bryant — We all recollect, when we were little lads, the little busy bee that was pointed out to us, as a fellow that we should always imitate, and that his example should teach us to be frugal during our life time. I was reading the other day of a case where they took some bees from Massachusetts to San Domingo, that beautiful country where they have summer all the year round,

and how they were going to get rich. The bees worked splendidly the first summer and made stores of honey, but when they found there was no winter, they quit work and lived from hand to mouth, as the expression is, very much as other people do unless they have some incentive to work. This goes to show that the bee is much like mortals; tell him he has got to dig or starve next winter, and he will search the broad prairies over for a little sweet; give him a government contract as Mr. Sanford did his, and, like man, he will make it rich; but tell him you 'll keep him in clover the year round, and the busiest bee will become as idle as a drone.

With the consent of the convention we will change our sweetening from honey to syrup, and discuss for a short time the question of cane-growing; it seems to do equally as well on the prairie as in the timber. The bowl before you contains sugar, the jars syrup made in Minnesota; taste it and tell us if you are prepared to say the farmer of the northwest cannot grow their own sweetening.

PROGRESS MADE IN THE CULTURE OF THE EARLY AMBER SUGAR CANE, AND THE MANUFACTURE OF SYRUP AND SUGAR FROM IT, IN MINNESOTA.

A. J. PHILLIPS, LA CROSSE COUNTY.

For many years the people of Wisconsin and Minnesota have been experimenting with various branches of farming, as it were, to have something ready to take the place of growing wheat when the soil became exhausted for the production of that cereal. Some have tried one branch of farming and some another. Many years ago the question of growing Chinese sugar cane was agitated, and many farmers in both states tried it, the majority of whom gradually gave it up, as the product most invariably was a dark, rank and semi-nauseous article known as sorghum. The seasons here were too short for the cane to mature; hence, an inferior article of syrup. But as the efficient commissioner of statistics of Minnesota, when speaking on this subject, says: "Two men in the big woods of that state, living twenty miles apart, and perfect strangers to each other, still struggled on in the business until one of them chanced to discover the seed of a hybrid variety, acclimated to that

state, and known as the Minnesota Early Amber. The men I refer to are Charles F. Miller, of Dundas, and Seth H. Kinney, of Morristown, both in Rice county. I formed the acquaintance of these two men at the winter meeting of the Minnesota State Horticultural Society, held at Rochester, last month. I found them to be gentlemen ready and willing to answer questions pertaining to the cultivation and manufacture of the cane at the present time. They had samples of both sugar and syrup present which were pronounced by all to be superior to anything of the kind they had ever seen." Using Mr. Metcalf's language further, he says: "These men might have succeeded alone, but when they came together as they finally did, and combined their experiences and their resources of their skill and invention, a new industry was born, and a new factor in the wealth and commerce of that state will very soon command public attention." Mr. Metcalf visited their premises, and the St. Paul Chamber of Commerce, in the spring of 1877, invited them to exhibit to that body samples of their productions, since which event they have had numerous letters of inquiry and hosts of visitors to see them.

A pamphlet is soon to be published giving a full account of culture, manufacture, etc., so that in this paper I will say but little of that. My object is to awaken an interest in this new branch of industry, so that farmers of our state can procure some of this seed, and start the old mills that have been idle these many years, and I think they will be amply repaid for their trouble, for I have faith to believe that the day is not far distant when the farmers of our state, where fuel is cheap and plenty, can, by help of the skill and intelligence of the men above referred to, which they can gain by reading this book or visiting them, as surely produce their own sugar and syrup as they can now produce any other article for family use. Mr. Kinney informed me that in 1875 he made four pounds of sugar; in 1876, he made 600 pounds, and twelve barrels of soft sugar in 1877, samples of which I have with me. He has used the Climax mill, made at Madison, for sixteen years, and recommends that strongly for farmers to buy. Mr. Miller recommends a mill made in Ohio. Mr. Kinney strips his cane before grinding, and recommends that as the best way, as he says it is splendid fodder, especially for milch cows, and he says it will produce two tons per acre. Mr. Miller does not agree with him, but grinds his cane with the leaves on.

The crop in Rice county, in the fall of 1877, is estimated at fifteen thousand gallons of syrup, and these men have no fears of an over production, as they estimate that Rice county alone will consume sixty thousand gallons in one season. So far, they find a ready sale to the merchants of their own county, at seventy-five cents per gallon at wholesale; showing conclusively that, to be sold at that price, it must compare favorably with the best syrup in the market. Mr. Kinney's and Mr. Miller's crops, for several years, have averaged one hundred and fifty gallons per acre, and, after paying for everything, to wit., interest on money in land, cost of plowing, planting, cultivating, harvesting, drawing to mill, making up, wood, and incidentals, they cannot make the cost of production over forty cents per gallon, showing conclusively that it is a paying crop with them, at least.

Kinney planted cane on the twenty-seventh day of May last, and on the third day of September, exhibited syrup made from it at the Minnesota state fair at Minneapolis, showing that it is well adapted to this climate. The syrup on exhibition here was taken from a ten-gallon keg, sent to me by Mr. Kinney, for which I paid eight dollars. The exact origin of this early amber cane is not positively known, but so far they claim it to be of Minnesota origin, Mr. Miller having obtained the first seed, a very small quantity, from a man living in the northern part of that state. Mr. Miller has found by experiments that in the following manner he increases the yield of syrup very much: I think he said, one quarter he sends seed grown in Minnesota to Missouri, has it grown there, and then brings that seed back for next year's planting at home. He gets a much better growth. The sample of sugar I have here is of both kinds, one as it is granulated, and the other as it appeared after having the syrup extracted, something on the same plan as honey is extracted from the comb. They let their cane lie from three to five days after cutting before working, but if the weather is very hot, it will not do to let it lie quite so long, as the butt ends will get sour. Mr. Miller informed me that he has made as high as one hundred and ninety gallons of syrup from a single acre of the early amber cane, showing it to be very productive. One cord of soft wood, dry, will make ninety-two gallons of syrup. I will say right here that my apology for this paper is this: I had sent a subject for a brief paper on fruit growing to Mr. Case before I went to Roches-

ter to attend the Minnesota meeting. When I found that the culture of this early amber cane was attracting so much attention there, I concluded to drop the fruit business for one meeting and prepare a short paper on this sugar cane business, as I thought it of great importance to our state as well as theirs; so I collected what figures and facts I could and started this essay. But when I informed Mr. Case of the fact, he, to use a modern expression, "went back" on it, intimating that the culture of sorghum belonged to the agricultural society, so I quit, and on short notice prepared a paper, as was announced in the programme. I have a few extracts from letters of Mr. Kinney and from a Minnesota paper that I can read, if desired, respecting this business. They are not lengthy.

Mr. Kenny says, this Early Amber Cane, if cut up and ground immediately, makes a beautiful syrup. But to make sugar in paying quantities, it must be cut and lie from three to five days, and if it is early and extremely hot, much care must be taken not to let it lie long enough to sour at the butt ends, as the acid would then defeat the making of sugar. Cane planted by Mr. Miller on the first of June last, ripened and was cut late, and made good sugar from the ripe cane; as the weather grows colder, and cane is not over ripe and cut late, the weather or air does not deteriorate the juice; and I have this way made my product all into sugar. This you will find is all simple enough when I tell it to you. But it has cost me years of careful study and observation. I think I shall succeed in getting a bill through the House of Representatives giving a premium next season for 1,000 pounds of good dry sugar made from one man's product. Another important point is to get the syrup of uniform thickness; you may make hundreds of gallons, but if you do not get it quite thick enough it will not grain. I should not, from past experience, expect much sugar from very ripe cane, unless cut very late in the fall, so that the butts did not sour any. The book that Hollister is publishing will help you, as we, Mr. Miller and myself, have given it our best efforts and conclusions aimed at, after twenty years' experience. The syrup I send you is thick enough for sugar, but I think there was a little too much acid in the butts. But it grains some in a warm room. I think it as good flavor as any I made. I think Mr. Miller's syrup is better than mine, as his patent helps him. I am fully satisfied that this business is only in its infancy in this state.

Want of time, and numerous letters to answer, prevent me from writing more. I think nearly every man in this town will plant some next season, as it is very profitable.

Mr. Adams — A few days ago I was shown some sorghum syrup that was made last fall from cane grown on the prairie that was better than any that I have ever before tasted. I don't know where I had ever found an article similar to it. I asked the individual who grew the cane where he obtained the seed. He said that he had procured it from Minnesota; think he gave the name as the Minnesota sugar cane. It certainly was a superior article of syrup, and it was manufactured in the county by a gentleman who resides near Mr. Phillip. During the last twenty years I have manufactured more or less sorghum. My experience was so full of disaster that I have not grown it extensively since.

Mr. Clarke — I have raised this year considerable syrup. I have not bought any sugar lately, and don't intend to buy another year. There will be from fifteen to twenty-five acres planted in my neighborhood and worked up into sugar. The quality of the syrup raised is very good; it is generally planted on a sandy soil, though some is grown on clay. That which was grown on the clay last year yielded the heaviest and made the best sugar, which was the reverse of my experience in years before. The seed this year is to be changed altogether. The change makes it early. We plant about the 15th of May. There would be a great saving to farmers if they would plant this cane. To illustrate, my sugar for the last five or six years has in no week been less than a dollar; formerly my bill was nearly seventy-five dollars a year for sugar. Since I have raised my cane, my sugar bill has been not to exceed twenty five cents a week, and the same is true of my neighbors. It is a great saving; it can be raised cheap, and it will pay any farmer that raises it.

Mr. Field — I would like to have Mr. Phillips tell us if he knows what kind of soil this cane grows on. I have had considerable experience in sorghum, and I never knew any difference in the soil.

Mr. Phillips — All I know about the business is what I gathered at the meeting of the Minnesota cane growers by hearing them ask questions and discuss their methods of cultivation and manufacture; they said that any soil that would grow a crop of corn would grow

a crop of sorghum of this variety. They claimed that they never made any good sugar, never had good success until they planted this Minnesota amber. This was raised in what they call the Minnesota woods; timber land, maple, basswood and elms.

A Voice — Did you investigate their arrangement for stripping?

Mr. Phillips — Mr. Kinney uses a great deal of manure on his land; he strips it while standing, cuts in five rows and dries in a winrow, to keep the butts from the ground; it lays till well wilted.

Mr. Miller said his building was thirty feet square. He drives to the second floor with his cane, has his mill there; he can put in enough to work two or three days, and by unloading his cane up there he don't handle it from the time it goes into the mill until he handles the syrup.

The question of the

RELATION OF SOIL TO TREE AND FRUIT-GROWING,

was then taken up.

President Bascom, of the State University, said that, although my experience in Wisconsin is limited, there are few subjects more inseresting to me in the whole range of agriculture. We are not likely to get very good fruit from abroad. That is my experience. It goes through large markets, and is very poor indeed. The best fruit I have had since I came here was grown in Wisconsin. I have seen some that was truly fine, but the question is a question of soil, not of fruit, and what I have to say will bear upon that point. We are exposed to protracted periods of great heat and great dryness. The circulation during those periods becomes deranged; the growth is stopped. The trees seem to me to be exposed to that difficulty. If it comes within a certain range of this condition, the tops will die although the roots may remain.

After the circulation passes below a certain point, it is very difficul to take up that circulation again. It will grow very slow for quite a length of time and will not have free circulation. It seems to me that it is necessary to maintain the life up to a certain point. If it sinks below, it is very difficult to recover from it. I have noticed in trees, since I have been here, that in the spring the roots seem ready to push forward with a great deal of vigor, and that

there is an inability in the top to receive the sap; the upper part will not retain its circulation. I have noticed also, in the orchard up at the University Park — the orchard lies on the northern slope and runs down to the lake — that the upper rows have suffered very much more from this sort of dry rot than the lower rows. They are not able to retain their growth. This seems considerably greater in the upper rows than in the lower rows. The lower rows may receive some aid from the lake moisture of the air. That may also explain in part why the eastern shore of Lake Michigan is so good a fruit region. It is because the heat is modified, because the climate is made more even by the lake; dryness and heat combined disturb their circulation, and the tree becomes unhealthy with a large life remaining in the roots.

If there be anything at all in this that will have to be remedied, it will be in the way of selection of location, and selection of the most moist location. It would be a very narrow remedy, and next, it would be very tedious. It would seem to be better to select varieties that shall exact those conditions of growth. If we direct our attention to those in this state, I think we may reasonably hope that the apple tree will in a very short time adapt itself to these conditions. I certainly never was in a state in which I saw anything like as many native apples as in this state. They are very thrifty and very stubborn. It is only with the more modified cultivated varieties which have been grown in other states under other conditions that we have this trouble; we direct attention to the adaptation of varieties to our clinate; I trust that we may overcome many of the obstacles that are now in the way."

Mr. Kellogg — This location of the orchard, and the adaptation of the orchard to the soil is the greatest cause of the failure of the fruit-producing portions of the state. There is no county, I think hardly a township, except what has the variations of soil, and some are entirely worthless. When a young man of 21 starts out to make a home, and has 40, 80 or 160 acres, he wants his building spot to suit. He wants his orchard where he is going to build. He don't consult the soil at all, and if his building spot by the roadside is on a level with the ground, why his orchard goes on that low soil, and it is ten to one a failure. There is a variety of soil sometimes on a 10-acre farm. In Rock county we have on one side of the river a sand formation, and sand that knows no end or bottom

while on the other side of the river you strike the limestone formation that is perfectly adapted to the growth of the apple. The choosing of the site of the orchard is one of the most important things in planting. If you have not got a clay soil with limestone formation, or any of these outer ridges, the higher the ground that you can get on, the better. If you can get on this clay soil, don't for any purpose get on to a sand hill or gravel knoll. You can get on the outer ridges, where yon are sure of success.

Mr. Finlayson — I understood the president to say that those trees on the high ground were doing the poorest.

President Bascom — Yes.

Mr. Finlayson — I think Mr. Kellogg is right. We find that whenever trees are a success, they are planted upon the elevations of our country. My observation for fourteen years is to that effect. The highest elevations which you find are the surest locations for the apple tree; and when our farmers quit planting around their doors they will succeed. They will raise just as good apples as my friend Tuttle does at Baraboo, and he has grown them well for several years. Undoubtedly there must be some cause that affects the tree, but, gentlemen, it is not the experience of fruit growers in this state, that the lower the ground the better the tree. We have got to change that *modus operandi*, and go somewhere else for our apples. I know elevations where the apples are as handsome as in Baraboo. There is something that associates with the root of the tree, the climate or the location, that I have never had explained to me, and I would like to have it done. Why is it that a tree in a low place, with the same soil, brought to a hill-top, will not succeed as it does if planted on our elevations? There is something I do not understand.

President Bascom — I spoke incidentally upon that subject. The location may be exceedingly low, that would be unfavorable unless there is running water or a lake; the hill will certainly be poorer, though there may be more moisture in the air, and it may become more saturated with moisture, the extremes of dry and hot ordinarily as they will be on an elevation, there will be a depression of warmth, and I suppose in reference to this farm on the lake, it has reference to the lake and not at all to the heat. I know that the lake, although it is a small lake, has a great influence. Where there would be two or three inches of snow there would be

moisture, and there is doubtless enough moisture in that lake in dry weather to saturate the trees. It has seemed to me, when there was abundant life in the tree, the life would struggle and break out in thrifty growth.

Mr. Finlayson — This is an important point, and it is well worthy of consideration. There is another question I want to refer to: What are the varieties of this upper row, and what are the varieties on the lower row? If I remember, those trees were set out in rows.

Mr. Plumb.— As a rule, the trees run down the hill, from the highest to the lowest. I would like to answer the question of Dr. Bascom here, with regard to the effect of climate on trees, and the value of moisture. I charge all these ills to some disease. I have learned by long experience that it is just as necessary for me to inquire into all the conditions as it is for a physician to inquire into the condition of his patients. There is a variety of causes, each operating in its own particular way, and there is a combination of all these causes. We say winter kills it. That expresses only a small portion of it. I think spring killing has something to do with it. But the particular point that the doctor refers to is the killing on the southwest side of the tree, which he attributes to the moisture of the sap of the trees. The method he proposes seems to be to have a larger inceease of moisture in the atmosphere. How shall we do it? In the first place, trees do not kill when the lake can influence the moisture. Those trees are injured when the tree is frost bound, when it gives off comparatively little moisture.

The western shore of the state of Michigan, and the eastern shore, is never frozen but what it gives a good deal of moisture. Its influence is felt in keeping the temperature above a low grade. It is not a parallel case. We will admit all the benefit the state receives from that large body of water. It does not apply to the university orchard on the north side of the hill, because at the time the sap sets in, there is practically a circulation, but it is very little, and it exhausts the moisture on the southwest side of the tree; and for another reason, the sun from this time warms up the south side of the tree and starts this little sap, and there is new active life, and hence it is much more apt to evaporate, and that portion of the tree is more rapidly exhausted; there not being circulation enough to supply that evaporation, consequently it dies. I admit all that. What is the cure? If we had lake Michigan on the

southwest side of that orchard, it would be the best thing we could have; but we have not got it. We have not got lake Michigan in Wisconsin, we have got Green Bay, and the trees on the eastern shore of Green Bay are in good condition; they have a large supply of moisture, so much so that they are in a state of moisture in the winter season. They are ice-bound, but in the interior of the state you have got to give up that theory of water salvation. My friend says he will have evergreens on the south side of every tree, because the evergreen will flourish and thrive, and not interfere with the tree, and make a handsome accompaniment. It takes some time to get the evergreens. Set a board up, one man says. Take tobacco stems and set them against the tree so as to stick up above the branches. There is no animal will touch a tobacco stem; none but one.

President Bascom — My remarks refer to summer killing. We have a good deal of spring killing in all the western states. There seems to me another kind of killing, and that is the killing of the top of the tree clear up to the small branches, but not absolutely dead. They are gone to the south part, and the sap will remain in the tree. It takes some time for that spring killing, whereas this summer killing spreads more rapidly. It shows very little vitality. The body shows vitality, but the top does not. I do not suppose that Lake Michigan has much greater influence than I described in my remarks. Lake Michigan helps the summer killing by modifying the conditions.

Mr. Plumb — If the gentleman refers to summer killing, I should like to know the nature of the summer killing. If he means summer blight, then I understand him.

President Bascom — No matter about that. What I mean is this: I suppose that if we have four or five or six weeks of exceedingly hot weather — dry weather — that the growth of the tree may be arrested, and that the tree does not readily take up circulation again. It may be arrested by extreme hot weather, and it might be arrested by cold weather. The circulation is checked. It takes time for the circulation to regain itself after the vitality has sunk to a certain point; it don't get back to that vitality. It may be done by extreme dry heat, and it may be reduced in such a way that it cannot recover itself. The next thing is the deadness of the sap vessels, which does not show itself until the next spring;

the cells will not receive it, and the next year they are dead. The evergreens must be kept in full circulation. Now, then, an evergreen, if it passes a certain point, never recovers. It may look a little green, and afterwards you get a sort of yellow tint to it. It may live six months, but a man of experience would certainly be able to detect the gradual change after it has got that hue. It arises from the circulation having lost its force. If the circulation, either from cold or from heat, or from great dryness, or from any other cause, sinks belows a certain condition, it will remain that way for quite a length of time.

Mr. Watson—How is the University orchard cultivated at present?

President Bascom — Since I have been there there has been no crop.

Mr. Tuttle — There is no question about spring killing. It is well known that a variety of those trees is liable to that. There is no question but what this summer killing is produced by a lack of moisture. It requires increased protection. The circulation is stopped; sometimes that process is going on for two years. It may be three or four years before the tree dies. The winter finishes up what the summer commenced. It is a well known fact in the south, in Georgia, Alabama, and other states, that the trees are injured by the heat of the ground; and that is one great drawback here. If we had the moisture that they have on the other side of the lake, we could do better. The cold and heat operate alike on the tree. The cold of winter operates just as much as the extreme heat in summer.

Mr. Field — I desire to ask what the gentleman thinks of these marks on the south side of the tree. I know that they showed very plainly on my trees. Was it the winter or the summer that caused this?

Mr. Tuttle — It may have been both. I have seen that process for years.

Mr. Field — It didn't show itself till towards the spring. The main branches of the trees were exposed just the same as the other ones, and rather more so, and those limbs would be perfectly smooth, while the body would be rough.

Mr. Plumb — I cannot agree with the Doctor, or with my friend Tuttle, on this question of summer killing. The only name that I know for it is what we call fire blight. In proof of this, the dryest

climate that we have on this continent is New Mexico, and it produces the finest specimen of apple trees, and there they have scarcely a drop of rain the entire year. How is this?

President Bascom — What is the thermometer?

Mr. Plumb — The thermometer in the valley of New Mexico rises as high as 110°, and stands there day after day during the warm period of the day.

President Bascom — Have those trees not been acclimated?

Mr. Plumb — The trees I refer to are trees which I sent there myself about fifteen years ago; I sent them to Judge Knapp when he was there, some 1500, and they are thriving there to-day. I have sent them to other parties, and they are doing well. I think, perhaps, the summer may have some influence in weakening the tree; it is a fact that we find trees doing this all over the country, on the most exposed portions, where they have the greatest amount of wind, the greatest amount of elevation. We have got a certain climate, and we must prepare for it; our trees must be restrained in their growth. A gentleman in Kansas says he plants them towards the southwest, at an angle of 45 degrees, and they gradually straighten up at the branches, so that the trunk has very little of the direct rays of the sun.

Mr. Kellogg — This is certain; if you put corn stalks around, you save the tree; or you can use tobacco. My impression is, that those University trees are suffering because the ground is not ploughed. I have several hundred trees. I live one hundred feet above the water. It is white oak clay land. My orchard bore pretty well this year, and a friend of mine came into my orchard, and he says: "Your orchard looks very thrifty." I manured the ground pretty well the fore part of the season. I think the University trees ought to be cultivated. I am surprised that they do not do it.

President Bascom — There is a feebleness which anybody can see, and there is not vitality all through the tree. I speak of this as showing the want of vitality.

Mr. Plumb — How is it with those on the south side of the hill?

President Bascom — It is the same on the south side of the hill.

Mr. Field — I would like to hear a word from our State Geologist, whether he has made any observation that would be of any interest as to fruit culture.

Prof. Chamberlin — I do not know that I have much to add in detail, after the discussion that has been had upon this subject. I have presented such facts as I have gathered in the geological report already issued. In that I have attempted to show the *natural associations* of our native plants, because it has seemed to me that those associations might be suggestive, and perhaps in connection with this discussion, those observations may have some value. By reference to them, it will be seen that a certain undergrowth almost invariably accompanies a given overgrowth. Whether this depends wholly upon the fact that both demand the same essential conditions of soil, etc., or, in part, upon a mutual dependence of the plants upon the conditions furnished by each other, as that of shade, for instance, may perhaps be an open question. In the report, sixteen such natural groups of native vegetation are described as occurring in the eastern part of the state. Among these there are subordinate varieties, or sub-groups, and where the areas occupied by the several groups join each other, they mingle more or less. In some cases, the effect of local causes can be observed. I judge from that portion of the discussion which I have heard, that those conditions which have been selected by nature for the growth of trees of a similar nature to those which we cultivate, are the ones which we find in our experience best adapted to such growth. It has also become evident to me in my studies, that there is a relationship between the soil and the native vegetation which springs from it, and that therefore the study of the two together, in the manner which has been attempted, ought to be productive of valuable results, if carried into actual experiment. I do not know that I ought to attempt to enter into any detailed discussion of these facts.

Mr. Finlayson — The growth and the location of the wild apple tree would then be an index?

Prof. Chamberlin — That might be a theoretical inference. As a matter of fact, we find that the crab apple associates itself mainly with the oak groups. As we advance from the areas occupied by the oak openings and oak forests into those covered by the denser maple forests, we find the ordinary crab apple replaced by other members of the same family. I should not infer that the absence of the crab aple would imply the absence of suitable conditions.

Mr. Plumb — I quoted you as making nine groups; now you say there are sixteen.

Prof. Chamberlin — The sixteen groups cover the whole, and include the herbaceous as well as the arboreous groups which you were discussing.

Mr. Finlayson — This wild apple tree we find in different sections of our country, where the black soil prevails. We find the wild apple tree grows most luxuriant in the lower soil along the banks of streams, in black soil, where the tame apple tree will not grow.

Mr. Plumb — The wild apple tree is indigenous to this country. You go south and you will find that our cultivated apples will thrive just as nicely as you find the excess of animal matter in the soil. That is the short answer to that question.

Mr. Jones — I would like to ask what tree would grow the best on the poorest, gravely, sandy soil?

Mr. Kellogg — The pitch pine and the European larch.

Mr. Plumb — I say the Scotch pine.

Secretary Bryant — In New Hampshire, the bastard birch is the indication of tree-food exhaustion.

Mr. Field — There is the white maple and the box elder.

Mr. Kellogg — The white maple will grow the best.

Mr. Field — I have seen the white maple thrive remarkably well on our sandy soil. The box elder is a native of our western country.

Mr. Kellogg — The European larch and Scotch pine will grow where you cannot raise white beans.

Mr. Field — You do not mean to insinuate that we have any soil like that in our state?

Mr. Kellogg — Yes, sir; there is plenty of it.

Mr. Wood — It would seem that this tree question is very unsatisfactory. There are many parts of the country where there is a scarcity of timber. Where I live we have a perfect surfeit of trees, and our anxiety is to get rid of them. With us, the great labor has been to get rid of the timber. I live at Baraboo, and we were under the impression that when we got a railroad we were going to have a great market for our wood. North of us, in years past, they have been getting rid of their timber by chopping and burning; anything to get it away. As quick as the railroad went through, it opened to this southern country the wood products of the north. The market for our own timber has been destroyed, so that we ship less from Baraboo than we did at first. They go fur-

ther up the country, where they can buy it cheaper. People who own wood land in that part of the country have been keeping it, under the impression that, as the country grows older, a market would be opened for our surplus wood; and hence, we do not encourage planting so much timber.

Mr. Field — I do not see how you are going to be affected by that.

Mr. Wood — If a man wants a farm, he had better go right into the midst of a prairie country where there is not a tree; better go and take his farm there, and plant trees, rather than go into a heavy timber country and hew out his farm.

Mr. Field — Perhaps his grand-children will rise up and bless him.

Mr. Wood — We shall have virgin soil for a good many years to come. There is that element in favor of a timber country, and while a certain amount of timber is indispensable, yet we all know that heavily timbered countries have been of very slow development. Take Indiana and Ohio; it took a generation to develop them, and it was not till people broke over past Indiana, Michigan and parts of Ohio, and got into the prairie country, that this great western impulse was felt. They had to work through that country.

Adjourned to Assembly Chamber, at 7: 30 P. M.

The convention met in the Assembly Chamber at 7: 30 P. M.

Hon. J. M. Smith, President of the State Horticultural Society presiding.

FISH CULTURE.

BY HON. WM. WELCH, CHAIRMAN OF THE FISH COMMISSIONERS.

President and Officers of the State Agricultural Society — Gentlemen:— Your secretary has kindly invited me to prepare a paper to be read at the Great Agricultural Table of the State of Wisconsin. The feast, in his opinion, would be incomplete without a service of fish, and according to hostelry etiquette, it should be served second in the order of ceremonies. I am glad to appear before

you in the capacity of caterer, and desire to tempt your intellectual appetites with an exhibition of the products of our Water Farm.

You are aware that the state is fostering, by liberal appropriations of money, fish culture by artificial means. We are one among 24 states and territories embarked in the important work of increasing the food resources of a great state. We stand in the front rank of this formidable army of communities, and at our head is the Smithsonian Institute, with Prof. S. F. Baird, honored for his great philanthropy and his vast learning, directing the expenditure in this new industry, of the munificent appropriations made by congress. Upon either ocean the United States government has erected establishments at which millions of the spawn of the food-fishes of the country are taken and impregnated, and expressed like common merchandise thousands of miles over land and distributed to the states provided with fish commissioners. We number in our ranks the most honored names in the nation — men eminent in letters and in sciences — in statesmanship and in politics. Stillwell of Maine, Pratt of Illinois, Hayes of New Hampshire, Lord of Vermont, James of Georgia, Lyman of Massachusetts, Shaw of Iowa, Pike of Connecticut, Dexter of Rhode Island, Seymour and Green of New York, Mosely of Virginia, Doster of Alabama, Polk of North Carolina, Jerome of Michigan, Sweeny of Minnesota, Fish of Arkansas, Harris of West Virginia, Rockwood of Utah Territory, Fisher of Ohio, Darbey of Kentucky, Shotwell of New Jersey, Reeder of Pennsylvania, Ferguson of Maryland — while in our own state we have that old pioneer, Palmer, of Boscobel, the practical Dousman of Waterville, and Hoy of Racine, the learned ichthyologist of the whole world — each, in his appropriate place, forwarding this important work. The Governor of the state, by operation of law, is one of our home commission, and gives us the countenance of his great office. These are but a few of the names committed to the work which we have in hand. Every sportsman not a pot-hunter, and every fisherman not a murderer is our friend, our patron and our co-laborer. Generous, liberal legislators look kindly upon us, and the cautious, careful, hard-handed granger gives us his beneficent smile. The right hand man of fish culture in the west is the Hon. Geo. E. Bryant — and who, as an honored Senator, with his equally worthy associates in both branches of the legislature, two winters back,

placed our commission upon a sound footing. With the careful and practical supervision of Supt. Welsher, we and the fish are happy.

Gentlemen, I am one who believes that we have not yet attained the highest excellence in fish culture. I do not purpose a new departure entirely, but *progression* is my watch-word. I have looked this fish question fairly in the face, and ought to understand it pretty well. I take for my text an extract from the Fish Commissioners' report of 1877:

"There is not a spring of water bursting from one of our thousands of hill-sides, and meandering through the pasture and meadow, which is not capable of supporting hundreds of speckled trout, with a small outlay in the construction of ponds. The boys and girls can rear them with less of labor and expense than that betowed upon the harem of hens — while the pleasure and delight attendant upon the work are a reward alone. The time will come when these rivulets of spring water will be turned to a higher account than as mere watering places for stock. The example of the state in stocking public waters will be imitated by individuals in stocking private waters. A good fish pond or two, stocked with fish, would be no mean acquisition to a farm. With a little well-directed labor, the fish crop will never fail. In their pure element they are subject to no scourge. Here, upon the quiet farm, they are not frightened by the puffing of steam engines and the dashing spray of water crafts; the offal of sewers, the filth of oil refineries, the washings of breweries, of stills, of gas works, have no poisons which reach them; the obstructions of dams, the accumulation of sawdust, the floating of rafts over spawning beds, are not among their calamities; and here, too, they are protected against worse than barbarian hands which deem it a merit to slay a fish when about to deposit her thousands of eggs, in the effort of nature to survive in spite of their endless combinations to destroy.

Here comes the question, How is this to be done? We answer, by directing the commission to distribute the fry of food fishes which can be reared in ponds, to every land-holder who owns suitable waters for fish propagation. In this way, and in this only, can the great benefit of the commission be fully realized. Now, we can only stock public waters. The great lakes, bays and rivers must, of course, be fully supplied by the state, as individual enter-

prise cannot do it, and would not, if it could. So far, all is well. But what is to be done with our thousands of lovely springs which have their sources upon our farms, and, after a short journey over pebbly bottoms and through "lovely dells and dales concealed from human sight," disappear in the lake or river? Look at the state institution at Nine Springs. A series of ponds on the "Hoy and Palmer" springs, covering less than half an acre of water, can be made to carry an immense cargo of fish of all ages, from ½ an inch in length to 4 pounds in weight. The food is there, too, when the flow is utilized within the boundaries of the state lands. The stream is literally alive with fish food, winter and summer. This may not be the case with all springs, but in most of them it can be provided, in part, by planting a species of fresh water plant, or *myriophyllum spicatum*, as commissioner Hoy would call it, and which would drive us to a Latin dictionary. Artificial feeding is cheap; chopped liver, yolks of eggs for the very young fry, and baked corn meal, fill the bill. Worms, insects, frogs, grasshoppers, flies, etc., are thrown to them by nature. The cost of feeding 5,000 trout, each weighing 1 pound and upward, is small, and in turn you can feed on them. "My policy" (as the late Andrew Johnson would say) is this: Any person owning or leasing a farm upon which is a spring of living water with a fair flow and a fall of three or thirty feet, who will construct a series of ponds of a size and in the manner as directed by the commissioners, shall be entitled to receive from the state hatching house, free of charge, from three to five thousand fry, for deposit in the head pond. When a year old, they should be passed into the second pond, and another supply furnished him for the vacated pond. At the end of the second year, the process should be continued, so that at the third year, he has the ponds stocked with one, two and three year old fish. The two and three year old ones may be taken for the table. When two years old, the speckled trout yields spawn. The owner of these ponds will soon learn how to propagate his own fish, and after the three years of operations, if not sooner, he and his boys and girls will become fish breeders. Introduce this system, and in ten years the state of Wisconsin will be alive with fish. There is no black art about the work of increasing fish by artificial means. Fifty dollars expended in material, and twenty in labor, will make a good hatching house for a hundred springs. Aside from the

profit there is a vast amount of pleasure in raising fish. I love to see a fish swimming in water; a speckled trout or a salmon moving about in graceful curves, impelled forward by an invisible power, moving here and there with the coyness of a sweet maiden, sparkling in beauty, darting hither and thither, and then poising its body in mid-water. It is a view which delights age and youth.

The objection, that I propose to use public money for private purposes, is not worthy of the liberality of the age. There is scarcely a government in Europe which has not given subsidies to private fish breeders. The minister of agriculture of Austria gave to Glanol a subsidy of $200 for the discovery of an improvement in constructing hatching troughs. Fish breeders have been encouraged by government in placing at their private disposal the use of public waters. As late as 1864, it was accounted a great feat to impregnate the ova and raise 30,000 young fish. Wisconsin is now handling upwards of 13,000,000 impregnated eggs, and will hatch and put out upon our water farm ninety per cent. during the coming four months. This work is being done with $8,000. In 1876–7, the commission handled nearly 10,000,000 fry, in addition to completing and putting in operation our works. We are just commencing to realize our capacities. It is no exaggeration to say that at Milwaukee and Madison we can annually handle 50,000,000 of spawn, and hatch out from eighty-five to ninety per cent. of strong, healthy fry. If but one in fifty should attain the weight of one pound, at ten cents per pound, in the market, they would bring $100,000. The market price of speckled trout is from forty to seventy-five cents per pound. Your secretary insists that fish can be artificially propagated to such an extent that all laws for their protection may be abrogated, and the supply constantly increased, and up to the full capacity of the waters to furnish food, and at a trifling expense. This is problematic.

Our special field for fish propagation covers two-thirds of the earth's surface. The amount of food furnished for its population from this vast reservoir of water is immense. We can approximately estimate the value of importations and exportations of fish from commercial exhibits; but these represent only a moiety of the vast consumption, and only that which is salted to supply the demands of commerce. In Canada, otherwise a sterile country, the production and sale of fish amount to upwards of $11,000,000 an-

nually, which is a greater proportion, per capita, to the population, than is the value of exports of wheat, per capita, to the population of the United States. Our American fisheries upon the Atlantic and Pacific oceans, and the inland fisheries, constitute a business which is prodigious, in the amount of capital invested, and giving employment to thousands and thousands of our population. It is one of the great leading industries of the United States, and ranks at least the third in importance. Of oysters alone, 4,000,000,000 are consumed annually.

The trade of the United States in mollosks is placed at $50,000,000 per annum, not counting the daily consumption on the line of their beds, which cannot be estimated. Add to this the value of other salt water and fresh water varieties of fish taken annually by our American population, and the aggregate is hundreds of millions of dollars. The decrease in productiveness for a few years past has been alarming and marked. This is being remedied by artificial propagation, and hereafter the increased consumption will be provided for by the simplest means.

The fish interest possesses a remarkable feature. It is one of the very substantial industries of the human race; the supply seldom being short of the requirements of man, and the production never in excess of his wants. From this fact, the price of this article of food varies but little, or not at all, from year to year, and even from generation to generation. There is hardly another article of human necessity, comfort or luxury but what experiences greater rises and falls in its value, and upon which are founded greater commercial vicissitudes, sometimes making vast fortunes for speculators and black-legs, in brief periods of time, and often overwhelming with financial disaster the honest producer, manufacturer and merchant. This is a stable vocation and business. The value of the precious metals has hardly undergone less fluctuations than has the value per pound of the fish caught and sold for the human race.

A theory has been promulgated by technical physiologists that fish is peculiarly an article of brain food, owing to the fact that its phosphorus supplies the waste of the phosphoric element in the cerebral organization. This is, doubtless, a fine therory, and is set forth elaborately in the writings of the late Prof. Agassiz, who was, if not its author, at least one of its most enthusiastic advocates. In this connection, all will remember the anecdote told of Agassiz,

that when asked by a light-brained individual, who had been reading his works, what fish he should eat to improve his intellectuality, the great naturalist replied: "You, sir, had better commence on a whale!" A simple reference to facts will blow this theory out of water. The food of the lowest species of human beings is almost exclusively composed of fish and reptiles, which, it is demonstrated by science, possess in an equal degree with fish the phosphoric properties. The Shosones or Digger Indians, the Esquimaux and Icelanders, the uncouth and degraded races which inhabit the islands of the tropical seas, and some of the remote tribes of China and Tartary have an almost exclusively fish diet. These facts appear to be conclusive that a fish diet is not a peculiar stimulus of mental development. If this absurd theory were true, the races now farthest in the rear of human advancement would have been at the front, notwithstanding climatic differences, the hard places in which their lines were cast, and the immeasurable inequalities of condition in which men start on the road of development; for mind will triumph over matter in the long struggle, and the longer and greater the struggle, the greater and more splendid will be the triumph.

The truth is that fish food should be mixed, in a fair proportion, with other food; it should be sandwiched with meat, bread and vegetables. A fair proportion of each should be maintained. That, in all respects, will prove beneficial, and lead to harmonious, equable intellectual and physical growth.

We are just beginning to learn something about fish. Our learned Prof. Butler will post off to Memphis or to the North Pole to learn something new and startling about pre-historic races, and which only concerns mummies and frost giants; he and other intellectual brokers will quarrel over the question whether an ancient copper implement is fused, or not; but neither he nor they can tell us the age of the four pound sucker caught upon the shore of Lake Mendota. It has quite recently been demonstrated how fish, in their native waters, reproduce their species. About thirty-five years ago, a poor fisherman of La Bresse, a Frenchman, made the discovery, and restocked, artificially, the waters of the "blue Moselle." If the process had ever been performed before, Joseph Remy did not know it. The great French Academy, founded in 1635 by Cardinal Richelieu, made Remy an honorary member; an academy

so exclusive that originally the number of members was limited to forty, and the portals of which Darwin was forbidden to darken. It is now being demonstrated that some varieties of fish exhibit paternal and maternal instincts; by rearing them in ponds their habits and their ages may be ascertained, thus greatly enlarging the field of scientific research. Our fish industry demands the countenance and kindly encouragement of our universities, academies, and the learned and good men of all our people. The state institution at Madison is grand in its possibilities. Its capacities for breeding and carrying fish are simply wonderful. At an expense of $500, a pond of an acre in extent could be made, which would contain and carry 300,000 speckled trout. The state owns 40 acres of land with her springs; of this, about ten acres are susceptible of being made into ponds, and abundantly supplied with spring water of a delightful and unvarying temperature of about 45 degrees. As contiguous to New York, Chicago or St. Louis, as it is to the state capitol, its value would be estimated at millions of dollars. The state, in future years, will rear here an aquarium where water plants will be cultivated, and where every species of fresh water fish will swim. Here, also, upon her 30 acres of dry and timbered land, a zoological garden will be founded, where will be congregated together the untamed beasts and fowls of the earth. To this spot our hundreds of university students will flock, to study nature in her infinite varieties. Our boys and girls—the coming supports of all our public and private institutions—will be freely admitted to this great exhibition of wonders. The air will not be stifled with the stench of the traveling caravan; the oaths of rowdies and the songs of bacchanalians will not startle the young, nor offend the chaste. Under the shadow of our then venerable university, and attached to it as an educator of all the people, it will be fostered by the state as one of her most cherished institutions. The place will approach in loveliness and attractions the second cycle in Dante's heaven, where he tells us that "spirits crowded towards him as fish in a clear pond crowd to the hand that offers them food."

Pres. Smith — The next subject is one that it has been somewhat unusual to discuss among us agriculturists at conventions. The subject of taxation by the president of the university at Appleton,

President Steele, whom many of you know, and I have no doubt that the remarks he will make will be highly appreciated by you all. I have now great pleasure in introducing President Steele of Appleton.

President Steele then addressed the convention on the subject of

TAXATION.

That human society is a human necessity, no one denies. That this implies organization, and that organization implies agents or agencies, is equally obvious. The aggregate of these agencies is what constitutes government. The inference is easy, that those who devote themselves to the service of society are entitled to a certain share of the aggregate production of the members of the society. The apportionment of the necessary amount among the individuals constituting the community, is what is meant by *taxation* — from a Greek word signifying an orderly arrangement or determination. The design of such management or system is, that each member of the community may contribute a somewhere nearly just proportion toward the expense of the government, which is the agent of society.

At first glance this might not seem a very difficult matter. Each one would be expected to pay, not exactly, perhaps, but approximately, either in proportion to his ability or in proportion to the amount of the protection afforded him; if, indeed, there be any difference in these two things. Yet even here a variety of questions arise, on each of which there is a variety of opinions. It is nearly impossible to harmonize these opinions. But this is not the worst of it. There is, perhaps, no subject in regard to which there is so much immoral public conduct as this. The methods themselves are largely vicious; but the application of the principles, the official practice and the customs of the people are demoralizing to an alarming degree. It has come to be regarded as a matter of common consent that preferred statements of fact are to be interpreted with a meaning totally inconsistent with their literal and natural import, and that even the oaths of assessors as well as of private parties are to be taken in a manner so accommodated as to deprive them of all sacredness whatever. There is scarcely anything so quietly and yet so surely destructive of the general con-

science of the community as the fraudulent custom in this respect among men whose moral reputation is otherwise beyond the least taint of reproach. A few facts will illustrate this statement.

The law of the state of Wisconsin concerning the taxation of real estate reads as follows: "Real property shall be valued by the assessor from actual view at the full value which could ordinarily be obtained therefor at private sale, and which the assessor shall believe the owner, if he desires to sell, would accept in full payment." The law further requires such assessor to subscribe a solemn oath or affirmation that he has complied with the above direction concerning each parcel of land in his return, and declaring that he has given the full value thereof, estimated by the rule prescribed.

One would think that officers so implicitly instructed and so solemnly sworn to follow instructions would not fail to estimate property, at least, very nearly according to its value. Of course, omniscience would not be expected of them, nor a perfect judgment. They might easily be supposed to be sometimes biased or prejudiced by various conditions and without moral fault of their own. It would not be strange if they should incline to construe liberally in favor of the individual, rather than rigidly in behalf of the public. But that there should be a universal and unconcealed purpose to violate both the law and the oath to follow it, and that this should be everywhere recognized, publicly understood, and scarcely eliciting even a faint rebuke, indicates something seriously wrong in the moral condition of society.

There is probably scarcely an assessment roll in the state of Wisconsin — and Wisconsin is not at all singular in this respect — which is not a collection of falsehoods solemnly sworn to by an agent of the public, who is yet at the same time acquitted by the public of all fault in this matter.

In proof of this, note the following statements gathered from the last annual report of the secretary of state. In Adams county, the assessed value of the land sold is at an average of $2.12 an acre, while the sales of the same land actually averaged $8.70 an acre. That is, the assessed value is twenty-four per cent. of the real value. In Rock county, one of the richest counties in the state, the lands sold brought on an average $31.20 an acre. The same lands were assessed at $20.50, or about sixty-six per cent. of the real value.

In Outagamie county, the sales averaged $9.90, and the assessed value, $3.75, or thirty-eight per cent. In Brown county, the ratio of the assessed value to the value received on actual sale is seventeen per cent., while in Kewaunee county it is seventy-three — the highest in the state. The year before this last, in one poor county, by some unaccountable miscalculation, or sporadic outbreak of Spartan virtue, the lands were assessed at forty-four per cent. more than they actually brought. But this last year there were only five counties in the state where the average ratio of the assessment to actual price paid was higher than sixty per cent. The average in the whole state was forty-six per cent. On the town lots and city property it was fifty-three per cent. I am not now speaking of the gross inequality here exhibited; that involves another large piece of injustice; but of the intrinsic immorality of the custom.

In the state of New York, the law respecting the assessment of real estate is similar in its requirement to that of Wisconsin, and the oath taken by the assessors is, if possible, more rigorous than that taken in our own state. They are to estimate the property "as they would appraise the same in payment of a just debt due from a solvent debtor." At the completion of his labor, each assessor subscribed an oath that the value of all the real estate assessed by him has been estimated according to the foregoing legal direction; and the statute further provides, that every assessor who shall willfully swear falsely, in taking their oath, "shall be guilty of and liable to the penalties of willful and corrupt perjury." Yet, in some of the counties of the state of New York, the valuation by the assessors is no more than twenty per cent. of the known value, while, in a majority of instances, the rate varies from twenty-five to thirty-five per cent., rising here and there in the cities to fifty and perhaps sixty per cent. as a maximum.

The case is still worse with reference to personal property. This, of course, is more difficult to estimate, as much of it is invisible or intangible, and the principles on which it is estimated are, in some respects, indefinite and contradictory. A considerable proportion of it is necessarily left to the representations of the owner, who, in several of the states, is required to make oath as to the truth of the statement presented by him. How utterly unreliable such sworn statements are, is evident from numerous examples which may be picked up in almost any county or neighbor-

hood. It is the general opinion of men qualified to judge in such matters, that the personal property in most communities is at least equal to the real property. Yet, here in the state of Wisconsin, where the real estate is assessed at less than one-half its valuation, it is even then more than three and one-half times as great as that of its personal property. It is about the same in the state of New York. Then, again, the valuations are remarkable. In Oneida county, New York, in 1842, the assessed value of personal property was $2,217,975; in 1869, it was $2,166,411; showing a decrease in twenty-seven years of $51,564. Probably the property instead of diminishing had trebled in that time. Moreover, merely the national bank capital of only two cities in that same county, on the first of October, 1870, was $2,172,000, or $5,589 more than the whole personal property returned in the previous year! This is not a singular instance in New York. Take another case, in our own state. From 1870 to 1875, the population increased more than a quarter of a million, or over thirty-three per cent. I suppose that no man of common sense, at all versed in the statistics of wealth, doubted that the personal property of the state made at least an equal advance. Yet, we find that in 1870, the personalty of the state was assessed at $79,218,533, while in 1875, it was only $77,827,663.

These facts and others similarly like them indicate a seriously bad moral condition of public sentiment. It undoubtedly arises from our methods of taxation, which are unwise and ill conducted. It is true that the assessors who make returns which are known to be false, and then swear to them as true, and the private citizens who, on oath, put in statements of the amount of their personal property which are utterly inconsistent with the facts, try to justify themselves on the plea that this is done by common consent, and that no one is deceived. The latter is by no means true, especially concerning the returns of personal property. As to the former, we ought to learn that common consent cannot suspend the laws of God. For the community, as a whole, to *act* falsehoods as well as tell them, and to adopt a principle of public policy which implies lying on a large scale, is to undermine and very soon destroy the foundations of integrity among its members.

It is easy to point out very great defects and inequalities in our existing method of taxation, but not so easy to devise remedies. I

do not propose any new theory, only to make general suggestions on the subject, which may be of some use.

1. In the first place, it is pretty evident that one of our nominally fundamental principles of taxation is not only impracticable but economically wrong. I refer to that which requires a uniform rule of taxation upon all property alike, without any exception. It is a most plausible principle, and is accepted by many as correct upon the very face of it, and as nearly self evident as almost any proposition in political economy can be. For this reason it is adopted, whether, in the meaning naturally attaching to it or some other, in many of our state constitutions, and assumed in most discussions of the subject. But the remarkable thing about it is, that not one of our own states adopting it, not one general government, and in fact, no civilized government upon the face of the earth, ever practically attempts to apply it. Notwithstanding its apparently axiomatic character, the instincts of both legislators and of constituents almost invariably reject the doctrine of uniformity of taxation. They do this, I think, not from any favoritism to any class, not out of any sentiment of compassion or benevolence for the unfortunate, but on purely economical grounds; on the conviction that whatever might be gained in this way would be more than counterbalanced by losses occasioned.

It is on this account that exemptions of a certain amount or kind of property are made in all systems of taxation. Thus in nearly every civilized country, and I suppose in all our own states, certain exemptions in favor of the poor are made. Certain articles of prime necessity in the house, certain tools used in agriculture and the trades, certain domestic animals, and a certain amount of property of a similar kind are untaxed. It is true that these items are exempt in the case of the rich as well as the poor man; but obviously the advantage wholly accrues to the poor man, as it was designed to do. They comprise but an insignificant fraction of the rich man's property, but in some cases it is the whole, and often the chief part of the poor man's goods. Such an exemption is not necessarily equivalent to an additional burden upon other property, but rather a diminution of what the burden would otherwise be. It is a relief to thousands. It encourages them, and prevents the loss of hope and self respect, and is thus a defense against pauperism and other burdens upon society many times more expensive than the exemption.

It is also an illustration of this error in principle, that in all civilized nations it is customary to tax such kinds of business and such articles of property as are generally admitted to be pernicious in their effects on society, at a higher rate than other kinds of business and property. The reasonableness of this policy is obvious. In the first place, if the tax is so heavy as to discourage and diminish the use of such commodities, no person suffers. On the contrary, it is scarcely disputed by any rational and candid man that much benefit would ensue not only to individuals, but to the community as a whole; still no one is debarred from the indulgence who can afford the luxury. In the second place, since by the diminished use of these hurtful commodities there is both greater purchasing power and an increased productiveness in the community, not only is the revenue of the government increased by this additional tax, but the taxable property is increased, so that the percentage is less. Thirdly, it diminishes the expenses of the government by the diminution of crime and pauperism, and thus makes the amount of the taxation less while the wealth to be levied on is greater. Finally, no one is compelled to pay the tax, since he may abstain from the indulgence. The same is true, to a certain extent, in respect to used luxuries of any kind. Hence most governments make a discrimination in favor of articles of necessity. If a poor man's bread and meat are heavily taxed, it is an essential evil to him. If the rich man's wines, jewels and carriages are heavily taxed, he can get on very comfortably without them.

It is on this general principle, too, that wise governments have exempted from taxation certain kinds of property which are so employed as to result in special public benefit. Examples of this are found in the temporary freedom of roads, canals, railways, and sometimes of highly desirable manufacturing enterprises which are not likely to be introduced otherwise, and yet are supposed to be of more benefit to the whole community than the value of the tax from which they are relieved. Of course, wise governments are cautious in conferring such franchises, and refuse to protract them beyond the point where the benefit from the exemption is as great as the value of the exemption.

Under this head, only in a more special form, came the exemption of religious, charitable and educational institutions. The principle here is not, or certainly should not be of religious or par-

tisan favoritism. The only question is, as to the economical results. If, on the whole, it will be better for the community in respect to more ultimate objects for which taxes are levied, to exempt these species of property, then let them be exempt; but if the exemption actually increases the burdens upon the rest of the property in the community on the whole, then let it be refused. One simple rule would seem equitable and reasonable. *Whatever property is actually and wholly devoted to the use of the public, and out of which the owners or donors or managers make no profit, should be exempt.* Yet this, like the preceding particular, is liable to abuse, and should be rigidly guarded. Corporations sometimes cover schemes for personal advantage, while other professedly public enterprises are made to redound principally to the luxury or consequence or power of a few. Such should be curtailed and carefully limited.

I have doubtless said more than enough to show that whether the instances I have mentioned are approved or not, the common sense of civilized society has never received, without large modification, the doctrine of uniformity of taxation. It is found to be in the first place, utterly impossible, and in the second place, altogether undesirable as well as uneconomical. What sensible men desire is, *the best article of government at the least possible expense*, and this expense distributed as justly as possible, and, at the same time, so that each class will feel the burden as little as possible. I do not care so much whether I pay more in proportion to my means than my neighbor, or whether I am paying more or less under the present system than I should be under some other. For these, reason about it as we may, are not necessarily the same.

2. As a general principle, it may safely be asserted that *direct* taxation is preferable to *indirect*. The former, as every one knows, is paid over personally and immediately by the individual tax-payer to some agent of the government. The latter is paid as part of the price on dutiable goods imported from foreign countries, or on domestic commodities subject to an excise tax. The indirect is the more popular tax, principally, no doubt, because it is paid a little at a time, and partly because it is unrealized at the time of its payment. Where a tax of a cent is paid on a bunch of matches, or ten cents on a pound of tea, it is scarcely noticeable, and there

are probably thousands of dollars paid to the revenues of the government by persons who never suspect themselves of any such thing. Yet, whether realized or not, it is entirely real, and millions of dollars are actually paid out of the earnings of laboring men for the support of the government.

There are two reasons for preferring direct to indirect taxation. One is, that it is apt to be more just. Direct taxes are usually levied upon a large variety of commodities, as in excise and import duties, and those of commoner use among the masses of the people. In this way, the poor man is made to pay much more than his proper proportion of the expenses of the government. It is true, if the excise and imports are on a few luxuries, the contrary may be true; but it is to be remembered that what is a luxury to one may be a necessity to another. The other reason is, that what men pay for directly and knowingly, they are much more likely to be interested in. If a farmer or mechanic has to pay over to the public receiver ten, twenty, or forty dollars at one time, and is conscious of having to calculate, and contrive, and economize with more or less carefulness beforehand in order to do this, he is likely to watch its expenditure more closely, and note whether it has been used wisely and profitably. He will be more disposed to hold the agents of society, the officers of government, to a strict account for their disposal of the public funds. It would make a vast difference in the conduct of public officers if every man knew just how much it cost *him* to carry on the government, and the popular restraint upon profuseness, corruption and general wastefulness would be more effectual.

3. Of the methods of direct taxation, the best and most equitable is unquestionably that of the *income tax*. I do not mean to say that this can be made absolutely equal, or very nearly so; no system can be made thus. But if any way could be devised to ascertain what the precise, actual income of each individual is, then the payment by each one of the necessary proportion of that to defray the expenses of government, would be the fairest method of taxation. Nor do I mean that the whole income should be taxed; for the same reason that where the tax is upon property, a certain exemption is made of articles of necessity; so here, as much as would be necessary to furnish the most ordinary necessities of life, so that no one having these would absolutely suffer, might be un-

taxed. This would involve no partiality or favoritism, as all would be treated alike in this respect, whether rich or poor. The taxes of no one would be any higher on this account, for, by this kind of alleviation, there would be, on the whole, greater productiveness, more taxable property, and less expenditure, than if no exemptions were made. Yet, singular as it may seem, while all, or nearly all, admit the greater justice and equitability of this method, it is, in general, a very unpopular one. An income tax is seldom imposed, and when, in a temporary emergency, resort is had to it, the people usually demand its early cessation, and refuse its perpetuation. There are some legitimate reasons for this: It is inquisitorial, and bears unequally upon different parties; but probably the main reason is, that its defects, though no greater, are more conspicuous than those of the other methods usually applied, and people are more likely to be discontented with evils which they clearly discern, than with still greater ones which they know to exist, but from which they are able to hide their eyes. There is also the same reason for disliking this method as for not liking the direct in preference to the indirect. We know and feel the tax when we pay it, and that is always disagreeable.

4. We have seen something of the inadequacy and viciousness of the methods of assessment at present pursued in most of the states of our Union. It is not only irregular and immoral in its operation, but it utterly fails to accomplish that at which it aims — the fair and equal taxation of all the citizens. This is especially the case with reference to personal property. It is stated in the second report of the commissioners appointed to revise the laws for the assessment and collection of taxes in the state of New York in 1871, that according to the best estimate they could make, while the real property of the state was assessed at less than one-half its value, though probably all assessed, not more than fifteen per cent. of the real and true value of the personal property was assessed where the law stringently requires that all such shall be assessed at its real worth!

The reason of this is that the nature of personal property is such that it cannot be determined by public officers except under the operation of such laws as no free and civilized people will submit to. Much of their property, even if taxable, is of a kind which it would require a very large amount of time and an extensive range

of intelligence to properly estimate. But much the larger proportion is invisible and intangible property that can be concealed, that can be converted into untaxable property, exchanged with persons holding like property in other states, and thus rendered exempt, and in a thousand ways made to evade the observation of the assessor.

One of the fruitful sources of perplexity to the legislature and of division of public sentiment, and of confusion everywhere, is, as we all know, the question of the taxation of mortgages. Shall the property implied in those securities be regarded as belonging to the mortgagor, and be taxed accordingly, or shall the mortgagee be held liable for the taxes? Most of our states compromise by making both liable, and so taxing the property twice. The manifest injustice of this furnishes the largest occasion for owners of mortgages to evade the payment of taxes upon them by every possible means. These devices are almost utterly unjustifiable; since one wrong cannot justify another. Still, human nature being what it is, where a palpable injustice exists, some means, fair or foul, will be taken to rectify it. It is one of the potent causes of the public and alarming demoralization existing in all our communities on this subject of the taxes.

It is difficult to propose a remedy for this particular wrong, on which even sensible people will agree. If it be proposed to assess the tax only on the mortgagee, it is complained that while real estate is assessed at less than fifty per cent. of its value, and mortgages at their full face, the latter have to pay at more than double the rate of the former. This is true. Moreover, there have been cases of high taxes, where an elderly man, after having labored hard and economized carefully through many years, supposes himself to have saved enough, so that the income from it will give himself and wife a frugal support for the balance of their days. But the whole being invested in a mortgage, at a moderate rate of interest, and being taxed at a certain rate, it is found that the tax is sometines nearly equal to, and, indeed, sometimes in excess of the whole interest. For this reason, and for several others, Mr. David A. Wells thinks it would be a more equable method of taxation to levy only upon the real estate, in addition to the property held by corporate bodies. Of course, all the farmers and owners of real estate would cry out against this as an obvious and almost outrageous injustice. Yet it

is not so altogether unjust as it would appear upon the face of it. Mr. Wells gives some very good reasons leading to the conclusion that the operation of such a method would be no more costly to the owners of real estate than the present method. But his reasoning I have not time to give; nor is it necessary; for, however plausible, it is not altogether convincing to the parties most interested and is not likely to be adopted.

There can be no question, as it seems to me, if we act upon the theory that all property should be taxed, that, at least, no property should be taxed more than once. As to the question, Who should pay the tax on a mortgage? it would appear on the face of it, very obviously, that it should be the *owner* of the property, and the owner of the property is clearly the mortgagee. How to effect this is still another question. We have seen the many, and apparently reasonable devices against it. I only suggest that the tax should be levied upon the mortgaged property, and if paid by the mortgagor, let it be so far a legal discharge of his note and interest, to be deducted in the final settlement. This would make the collection of the tax certain, and put the burden upon the real owner.

But Mr. Wells proposes another plan, totally different from this, and from any other ever adopted. The general features of his plan are as follows: 1. All real estate is to be assessed at its actual value, and the laws in relation to this are to be executed. 2. All shares in banks, and in gas companies, turnpike companies, plank-road companies, and in all trust companies, fire and marine insurance companies, and similar corporate associations, is to be assessed according to their real value. 3. All other personal property is to be exempt from taxation; but as an offset to this and instead of it, every person, family or firm is to be taxed according to the value of the rent of the buildings occupied as a place of business or dwelling. Thus, if a man occupy his own house, or store, or factory, the real property will be assessed according to its actual value, and taxed accordingly. In addition to this, its rental is to be estimated at ten per cent. of their value, and the tax levied on three times that amount; and this shall be in lieu of the whole tax on his personal property. This is on the principle that there is no so good test of a man's real revenue as the amount of rent he pays, and this is generally, or on the average, something like a third of

his annual expenditures. It is not claimed for this plan that it meets the demand of apportioning the revenue for the government among the members of the community with absolute accuracy. No plan, unless devised by Omniscience, would do that. But it is claimed, with a good deal of reason, that it approximates their proper and perfect apportionment more nearly than any other plan heretofore proposed.

Besides these, it meets several other wants in our system of taxation. 1. It becomes virtually a tax according to income, without the inquisitorial, arbitrary and other disagreeable features which almost invariably appertain to an ostensible income tax. So far it is altogether the most just and equitable tax possible. 2. It is far more likely to reach all the resources of a man than any other heretofore tried. It will make no difference under this system whether his securities are located in one state or another, or in one country or another, and will hence do away with a large class of business to which resort is had with reference to taxation. It will also end the discussion and the not unnatural discontent concerning the non-taxation of government and state bonds. There are invincible reasons why no government should let the bonds be taxed by either a subordinate or a co-ordinate government, since in so doing, it might be placed financially in the power of a hostile party, to its great injury. Still there is no reason why the income derived from these securities should not pay its due proportion of the expenses of the society. In this way, it will be sure, while there will be no possibility of discriminating against any class of securities or evincing hostility to any government. 3. Finally, the assessment and collection of the taxes under this system will be far less perplexing and far less expensive than under any former system.

Mr. Goodland — It requires all the moral courage of a man to get up and point out not only the merits, but the imperfections of the present system of assessment. There is something to be said on the question of assessing. I will not detain you more that five minutes. The supreme court has decided, as you doubtless all know, that many of the assessments of this state — that many of the assessors have not complied with the law. I undertake to say, with all deference to the supreme court, that it is a moral impossibility to

assess fairly according to the statutes of this state. The law says substantially that assessors shall value property at what they believe the owner would be willing to take for it if he desired to sell. That is the only foundation that the assessors have. It is a doubtful word. We have heard of Americans wanting to sell their wives, but circumstances alter cases.

PRACTICAL FARMING.

BY HON. A. A. ARNOLD, GALESVILLE.

Practical, is that which may be done or effected by human means or power that can be applied. That which is possible is not practicable, for the reason that it is not always useful.

Theoretical, is speculative. It may be either possible or practical; it may be both. Whether possible or not, depends on whether sufficient means may be employed to effect the speculative results.

Whether practical or not, can only be determined after experiment or actual practice.

Hence, we may discover three distinct kinds of farming, to wit: theoretical, possible, and practical.

Theoretical farming, in truth, only obtains when the farmer simply acts upon speculative or theoretical propositions. Much is said about theoretical farming. It would be a better term to say possible farming, for, as used, it only means a manner of farming that is impossible for the common farmer; that kind of farming that men with large means are able to maintain. With them it may be theoretical, but not profitable. It may be possible, and neither practical nor useful, or it may be alike possible, practical and profitable; if all of these, it arrives to our standard of practical farming; if it lacks either of these last, it is not desirable, and for that fault alone, it would not be practicable. It becomes nothing more than theoretical farming.

Theoretical farming is ordinarily applied to those kid glove fellows who live on a farm, or own a farm, and make their money to run it somewhere else. They are agriculturists. To illustrate: A lady was once asked, "What is your husband's occupation?" She replied, "He is an agriculturist." Says my friend, "Oh! he is a farm-

er." She replied, "No, he is an agriculturist." "Well," says my friend, "I thought a farmer was an agriculturist." "No," says the lady, "there is a great difference. The farmer lives on his farm, works it, and makes his money and his living from it; while we agriculturists only live on our farms for fun, or when we are tired of gay city life. We make our money in other business or professions, and spend it on our farms at our leisure."

Thus, we that are farmers may learn the distinction. Of these agriculturists, in this sense, I have no words of disparagement. If a man is able, and takes pleasure in superfluous adornments, in making experiments, or anything else that proves more expensive than profitable, that is his business. If he hits upon a practical point in farming, give the credit where credit is due. We seldom find so big a fool that we may not learn something from him. Bigotry in farming is as despicable as anywhere else.

The practical farmer feeds his farm, and in return the farm feeds him. If the farm is starved, it will starve the farmer. Nature always gives bountiful returns for all prudent care, attention or expenditure, alike in tillage and fertilization. If he raises small grain alone, the soil will become impoverished. As it is said, "he runs his farm;" with a prudent amount of good stock, well cared for, the farm will run its owner.

All farmers are not able to purchase pure blooded stock, but there is now no excuse for not improving the blood, for not grading up, as it is called. Pure blooded or grade animals may be kept as cheaply as it is profitable to keep any. Starving or stinting an animal never paid, no matter what may be the breed. Even a goat or a donkey will show its keep. A man that looks on and begrudges these beautiful domestic animals (that contribute so much to our pleasure and comfort) the food they eat, will never make a practical farmer; he is worse than the man that has "no music in his soul;" he is not only fit for murder, he is fit to be hung. I have never yet seen the time that pure blooded stock would not bring more than mongrels. Keep the best of every thing, should be the farmer's motto. Some one will want them, and at a fair price; if it does not pay well, poorer ones will only pay less. Purchasers will seek them, which is not the case with an inferior article of any kind.

Go through our land, and it is questionable whether there can be

found a class that, in proportion to their numbers, succeed as well, that as a rule manifest so little knowledge of their pursuit; often, such perfect shiftlessness and lack of business qualities.

The mechanic who neglects to do a good job, or even the common laborer that fails to give a good day's work "is often reproved, and that without remedy." Not so with the farmer; if he half tills his land or wastes a large percentage of the crop in harvesting, or does other ruinous things, there is no one but himself to reprove, and as the lash is to fall on his own back, he puts it on lightly. He always has some excuse for lack of care or a poorly done job. His work is driving; has too little help; perhaps he will say he did not think (likely the last). The truth is, he is not a *practical farmer.*

Practical farming requires means as well as skill and judgment No man should invest his money in poor land. It is a poor farmer, however, that cannot appreciate the means at his command, be they great or small.

It would be a poor preacher that would be discouraged because other ministers had larger churches and larger congregations; larger salaries or more appreciative audiences. So it must be a poor farmer that would be discouraged or slacken his efforts because other men (perhaps his neighbor) has a larger farm, better stock, a heavier income or a better soil. His duty, and what makes *him* a practical farmer as distinguished from the impractical farmer, lies in this, that he appropriates the means within his power as best he may.

That man deserves praise that does his work well, whatever it may be, not he that thinks, talks and promises well, but continually fails in doing.

Agriculture is both a science and an art. We learn the science from books, at school or from others; the art alone by practice on the farm. A man that learned his skating from a book, relying on that alone, would probably break his head in his first trial on the ice itself. So with plowing, harvesting, thrashing, marketing; all require experience and skill that can only be obtained by actual practice.

Perhaps there is not a vocation wherein there is a better opportunity to show good judgment and use to advantage a broader information than in *this* too often despised and underrated calling.

In society, if a stranger is spoken of, and the inquiry made as to his business, the answer being that he is a farmer, the first impression is general that he is some common sort of a fellow; and not until after an acquaintance does the mind become disabused of the thoughts, if indeed it is at all. This comes from the prevailing ignorance in our profession. Ignorance when there are such ample opportunities through the farmers' journals, the farmers' clubs and the Grange, should breed contempt. Public sentiment is not deceived. It passes judgment, and there is no avoiding it, however much we may scold and claim it an error. The world is the critic, and there will be no change until we prove more inteligence. "By their fruits shall ye know them."

We have great cause of gratulation over the advancement in the appliances to make labor more pleasurable and profitable; but I maintain that in our class as to inteligence when compared with the rest of mankind, we have no cause for self-congratulation. When the farmer becomes a leader in society because of his intelligence, when we may produce as many leaders of public sentiment in our profession as in others, in proportion to our numbers, then, and only then, we may boast ourselves; until then, let us not humbug ourselves, or be humbugged by others, into the belief that *we* are the *salt* of the earth. "If the salt has lost its savor, wherewithal shall it be salted."

The professions or the trades demand education and skill in specialities. The farm demands these and more; it wants energy and push; and enough of both to learn for the sake of the knowledge; not like them, often driven to it to keep pace with their cotemporaries. The farmer may live without study; never without thought or the faculty of appropriating others' thoughts. He may never aspire to be a practical farmer without skill together with study and thought. "Wisdom is the right use or exercise of knowledge the choice of laudable ends and the best means of accomplishing them." This is wisdom in act, effect or practice. If wisdom is a faculty, who requires it more than the farmer? If the result of study and thought, who needs more to study and think than the farmer? Prudence is a laudable propensity, but it is only a specie of which wisdom is the genus; for prudence only teaches us to avoid evils, while wisdom is the exercise of a sound judgment either in avoiding evils or in attempting good. Too much

prudence and too little wisdom have kept many a farmer poor all his life. Prudence begets care and attention; never penuriousness or dishonesty. Wisdom begets discreet expenditures; never prosperity. Much is said to the effect that the farmer need not be a genius. I believe that; for I never saw a genius that was not at the same time half a fool. God seldom put more than a certain amount of brains in any one man's head, and where it is naturally active in one department, it is generally at the expense of the balance.

They say the farmer should have good judgment; but does good judgment, wisdom, proceed from, and is it the outgrowth of anything short of study and thought, or is it a *natural* faculty? Or does it ordinarily embody both? To operate, apply and utilize is the result of education, and, without these results, there is no education, no proper prudence, no wisdom, no success. "Knowledge is power, because it has become so much; wisdom is weak, because it has become so little." Faith provokes belief or theories; practice and art give to this certainty. "Faith without works is dead." That farmer that believes every man not engaged in farming to be a parasite; that we are the embodiment of honesty, that we are the only vine-dressers, is a *bigot;* he would be were he anything other than a farmer. Such monstrosities *are* produced; God only knows what for. There is not the same sharpening process for the farmer as in the professions. With them, mind is more constantly coming in contact with mind, and unless prepared to cope with and appropriate the scintillations, they will fall behind in the march and finally be left by the wayside, useless and forgotten.

With us there is not this constant friction of thought against thought. There is not enough of it. We generally live isolated and deprived of many of the privileges that are within others' reach. This is irreconcilable in the country. We have nature, however, in all her grandeur, and from her we should cull enough to in part compensate for the lack of other privileges. Thoughts prompted by contact with nature are, like nature herself, refreshing and natural. I have, and I presume every person that hears me can remember of certain inspirations when we have been alone with nature, which, could they have been written at the time, would surpass any efforts of ours at any other place or period in our lives. No orator has better succeeded than he who makes constrant drafts from nature's fount. The cloistered student, treated

with a view of romantic scenery, can almost perceptibly feel the inspiration. This the farmer may constantly enjoy. True, he may always see and never appreciate. He may be likened to a person in a vast library, with nothing to do but read, and still too indolent to read one of the many volumes before him. This wisdom and art of appropriating that the practical farmer possesses to arrive at our ideal standard is not so for his own personal profit or mental enjoyment alone; it has a vastly wider sphere; it extends *ad infinitum*.

The farmers must have some of this farmers' wisdom to make the business a success financially. Financial success is the beginning and end of all desire on the part of many, often it is the only question asked: "Does he make it pay?" In this day and age of the world, if this be the great ultimatum, if it is his only purpose to see how many dollars and cents may be accumulated, he has doubtless mistaken his calling, for the short road to wealth lies in other directions than through the agricultural districts. Wealth is desirable for the comforts and luxuries it affords, and just to the extent that it is subservient to this end it is a blessing, beyond that when accumulated with the miser's motive, or for the purpose of bolstering up the possessor in the false idea that, by reason of his accumulated wealth, he is better than his fellows, or for the pampering of a false pride, that its possessor is, by reason of it, entitled to more consideration, just to that extent it becomes a curse instead of a blessing. Farmers are often too modest; our country manners are often the subject of much mirth. However much the world's polish is desirable, the evidence of a mature, well stored mind is more so, if we can possess the one only. There is a consciousness of mental strength, or a conviction of the lack of it, that ever remains with us, and we are as cognizant of it as we may be of moral rectitude. The strong man, like the cataract, hews his course.

If the farmer has a cultivated mind and hand, a well cultivated farm will bear testimony. His fences and buildings are neat and in repair; his crops will be good; the stock will show their breeding and keep. There will be no bushes along the fences, no gates off from their hinges. All will be done in season and in order. Trees will line the road side; fruits, flowers, trees and shrubs will adorn the homestead; walks, lawns and pleasure grounds surround

his dwelling. His barns will be arranged both for the comfort of the stock and the convenience of their possessor. Looking into the house, we find many of the comforts and luxuries of the wealthy; conveniences to make work easy in the kitchen; books and papers in the library or drawing room. These and more are the accompaniments of the well to do farmer, and should be the aspiration of all. With no prospect ahead, no ideal in the future, no substantial hope, but the constant drudgery that many subject themselves to, farming is a crime. Shiftlessness and practical farming are direct antipodes. A man is never called to do anything that he cannot do well. An honest pride or a laudable ambition may be as well satisfied on a farm as otherwise.

But what a contrast: "I went by the field of the slothful and by the vineyard of the man void of understanding, and lo! it was all grown over with thorns, and nettles had covered the face thereof, and the stone wall thereof was broken down; then I saw and considered it well; I looked upon it and received instruction." Bad examples like this are often productive of good by the lesson they teach. Wiser is the man that "causes two blades of grass to grow where but one grew before," than he that curses monopolies and all classes of people and professions.

Each of us is at work directly for himself, but it is a foolish, begruding spirit that wishes to lift itself up by pulling another down. It is the *lex non scripta* that every man shall be appreciated according to his ability and worth, and whatever may be his calling in life, he that *works* well and *does* well shall be rewarded.

Although the present outlook is unpromising, we may console ourselves in this, that if miserable, we have plenty of company. Financially, we may find men of all classes in as lucky a boat as ourselves, and equally helpers in the prevailing financial storm that is upon us. Brcther farmers, let us study well our calling; just now study well economy; a *cheerful* economy is the only sure road to wealth for the farmer, for it is by small gains alone that we may hope to accumulate much now on the farm.

If any have mistaken their calling, change immediately; the sooner the better. Remember, however, "A rolling stone gathers no moss;" therefore be careful, however unfortunate in the past, before you decide. Remember our privileges, the simplicity of our lives, and its inexpensiveness. Think of the substantial phys-

ical, mental and moral education of our sons and daughters. Remember the pre-necessity of labor to great mental or moral development; that most of earth's great ones were the sons of toil.

While hard work, hard hands and small pay are the common lot of the farmer, we might name numberless blessings that others do not enjoy. Practical farming is laudable; it is desirable; it is conducive to good morals and a healthy development; renders our homes happy, and gives us a fair prospect of a ripe old age.

HEALTH IN FARMERS' HOMES.

BY PROF. W. W. DANIELLS, OF WISCONSIN STATE UNIVERSITY.

Doubtless some may query why I should address farmers upon the subject of health, when statistics prove them to be, of all classes of our population the healthiest. The nature of his calling is such as to furnish the farmer those natural sanitary conditions most influential in promoting health. He lives a great portion of the time out of doors, and his lungs are consequently supplied with pure air, untainted by the breath of fellow workmen, and free from the dust and odors to which factory operators are continually exposed, and which are a fruitful source of disease.

The home of the farmer is somewhat isolated, and is consequently never invaded by the impure air, often reeking with offensive odors, that frequently abounds in closely populated districts. Constant daily exercise, when not too severe, as it frequently is during the summer harvest, develops his muscular system, and gives him a good appetite and strong digestion, while he is never subjected to the constant worry, excitement and mental strain which are the first cause of sickness and disease among business men in our cities. Yet I trust that, before I close, you will think with me that there is need of improvement even in the health of farming communities, and that, to a large extent, the means for that improvement lie within the reach of all.

Fortunately for us, the time is now passed when it was considered as interfering with the divine order of the universe to inquire into the causes of sickness in our midst, or as attempting to thwart the designs of an all-wise Creator by putting forth efforts to heal

the sick, and to prevent the occurrence of disease. The man who said, that the relative degree of the civilization of any people can be told by the amount of soap they use, should doubtless be called a philosopher, although he may not have "struck bed rock" — to use a miner's phrase — in the fundamental test by which he would grade the progress of the nations of the world.

To-day, doubtless, one of the most important indications by which the rank of a state may be known, is the effort which it puts forth to prevent sickness and disease, by seeking the causes which produce them, that those causes may be removed or avoided. It is but a comparatively short time since the care of the health of its subjects was recognized as one of the functions of the state.

Plagues in the olden time, cholera and other epidemics of our day, have destroyed myriads of human lives, and men have suffered the putrid causes of those diseases to exist all about them, folding their hands in resignation, and praying God to stay death in his terrible career, while the inexorable, self-executing laws of health which are a part of his divine law, were being violated upon every hand.

Gradually men are learning that sickness and disease are caused by breaking the natural laws of hygiene, which are as imperative in their demands for obedience as is the moral law, "Thou shalt not kill," and whose violation is as surely followed by a penalty.

The duty of the state to its citizens is, to secure to them and furnish the conditions for the enjoyment of all their natural rights. Among these acknowledged rights are life and liberty. If man threatens my life or liberty, the state recognizes its duty to me, and removes the cause of the danger by which I am threatened. It is no less the duty of the state to protect my life and liberty against disease, so far as it lies within the power of the state to remove the danger which threatens them. This duty is recognized by our own and a few other states, and has been partially met by the establishment of a State Board of Health. The time is doubtless not far distant when it will be recognized that a department of health is as much a part of the government of a state, is as deserving of the time of its best men, and the money needed to make it effective, as is a department of justice.

If we put aside all higher considerations, and look at the subject of health from an economical point of view only, it assumes an im-

portance which in the aggregate appears quite startling. The economical prosperity of a state is directly dependent upon its power of producing wealth, and this power is the sum-total of the productive capabilities of the individuals composing the state.

Now, as the ability of each individual to labor, *i. e.*, to produce, is directly dependent upon his health, the total production of the people of a state depends upon the health of the entire community, the public health. Then, as a commonwealth is in duty bound to use every proper means for the promotion of its own prosperity, it becomes one of its functions to aid in securing those conditions that will promote the health of the community as a whole.

It is estimated by English observations and calculations that for each death there are two constantly sick; that is, 730 days of sickness and disability for every death. (Mass. State Board of Health, 1874, p. 346.) In this country, there are no sufficient statistics upon which to base such a calculation, but American health assurance companies, adjusting their premium rate upon these English statistics, have failed, because the sickness was here greater than those figures indicated. By applying the death-rate obtained from English statistics, then, to our state, the errors will make the estimate too small, rather than too large.

The number of deaths in Wisconsin reported to the secretary of state, in 1876, was 1,180. This, upon the basis of the population of 1870, would be but a fraction more than one death to one thousand of the population. The statistis are unreliable, several large counties reporting no deaths.

Statisticians have calculated that 11 to 1,000 represents the lowest death-rate attainable; that, from purely natural causes, 11 of each 1,000 will die annually. To keep on thoroughly safe ground, however, we will call the death-rate 8 to 1,000. Upon this basis, with a population only equal to that of 1870, there are in a year in Wisconsin, 8,423 deaths, which, according to the above estimation, would represent 6,148,790 days, or 16,846 years of sickness. Fifty cents per day would certainly be too small an allowance for the patients' loss of time, medicines, physicians' fees, the required nursing, and other expenses necessarily incurred during illness. But even at this rate there would be a total moneyed loss to the state of $3,074,395.

English statisticians indicate that for each 100 deaths in the

country, there are 140 deaths in cities. With a smaller proportion of our population in cities, we, in Wisconsin, would have a larger proportion of deaths in the country. But in order that the estimate may be within safe bounds, we will use the English figures, by which five-twelfths of the 8,423 or 3,509 deaths would occur in the country. These deaths represent 7,018 years loss of time annually by sickness, and a material loss to the farming community of $1,280,785.

There is a certain class of diseases colled Zymotic diseases, sometimes also germ diseases, because their course has suggested to observers that they were the result of the working of a morbid ferment in the blood. Among these are, typhus, typhoid and scarlet fevers, and diphtheria, that are quite common with us. This class of diseases is known to be caused by decomposing organic matter. The evidence accumulates, as more attention is paid to the subject, that they all have their origin in filth and uncleanliness, and are imparted to man through air made foul by the putrid emanations which arise from decaying organic matter, or by water that has taken such matter into solution. It is estimated that five per cent. of the sickness of the country communities is caused by this class of diseases. So called bilious fevers, dysentery and diarrhœa, are also largely produced by the same causes.

Consumption, if not directly caused, is developed in those having a tendency to this disease by impure air, and especially by air containing an excess of moisture. Then so far as the diseases mentioned are the result of the causes to which they are here referred, they are to the farmer, preventable diseases, for no conditions can be better for securing freedom from impurities of every kind in air and water, than are those by which he is surrounded.

The distance of his house from other residences makes it impossible for his neighbors to befoul the air that he breathes, while the abundance of room he enjoys makes it possible for him to place his barn and all out buildings so far distant from his house as to preclude their being a source of danger, and at the same time enables him to select a site for the dwelling removed from the moist evaporations of marshes and low lands.

After my paper was begun, in seeking statistics to substantiate my opinions, I came across an able paper upon "The Health of the Farmers of Massachusetts," by J. F. A. Adams, M. D., in the report

of the Massachusetts board of health, for 1874, which has been of great interest to me, and to which I shall have frequent occasion to refer. Dr. Adams' paper is based upon the replies of forty-nine physicians, having a "country practice" in different parts of the state. In summing up, he gives the chief causes of sickness of the farmers of Massachusetts as follows:

1. "Overwork and exposure, the women being more frequently overworked than the men.

2. "Improper and improperly cooked food.

3. "Damp location of dwellings.

4. "Want of cleanliness about their houses, especially in reference to drains, privies, cellars, and proximity to barn yards and hog pens.

5. "Impure drinking water, largely due to the preceding causes.

6. "Bedrooms imperfectly ventilated and on the ground floor, with the too general use of feather beds.

7. "Insufficient recreation."

I am certain no one will claim that in matters pertaining to health, the farmers of Wisconsin are in anyway better off than those of Massachusetts, or that all the causes to which illness is attributed there, are not in continually active operation in our farming community, or that they are not followed by the same serious train of results to farmers and their families.

It is my aim to-night simply to call your attention very briefly to the necessity of pure air and of wholesome water for all who would be vigorous of body, and to the sources of contamination of these primary requisites of health.

An English physician, in a late article on "The Laws of Health," says, "on an average, one-half of the number of out-patients treated by a hospital surgeon suffer from diseases primarily due to a want of knowledge of the laws of health and cleanliness. The ignorance of hygienic laws, which affects so disastrously the health of the rich as well as the poor, exists chiefly in regard to dress, ablution, and ventilation. This statement will at first appear startling, but an enumeration of the diseases that can be constantly traced to the above causes will show upon how sound a basis the statement rests."

Many of you are doubtless mentally replying that farmers breathe the purest of air, and that this part of my theme can in no way be applicable to them. If you feel this to be true, you will

not object to my examining your premises, that the truth of your opinions may be proven.

We are, in Wisconsin, in some respects, unfortunately situated. The climate is severe. During seven months of the year it is necessary to warm our dwellings by artificial means. Fuel, on account of its scarcity, is costly, so that every means is taken to economize in its use. Now, what are the means by which pure air is supplied to the farmer's family during these months, when the wife and younger children are of necessity kept in the house, from which every precaution is taken to exclude the outside air? Fortunately it is impossible to entirely prevent a change of air in our living rooms, when there is any great difference between the temperature within and without. There are small openings about the doors and windows, through which brisk currents of air will pass, in spite of the joiner's skill in fitting, or of the housewife's attempt to make them airtight by filling with rags or cotton. Besides, as Pettenkofer has shown, the walls of our dwellings, whether of brick and mortar or of wood, are porous, and when not saturated with moisture, are being continually traversed by currents of air. The change from this source in a room having brick walls, and containing 2,650 cubic feet of space, amounted to seven cubic feet of air to each square yard of wall, when the temperature was 9.5° greater inside than outside. In addition to these sources, there is the more or less frequent opening of doors, which aids materially in changing the air in a room, especially when it is warmer than that outside. Other sources of ventilation than these accidental ones are rarely found in country houses.

The sources of rendering the air of dwellings impure are, first, respiration, by which we change its normal condition, withdrawing a portion of the oxygen which is necessary to life, and in its place exhaling carbon dioxide, which is injurious. A second and probably a more important source of contamination of the air is found in the exhalations from the lungs and skin that are continually being given off. This organic matter when once in the air soon begins to decompose, rendering an atmosphere containing it, positively pernicious, and it should always be removed by the introduction of fresh air. The sickening odor of a small bedroom after a night's occupation is due to impurities from this source, rather than from the change in composition due to the first source. Still another source

of pollution in the air of dwellings is by cooking. The processes of frying, baking and boiling, almost continually going on in the kitchen, fill the air with matter that is injurious when breathed, and by those who live in the kitchen a large portion of the time, as many farmers' families do during the colder season of the year, very little pure air is taken into the system.

Nearly every dwelling is over a cellar, in which are stored the vegetables and other provisions for the use of the family. As the living rooms above are much warmer than the cellar, there will be continually passing from below upward a current of air through any openings in the floor, and more slowly through the floor itself. Unless cellar walls extend above the ground, with ample openings, through which air can be daily admitted, the atmosphere becomes impure by the slow decomposition of the vegetables, and the impure air arising from such contamination passes to the living rooms above.

Yet the majority of men, instead of airing their cellars, cover every square foot of wall outside, as well as the windows, with earth or litter from the farm yard to prevent the entrance of cold air. All of you know the "close," offensive odor of the air in such a cellar, full of dampness and of the uncomfortable smell of decaying vegetables. Everyone feels such an atmosphere to be unwholesome, yet many families live from November to April in apartments into which such air is slowly but surely being infiltrated from the cellar beneath.

The earth contains a large amount of air, and this air in the earth about dwellings always contains an increased proportion of carbon dioxide, resulting from the decomposition of organic matter in the soil. From a cellar, the air passes into the heated rooms above as cold air is drawn into a heated chimney, replacing the warm air which is lighter. The ground air from the earth upon all sides enters the cellar to take the place of that which has passed into rooms above, so that if a cellar is completely shut from the outside air by banking, there will be a circulation from without through the ground, which is porous to air, and thus an atmosphere heavily laden with carbon dioxide and moisture will enter the living apartments, bringing with it the germs of disease and death. There is thus a double source of danger from unaired cellars.

That I was not wrong in thinking farmers negligent in this mat-

ter may be inferred by reference to the report of Dr. Adams, already noticed. One of the questions upon which he sought information was, "Have you seen sickness produced by decaying vegetables in the cellars of farmers' houses?" Twenty-three physicians answer "yes," twenty-four, "no," and two make no answer. Some of the correspondents make very strong statements in support of their affirmative opinions. Several physicians of Madison have also told me of frequent cases of sickness from this cause occurring in their own practice.

In regard to securing good air in sleeping apartments, there is not only among farmers, but as well among all classes of our population, the greatest carelessness. There are very few bedrooms that in the morning have not an odor that is sickening in the extreme, when breathed by one just entering from pure air. No one would think of sitting in this putrid atmosphere for a moment, yet parents will sleep, and furnish no better places for their children, in an atmosphere that is disgusting to contemplate. Thirty-four out of fifty-nine physicians of Massachusetts mention this as a cause of sickness among farmers.

Badly ventilated bedrooms are a prolific cause of morning headaches, of a feeling of languor and want of energy in the early part of the day, and of want of appetite for a good nourishing breakfast, that should prepare one for a vigorous day's work. A mistake is often made in the ventilation of sleeping apartments having no fire in them. Such rooms, during the winter, have nearly the temperature of out of doors, hence, leaving the window open, even for many hours, does not necessarily cause a change of air. The movements of air are caused by a difference of temperature of adjacent portions, and the greater this difference, the more rapid the movement. It is very difficult to renew the air of a room having the same temperature as the air outside, while, if there is a difference of but 10°, the change will take place readily, if opportunity is given. Cold air is not necessarily pure air, a fact that needs to be borne in mind in the ventilation of sleeping rooms.

The volume of air necessary to be introduced and withdrawn hourly for each person, in order to receive good ventilation, is much greater than is generally supposed. Pettenkofe, a German, and Morin, a Frenchman, both being men of very high standing, agree that in hospitals for ordinary cases, in good workshops and in large

rooms for long meetings, 2,120 cubic feet per hour, for each person, are required. In schools for adults, and barracks by day, 1,060 cubic feet, and in barracks by nights, 1,410 to 1,765 cubic feet are required. If we take the least figures given by these authorities, in schools for children, where from 424 to 530 cubic feet per hour are required, and apply them to our sleeping rooms, we should find greater health resulting therefrom.

It is sometimes said that there is nothing cheaper than pure air. To suppose that statement to be true, in our climate is a great mistake. It is plentiful and cheap indeed in summer, but in winter when our houses are closed to its entrance the case is very different. The average temperature of the five months, from November to March, both inclusive, for the past eight years, as shown by observations taken at the university, is 23.3°. To take the amount of air needed to ventilate our houses at a temperature of 8.5° below the freezing point, and heat it up to 70°, that is through a range of 46.7°, is not a cheap process, even where fuel costs but one-third the price it does in Wisconsin. But it is a question not of money, but of vigorous health and prolonged lives for ourselves, and for those who look to us for support, and we should not hesitate to pay the required price. Unwittingly, we have largely adopted means of heating our homes which leave us much worse off in this respect than were our fathers. The air-tight wood-burning, and the base-burning coal stoves now in almost universal use, are poor substitutes, so far as ventilation is concerned, for the open fire and Franklin stoves so generally used twenty-five years ago, than which there are no betrer means of securing thorough ventilation.

Those I have mentioned are the sources of polluting the air of dwellings from within, and which are mainly active during the cold half of the year, when it is necessary to keep doors and windows closed. But there are frequently foes lurking without as well as within. There may be danger to health in allowing air to enter dwellings, as well as in the prevention of its entrance. If there is in the vicinity of the house any decomposing organic matter from which unpleasant odors arise, there is danger, and the source of the danger should be removed.

Not unfrequently one sees the farmer's house in winter banked up to the depth of several feet with barnyard litter, which is harmless while frozen. But the spring time is a busy season, and the

early summer often finds this litter unremoved, but fermenting and giving off polluting gases, which enter the windows that are raised that the fresh air of heaven may come in. The farm-yard and the hog-pen are sometimes so near, although I am glad to believe not very frequently in Wisconsin, that in the early evening the house is invaded by stenches that have their origin in their decomposing filth and uncleanliness. Those living in the vicinity of marshes or low lands often, during hot, quiet summer evenings, can detect in their houses the odor of gases arising from the decomposing organic matter of the marsh. All these gases arising from fermentation and decay are injurious to health. If the causes producing them exist about our homes, as they so frequently do, the breezes that fan our cheeks, and which should be to us the messengers of health and strength, may bring with them the latent germs of disease, poisoning our blood, and stealthily but surely establishing within our systems the foundation of burning fevers and wasting decay.

In reply to the question propounded by Dr. Adams, "Is sickness apt to be produced by the house being too near the barnyard?" twenty-three Massachusetts physicians reply "yes," twenty-three, "no," and three make no answer. When half the physicians who have country practice believe sickness to arise from such sources, it is certainly worth our while to give the subject serious thought, and if we are harboring about our homes any sources of impure air, to see that they are so far removed as to no longer endanger the health of those of our families who must pass the larger portion of their time indoors, and who look to us to surround them with conditions that shall secure the health and vigor necessary to a useful and happy life.

The water used for drinking in Wisconsin is obtained almost entirely from wells, varying in depth from twenty to seventy feet. The source from which the main water supply of any well is obtained depends upon the nature of the soil-strata and the surface-configuration of the country. But whether this source be near or distant, the well acts as a reservoir, toward which the soil and surface water in its own vicinity will surely gravitate. It acts as a drain for the ground in its immediate neighborhood. The distance from which water will percolate through the soil and enter a well will vary greatly with circumstances. It may, however, be stated as being within safe limits in our loose drift soil, that a well will drain

an area whose diameter is four times the depth of the well; that is, that the soil water from every side of the well, to a distance of twice its depth, will find its way into the well. I think I am safe in saying that thirty-five feet is much less than the average depth of wells in the south half of Wisconsin. A well of this depth would receive the surplus water from the soil within a circle whose circumference is seventy feet distant, or from a total area of fifty-six square rods — more than one-third of an acre. Now, rain, falling upon this area, dissolves the soluble matter of the soil, carrying it along as it slowly works its way through the porous earth. Soils have the power of purifying water by withdrawing from it, by absorption, matter which it contains in solution. This power, however, is limited, and varies with the kind of soil. In general, clay soils possess it in the highest degree, while in all soils it diminishes as sand and gravel increase. But all soils, even those having this absorptive power in the greatest degree, may become saturated with this soluble material, when they will no longer be able to take it up from solution. Through such a soil, water passes unpurified.

Now what, in the majority of cases, are the conditions existing about the wells from which farmers obtain their drinking water? For convenience, the well is placed near the house, often between the house and the barn. The slops and waste from the kitchen are daily thrown upon the ground not far from the door. The family closet is not far distant. Fowls, and often larger animals, are allowed to deposit their filth all about, while the barn-yard and pig-sty are often so near that the water from the soil beneath them finds its way into the well. For a time the earth may be able to so purify the water from all these sources of contamination that they will be harmless; but its capability of doing this grows less every year, and no one can tell when it ceases, or when danger begins. I feel that I cannot sufficiently impress upon you the serious effects arising from drinking impure water. It is a prolific source of bowel disorders, and of fevers of all kinds that are so common during the summer and early fall. And it is all the more dangerous to the public health because it is not usually recognized as a source of evil, and its effects cannot be readily traced to the true cause.

Many of you, doubtless, have attended conventions of dairymen, and know the great stress they put upon the necessity of furnish-

ing wholesome water to dairy cows. Cheese-makers attribute "tainted milk," "floating curds," and their attendant evils largely to impure water furnished the cows. If impure water so affects the health of cows as to injure the milk, it will much more certainly affect the health of men. I have asked several Wisconsin farmers in regard to the surroundings of wells in their vicinity, and they have detailed to me many examples that were disgusting in the extreme, and which I am confident will be in the end, if they have not already been, prolific sources of disease.

There is all the more danger from water made foul by decomposing organic matter, because it often gives no indication of its presence. Such water may be clear and sparkling, having a pleasant taste, and is frequently preferred to that which is more pure. It is scarcely more than a year since the authorities of the city of London were compelled to order the removal of all the public pumps, because the water from them was more palatable, though less pure, than was that of the city fountains.

In reply to Dr. Adams' question: "Are farm-houses apt to be supplied with impure water? If so, with what results?" Twenty-one physicians replied, "yes;" twenty-fiour, "no;" and four gave no answer. When forty-six per cent. of the physicians have traced illness to impure water, there must be evidence enough to convince us that there is danger from this source, and recognizing that danger, we should have the wisdom to avoid it ourselves and sound the warning to others. The most wholesome water for household purposes is filtered cistern water. In my own family, for sanitary reasons alone, no other is used; but I am not vain enough to suppose I can prevail upon many of you to follow my example, and discard well water altogether. Yet I am confident such a course would remove from our midst one fruitful source of danger to the public health.

I feel to-night that I labor under two of the embarrassments of the ordinary temperance lecturer. First, because my audience, like his, is not composed of those who most need to know and practice the doctrine inculcated, and second, because doubtless many of my hearers feel that I have a hobby, a sort of harmless mania, but a madness none the less, and that if you will but sit quietly and indulge me while I thoroughly air my opinions, no farther ventilation will be necessary. Against such a state of feeling upon

your part, I earnestly protest. I have no hobby. But I have seen sickness and suffering and death come to households, where the angel of health alone would have entered had there been furnished him the pure air and wholesome water, without which he cannot survive. I have seen weeping eyes, and heard the cry of anguish when the golden chain that binds together the home circle has been broken, where there should have been but rosy cheeks and joyous shouts and laughter, and countenances beaming with the happiness of an unbroken family circle, than which no earthly happiness can be greater.

I know much of this human suffering of body and soul can be stayed, and that it will be stayed when proper care in securing cleanliness is exercised in and about our homes. A recent writer of a prize essay on "Floating Curds," in cheese-making, says, "Urge upon the attention of your milk-producer the immense importance of cleanliness in every department of the business; that constant, relentless warfare against all forms of filth and nastiness must never be relaxed for a moment's truce." These words are worthy of a place not in cheese factories only, but in every home in the land. They should be indelibly printed in the cellar, the kitchen, the bed room, and the parlor, about the drain, the family closet, the barn-yards and all out-buildings.

No person should forget, for one moment, that filth and foul odors are the forerunners of disease and death, and that cleanliness, at all times and in all things, is the most perfect sanitary law known. Do not say to yourselves, "He may better talk to city people about sanitary measures than to us." The fact that the proportion of deaths from dirt is much greater in the city than in the country does not remove any man's responsibility for supplying good air to his own family. Pickpockets and thieves are also more numerous in towns, but the law punishes a countryman for these crimes the same as if he were city bred. So does nature punish alike all who violate her laws, and wherever be our abiding place, she will find us out, and exact from us a penalty for the transgression of every sanitary law. The only sure escape is in living in accordance with all her requirements.

Mr. Field — What kind of filter would you propose in a house?

Prof. Daniells — The filter in my house is simply of brick, and I

find that it is very effective; that is, for filtering purposes. It is very effective for all ordinary purposes, and if any of you gentlemen feel disposed, I shall have great pleasure in exhibiting to you the filter in use in my house.

Mr. Clark — As there seems to be no disposition to further discuss the paper, I will say a few words, partly by way of inquiry, upon another subject; we have connected with our State University a farm, and I would like to know if we, as farmers, have our share in that institution of what was intended for us; are we getting any benefit from the institution? It is every farmer's duty to look after his own interests, and not spend his time in finding fault with men engaged in mercantile business, or other vocations, but attend to our own, and see that we have our rights. A few years ago it was not uncommon for us to read of matters of interest to us being enacted on the farm. We read of experiments tried, and the result; but within the last three or four years, I have not seen or heard from it. It is of the utmost importance that some of the men who direct this institution should be experimental farmers, and not altogether by men engaged in other pursuits and that care little about agriculture. This is a matter that we, as farmers in this convention, have a right to consider, and I want to know whether my rights are looked after in the minority or not. I want Prof. Daniells to tell us whether we get the benefit.

Prof. Daniells — I have nothing whatever to do with the finances of the University. They give me work to do, and there is enough of it, and I do that work as well as I can. I hold myself responsible for the quality of that work so far as my ability goes, but I do not hold myself responsible to look after the board, neither the appointment of them.

Mr. Clark — We have not seen anything for the last two years of the reports of the institution which are usually made, I understand, to the legislature.

Mr. Field — I desire to say a single word. I think Mr. Clark has broached a subject which is of some importance to this convention. I was connected some years ago with the board of regents of the State University. I could not say to-day that there is a single practical farmer on that board. I won't say that there is not. The professor could answer that question better than I can, as I have not

kept track of the gentlemen appointed for some years. But I am told there is not one member of the board who is a practical farmer. I believe it is our duty to request His Excellency, the governor, to make such appointment in the future as shall represent the agricultural interests of the state. It is just; it is right. It is our duty to demand it; to go to him in person while here and demand it, that there shall be men who are practical, scientific men, if you please, or at least practical. We have our scientist, and I believe Prof. Daniells has stated to you that he has all the work he can do, and he does all he can do. He does his work well. As to what proportion is expended in the interest of agriculture, I am not able to say, but I think it is a matter that is worthy of your attention, and I have no doubt that the governor will listen to any of you gentlemen with a great deal of pleasure. I think it would be well to suggest some names that represent our interests.

Mr. Robbins — I feel a great interest in that question. In 1858, I was chairman in the Assembly of the committee on Education. I was in the legislature when the question came up whether they should have an agricultural college connected with the University, or whether it should go somewhere else. I took the position that the University should have the agricultural college. I am afraid that the farmers have been humbugged in this matter. From my locality a lawyer was appointed, who never farmed in his life, and knows nothing about it. I say, as a farmer, that I am not benefited by the State University a particle. I don't blame anybody for it but the farmers themselves. I think that they are too modest. I think they stay at home too much, and attend to their own business too much and are represented too much in the legislature and congress by members of the learned professions. I did hope that the Agricultural College would be represented by at least one practical farmer. Perhaps it is; but I don't think it is. I don't know but it is best to give all of those positions to lawyers, but I don't believe it is. If I want a little counsel of ten minutes, I have got to pay ten dollars for it, and I cannot afford that. I would like to know something about the University without going to a lawyer and paying him for it. I am a farmer, and expect to live and die a farmer, and I expect my children will be farmers after I am dead. I hope that the next generation will be wiser than the present. I believe that the bone and sinew of the state of Wisconsin has to

pay these taxes. Everything comes out of the grouud. If you can find anybody else that is paying taxes, I want to know who he is. The merchants are paying taxes, but where does the wealth come from to pay their taxes? It comes out of the ground. I hope the time is coming when farmers will come up, and not sit still and allow others to do all the thinking and talking. I want the State University to become a success, and I believe it can be better managed here than any where else; but if it cannot be, I will give them one hundred and fifty acres of my land if they will establish an agricultural college there and try the experiments.

Mr. Field then offered the following resolution:

Resolved, That it is the sense of this convention that one or more of the regents of the University of Wisconsin be appointed, who are practical farmers, and that a majority of the committee appointed by the Board of Regents to give directions relative to the experimental farm, ought to be practical farmers.

Prof. Daniells — What you want is a board that shall look after the interests of Wisconsin. You must have men fitted for the place, or else it is no good. It is immaterial whether he is a farmer, lawyer or banker, unless he is fitted for the place. That is the principle upon which you ought to go.

Mr. Field — It matters very little whom we have there, provided they look after the interests of the university. There are additional interests as well as agricultural, but I think there is not a single farmer to manage or give advice in relation to the college farm. I ask the professor if that is not the fact.

Prof. Daniells — There are none that I know of.

Mr. Adams — I desire to say one word. I am in favor of the resolution which has been read, but I would be unwilling to place the University exclusively under the control of any class of men of any occupation. I think we have got too many of one occupation, and yet I have not a word to say against any of those gentlemen. In regard to what has been done at the University, so far as my observation extends, I think it has been well managed, that is, it has been managed in accordance with the wishes of those who control the management. The farm superintendent, Mr. Hayden, has done his part well under the direction of the executive committee, and the experiments, as I understand those experiments, are all recorded. If I mistake not, I have read the record of them. I think they are published in the catalogue of the University.

Prof. Daniells — The board of regents publish a report annually.

Mr. Adams — They are circulated over the state, and the members of this convention can obtain copies of them, and ascertain what has been done during the past year in the line of experiments.

Mr. Jackson — I am glad that this matter has been brought before the convention. It does seem to me that there is a wide-spread ignorance in regard to this matter on the part of the farmers, as to what the agricultural department is doing. Perhaps it may be your fault as agriculturists. It seems to me no matter of higher importance has been called to the attention of this convention. On the supreme bench we do not find a majority of farmers. Farmers ought to be represented in the educational department. It seems to me that this matter should be pressed upon the governor of the state, and at least one practical farmer should be upon the board, and that we ought to hear more in regard to agricultural and practical farming.

Mr. Clark — Who has a right to vote; merely members of the society?

The President — Everybody has a right to vote.

Resolution adopted.

Mr. Field — I move that a copy of the resolution be sent to the board of regents.

Agreed to.

THURSDAY, 9 A. M.

The convention met in the Agricultural Rooms.

Hon. N. D. Fratt in the chair.

FARM BUILDINGS — THEIR COMFORTS AND CONVENIENCES.

BY B. S. HOXIE, OF COOKVILLE.

The topic assigned to me in this paper is one of more importance than would appear at first thought to the average Wisconsin farmer, if we are to judge the thought as it has found expression in the majority of farm buildings. It is true that public taste is being slowly educated in this respect, and an improvment is perceptible.

And now and then we have an article or dissertation from some city architect on farm houses and buildings, accompanied with draughts and plans too costly for the average farmer, and generally as illy adapted to the conveniences of a farmer's home as the farmer's barn is to the city livery stable. In presenting this paper to the farmers of Wisconsin I do not expect that the plans here presented, or the thoughts and suggestions expressed, are faultless or above criticism. But as a practical builder for more than twenty-five years, in buildings costing from hundreds to thousands of dollars, both public and private, I should be a dull student indeed if some facts had not been gathered up and stored away that may be useful to others. The grand old structures of ancient Greece and Rome present, even to modern ages, towers of strength and beauty, with their lofty domes and spires; their columns and entablatures have been the admiration and study of the modern architect, as they convey to his mind uniformity in the structure of parts combined with *harmony*, *strength* and beauty. And we will excuse the lovers of this almost divine art, if, after the study and contemplation of these, they fail to adapt themselves to what is pleasing, symmetrical and convenient in a farm dwelling.

History informs us that at one time it was a penal offense in Greece for an architect to construct a public building of any kind which was not pleasant to the eye, completely adapted to its use, and combining harmony in its proportions. And I am not sure but it would be as useful to us to restore their laws as it is to study their designs. If this were the case, a modern farm house would contain, perhaps, some conveniences, if it did not beauty of design, and our public buildings strength enough to withstand their own weight.

It is not expected that the country farmer, or he who causes to be built a city block or factory, should study architecture. The one employs an experienced architect to draw his plans, make estimates and superintend the work of construction, and the other employs the nearest available carpenter, and generally the cheapest one he can hire, and quite often tells him how many rooms he wants in a given space, and lets the job to the one who will enclose it and roof it for the least money, and then brags how cheaply he has built his house; and it is generally cheap at whatever price it cost. The owner of that vast pile of brick and mortar makes up

for his lack of knowledge of architecture by paying for the services of one who does know, while the farmer considers it a waste of money to pay for even a well matured plan or design with specifications, saying nothing about an elevation of the same, and thus offers a premium for mediocrity by employing the cheapest, and consequently the poorest workman. And for this reason, quite as much as to the lack of means to build with, unsightly, ill-constructed farm houses spread themselves out in the landscape by the roadside, marring the beauties of nature instead of bending to it. I will admit that this practice is not very encouraging for a good practical builder to spend much time in studying the masters, or perfecting himself in skill or style. And yet it is to the general knowledge and practical skill of the house carpenter that we are to look for an improvement. And if it be possible for me to point to a remedy by what I can offer in this limited space, then I shall be repaid for my effort.

It is often remarked by those from the country visiting friends in the village or city, especially our wives, mothers or sisters, How nice, handy and convenient you do have everything about your house to save work! I wish our house could be as handy. The farmer perhaps may say it *costs* to have all these things, and so it does; but on which side of the account does the profit or loss come in?

The farmer buys his improved farm implements to save time and money, but rarely thinks that the time of the wife and daughters in their journeys to the wood pile, well and cistern, is worth the saving, or of the extra steps to the cellar and pantry in the preparation of a single meal, if all the necessary adjuncts were in nearer proximity to each other. I have often seen the wood pile at a farmer's house two or three rods from the kitchen door, and then not under cover. The well ten or fifteen rods away, and sometimes down a steep hill to save ten or fifteen feet in digging, making miles of extra travel in the course of a year, and the cistern, if there was one, with no other convenience for drawing the water than a rope and pail. It is no wonder then that the daughters in such a farm house are tired of the drudgery and extra labor in household duties.

One of the greatest obstacles in the way of erecting proper and convenient buildings is the want of well matured plans, and the

careless way in which the work is undertaken. The building of a house may have been long in contemplation, and about how much it may cost, perhaps; but the most important part left out is the care and thought bestowed to make our house adapted to our wants, in its convenience and adaptability, for what it is intended, as a model farm-house. I once built a house for a well-to-do farmer which probably cost him two thousand dollars. It had neither a pantry or closet on the principal floor. (I will add that a wing is intended at some future time, which may perhaps contain a pantry.) The house is lacking as much in beauty of design of exterior finish as it is in convenience of interior arrangement. This is one of those houses which I should say was built without any thought for convenience, but which has already cost more than a neat, pleasant and convenient house could have been constructed for, which would have been an ornament to the landscape and a pride to the owner, if he possessed a cultivated taste.

Some years since, I was employed to build what the owner considered a good farm-house; it was large enough for that. A pantry was finished, but there was not a closet in the whole house; he could see no use for one; and would not even have a shelf put up in the cellar-way, where there was plenty of room, because it would always be full of something. Now the ladies will know, if I do not tell them, that these two houses were planned, and never (at least in my presence) was the wife consulted, in any particular, as to the construction.

A farmer often thinks that he cannot spend the time to examine the plan and arrangements of buildings in his own town or vicinity, much more pay for a well matured plan by some good builder. He has seen a house in some of his travels that suited him perhaps, as to exterior, and he attempts to have one built like it, and when too late he finds the interior arrangement was for some one whose taste and wants were quite different from his; in other words, it was not his house, neither were the scenery and surroundings such as he possessed on his farm. More forethought, with the skill of a good builder, in this case would have been better than all the after regrets of defects too late to remedy. Sometimes, again, as much depends on the location of a farm house and buildings, for a pleasing effect in their grouping together, and ease of access, as in the construction of the building itself. And we often see a farm house

on one side of the public highway, while opposite are spread out barn, sheds, and other out buildings, to reach which gates must be opened, and the muddy or dusty street must always be crossed hundreds of times in the course of a year, and this too with hardly a possible remedy. In my mind, I can conceive of no excuse sufficient for this flagrant lack of taste or convenience. It is easier to point out defects than to correct faults; but the defects must first be pointed out to know where the fault exists. Many a farmer's wife has been quite content with the arrangement of a house because she knew not how to have it planned differently.

The room where farmers' wives spend a large portion of their time, the kitchen, should be one of the pleasantest rooms in the house, and others should be subservient to that, and if any must take back seats, let it be the parlor. I would say for the kitchen, let it be easy of access to the family sitting room, chambers and cellar, have your cistern pump and sink so near the cook stove and pantry that a space of twenty-five or thirty feet will not have to be traversed to carry articles from one to the other three times a day, or more than a thousand times in a year. And instead of going three or four rods to a wood pile, construct the wood box in the partition between the kitchen and woodshed, filling it from one side and taking it out from the other. In the pantry, or near the pantry door, construct a dummy or dumb waiter, so that numerous articles of frequent use through the day may be lifted from the cellar without any ascent or descent by the stairway. If this waiter cannot be arranged conveniently, so that one part can balance the other with connecting pulley, one can be made with balancing weight, and all be below the floor except when in use, and then disengaged by latch or spring, not interfering with space otherwise wanted above the floor. Arrange bath and sink room with closet to hang clothes of every day wear by the farmer at one side of the kitchen, near and easy of access to the back entrance, for the neat and tidy housewife will hardly care to have farm laborers wash at the same sink where she does the dishes.

Let the kitchen open upon a broad and sunny veranda, and, if possible, select the building site so that not more than two steps in height shall lead from this to the ground. And at the front entrance, for the stranger and company, and where you seldom go up and down, you may have as many steps as you please. And in

speaking of closets for the kitchen, I will say, have a clothespress or closet for every bedroom in the house, and still another, which shall be of easy access to all sleeping rooms, for extra bedding, not needed in the summer season. We have now sketched the plan for a kitchen. Will it be a convenient one? If so, arrange or group the other rooms around it in such a way as to make them of easy access in proportion as their most common or ordinary every day use demands. Build your chimney or chimnies, that indispensable adjunct to a house, and which too many do not know where to place, in such a relation to the rooms that one chimney will answer for all the stoves needed in the princpal rooms of the house, both to economise labor and fuel. And as farmhouses are generally ventilated by lowering or raising the window casements, by all means balance them with weights and pullies. I would, also, as another means of ventilation and of convenience, place registers in the ceiling of every room possible, rather than to allow stove pipes to pass up through the floors. They not only afford one of the best means of changing the air of rooms in the warm seasons, making them cooler; and they also are quite as useful and indispensable in warming upper sleeping rooms in winter.

I have thus far spoken of the convenience of the house in its parts, and nothing as to its architectural display or style of finish, but sufficient has been hinted at that its parts shall be in perfect keeping and harmony with modern taste and refinement. As such a house must be provided with walks from the street and to out-buildings, I would use the best and cheapest material at hand, and I know of none cheaper and better within ordinary means than good sound boards or planks, nailed firmly to joists or scantling, as being always dry and easily kept clean. I would expend as much on the lawn as the purse and taste of the owner can afford. But let this spot we call our home be the dearest and best spot on all the green earth. Children will love it and in after years they and theirs will venerate it. And as they in time go out from here, pleasant memories will ever be present with them.

I have already exceeded the intended limit of this paper, and the barn is only incidentally mentioned; my excuse is, that in all my experience as a builder, I find a greater lack for comfort in the farmer's house than I do in his barn, and am also quite sure that the farmer who cares for the comfort and convenience of the in-

mates of his house will not be far behind in the proper construction of his barn, and at some future time I may point out some defects in out-buildings and their improvements. I have thought it best to add to this paper plans of two or three houses which embrace some or all of the features pointed out, costing from one thousand to twenty-five hundred dollars each, depending, of course, upon the style of finish and the kind of material used.

No. 1 was built by me last summer; one wing and main part two stories in height, the kitchen one and one-half story in height, with wood shed one story; lower rooms nine feet in clear, upper rooms eight and one-half feet. The stovepipe is to pass through partition in the sink room to chimney, thus warming it in winter. A chimney can be placed in end of kitchen by supporting it in such a way as not to interfere with lighting chambers from gable end of same. No. 2 and No. 3 are now under contract to be built this season. I have only given the ground plan of each, showing the arrangement of rooms etc., on lower floor. The elevation would cost too much to prepare and engrave, and as I do not wish to advertise myself in this way as an architect, they are omitted of course. The chamber rooms and closet in second story can be easily arranged by any practical builder. Nos. 1 and 2 are built with common or one-fourth pitch roof covered with shingles.

No. 1 is two stories in heighth, except kitchen and wood room; lower story is nine and one-half feet in clear, the upper rooms eight; the chimney in main part is built partly within the partition, but to come down through the floor so as to receive stovepipe from any room where it is required to set up a stove. The open space beside kitchen chimney in Nos. 1 and 3 is to represent woodbox. Vestibule in No. 1 is to be lighted by glass from upper panels in door. Vestibules in Nos. 2 and 3 to be lighted by oval window not shown in plan.

No. 3 shows sink in corner of bath room in such a position as to use water from the same pump in woodshed side by small slide door when used as a summer wash room; c. c. are two small closets, one to accommodate bath room, the other for kitchen. The space above wood box, as shown at the right hand of chimney, is to be finished as a cupboard projecting into the wood room, same as wood box, to be used for tinware and stove utensils; d. in pantry is to represent dumb waiter passing into cellar. This, however, can be

placed in the corner next to stair partition, as it will be always below the floor when not in use. A closet can be taken from the end of passage at foot of stairs, unless an oval light is needed to light the stairway. Folding doors connect the three rooms as shown on plan. This No. 3 is to be two stories in height, including mansard for all except wood shed, which is omitted for want of room. Vestibules are to be carried up higher than verandahs, so as to show a disconnection with them; the different plans are drawn on a scale of one-eighth of an inch to the foot, outside measure given as easier understood than to take out space for partitions. As it was not the intention of this paper to go into details, I have considered the explanations as given to be sufficient for any intelligent person who may be interested in building farm houses.

Mr. Phillips — I would like to ask a question with reference to ventilation: Whether it should be above or below; whether it is proposed to start a chimney from the cellar, with a view of ventilating the house?

Mr. Hoxie — I have not time to go into the detail of all these things. Of course there are various suggestions that grow out of this on the subject of ventilation. I speak of the ventilation in common use through the window, the door, and also the registers that are placed in doors, which are inexpensive, and I consider them almost indispensable, as I just hinted. Of course the matter of ventilation can be arranged more perfectly and much better. There are various means of ventilation, and some are better than others.

Mr. Phillips — I built a house in 1876; I was very anxious to have one room that was well ventilated, and I consulted some authority, and I found that the bad air always ascended. I put the chimneys higher to get the benefit of the fresh air; and I know others that intend to build the same way.

Prof. Daniells — I believe this is largely due, in the first place, to the ignorance of the people. If any man will go to the upper portion of this room and breathe for a time, he will acknowledge that the air is worse up there than it is here. It is not good air even here. The thing which affects the air is that which is thrown out from the lungs. It is warm air, and warm air is the thing which affects the current of air. It is half as heavy again. The

loss of diffusion is such that you put a heavy gas into the air, and if there is no large quantity, as there is in the case of exhalation of the breath, two or three per cent., it immediately diffuses itself in the air, even though the temperature is the same; but the temperature is warmer; the breath is warmer than any living room, consequently it rises; but then there is acting in opposition to this the principle of diffusion throughout. The two gases will mix, and mix with very great readiness, the heavy one going down and the light one going up, so that carbon is at the bottom of the room. The question of ventilation is a thing which is very difficult to settle. So far as I know, there is no easy method of ventilating a room. The great difficulty is in keeping a room warm. There is no reason why thorough ventilation cannot be had, and the air in the rooms thoroughly changed by windows, if the windows are allowed to be lowered at the top. However, that is expensive here. As I said last night, the warm air will go out. You can ventilate very largely from openings at the bottom.

Mr. Hoxie — I have heard many discussions upon this subject, and I am at a loss to arrive at what is proper. I think it is safe to say that I do not get pure air now. I want to ask the professor some questions aside from what were asked last night. He speaks of the unpleasant odors. Is it a fact that all unpleasant odors in and around farm buildings are necessarily poisonous or contaminate the air? I claim that they are not.

Prof. Daniells — I have no doubt that nature designed the nose as something to protect us when we are surrounded with disagreeable odors. I got a good many of the bad odors on farms, but it seems to me that this proposition must be thoroughly tried. Any decomposing organic matter giving off unpleasant odors is injurious to the system, and this is one of the means which nature gives to warn us that there is something about us which is not wholesome. In Dr. Adams' paper, of Massachusetts, one of the questions was, whether the proximity of the barn yard and hog pens, etc., produced disease, and he said no. He said he had an idea that those stinks were healthy. There is a great deal of importance to be attached to this. No man, I should imagine, would be willing to live in an atmosphere that contains that amount of impure air. I say this without being a medical man, or having investigated the subject either scientifically or from observation.

Mr. Hoxie — It would seem to me that these odors would be very offensive to some people. I think nothing would be so disagreeable.

Prof. Daniells — It is an odor of decomposing organic matter. You get impure air from that and so with regard to everything that accompanies decay.

Mr. Wood — I have been sitting here for some time and have had a stream of cold air pouring down, and expressed the fact that I was sitting in a draft and I was liable to take cold. I am a farmer, and I can go out doors and I would not mind facing a hurricane. I notice the moment I am exposed to a draft, to a small current of air, I invariably take cold. I don't understand those things. I removed from that seat as soon as I thought the draft struck me. If I got close to the window I thought I would not experience so much of it. I wish we did know just how to accomplish those things to get pure air without draft, for I believe it is the experience of almost every one that drafts are unwholesome. I would rather go out and lie on the green grass at night with the wind blowing than sit in that chair. I don't know how these things can be remedied. Before I sit down I would say that I hold in my hand a copy of the *Prairie Farmer*, and I would like to ask this question —Is there any differenee between Russian wheat and lost nation wheat?

Mr. Boyce — I believe that wheat is grown in various sections of this state. It is sometimes called the Judkins wheat, and by another name, but I believe it is all the same variety of wheat. That wheat was disseminated by Benjamin Judkins, of Medina, Dane county. Wisconsin. It was known, for some years, as the Judkins, and afterwards as the Russian wheat. The same variety was taken to Minnesota and disseminated under the name of the lost nation, but it is all the same.

Mr. Flynn — It was brought by Benjamin Judkins to Medina. I had a sample of it. It resembles very much that variety, yet the product was very much superior.

Mr. Boyce — It was really a change of locality.

Prof. Daniells — If a man will connect a pipe from one opening through the cellar wall or window, and carry it along the cellar down his stove and discharge the cold air directly under the stove, with some kind of a register which he can control, he will get the fresh

air entering directly under the stove, and if he will allow plenty of cold air to enter, and warm it, the rest of the air will get out sufficiently for ordinary living. There are seasons when the housewife wants air. My house is heated with a furnace, but we get fresh air in through the furnace, and there is no means for it to get out. Where it goes to I don't know. I have a large cellar devoted to the pipe, with an arrangement so that I can judge to some extent. I think that could be done, and it would assist in ventilating the house. I think this idea of Mr. Hoxie, in regard to putting registers in the ceilings, is a most excellent thing. All sleeping rooms should be partially warm in winter time, for the mere purpose of changing the air of the room, which should be warm.

Mr. Phillips — I was interested with regard to locating out buildings, and the gases that arise there. It seems I cannot live on a farm without traveling a mile and a half a day to feed my hogs and to mind the gases ; but if these gases were not poisonous, why, I can stand it a little more.

Prof. Daniells — There is not on record a case where a man has been killed.

Mr. Sandford — The plan I would adopt is to leave a space open at the top of the building. There is no direct draft, still it furnishes good ventilation.

THURSDAY, 2:30 P. M.

The convention met in the spacious chamber of the Wisconsin senate, through the courtesy of the senators.

Miss Field read a paper prepared for the occasion by Miss Ella A. Giles, of Madison.

THISTLES.

BY MISS ELLA A. GILES, MADISON.

Disregarding the advice of a writer who said " If you wish to be happy, never ask a favor," I deliberately resolved to solicit counsel with regard to a suitable subject for this paper. I frankly stated to a friend, of acknowledged intellectual superiority, that I might

as well have promised to translate a page of Sanskrit, or elucidate the mystery of the trinity, as to write anything about horticulture; but, since I had obligingly consented to display my own ignorance, that humiliating course had assumed the semblance of a duty. My confession ended with the question, "Now, what shall I write about?"

"Thistles! Canada thistles," was the almost instantaneous reply.

The speaker was one of those brilliant, humorously critical men, who, while fully appreciating the sublime, are inclined to take the perilous step which leads to a view of the ridiculous; who affect greater indifference to nature than they feel, and who would consider it an evidence of weakness and femininity to examine and admire the gauzy wings of a fly, inhale the fragrance of a flower, or dwell enthusiastically on the beauties of a boquet.

I was in earnest, and did not keenly relish the flavor of my friend's witticism, or approve of the levity of his manner. I expressed as much, and begged him to be serious, whereupon his face became preternaturally solemn and stoical.

I was filled with conflicting emotions, but, after a few moments hesitation, I ventured to say that, although I had thought of a subject, I feared it might not be satisfactory, and had hoped he would suggest a better one.

"What is your subject?" he asked, and I was so deluded by his semi-interested tone that I willingly announced my chosen theme.

"The Leafwork of Nature," I said somewhat loftily. "There is a close analogy between the leafwork of nature and the leafwork of life. There are many comparisons to be drawn and lessons to be learned from both. It is a principle of life that, whatsoever we may say about our independence or our personal freedom, we are free only as the leaf upon the plant is free. Away back in the past, if not in the present, we join some other life, and draw from it our vitality and power, as the leaf from the stem, the stem from the branch, the branch from the trunk, etc. I shall refer to the biblical comparison: 'We all do fade as a leaf,' and endeavor to show that we also grow and flourish as a leaf, and that even as its usefulness is not ended when it falls to the ground, so our spiritual influence will continue to live in various forms when our mission here shall seem to have ceased," and having reached the moral of my discourse, I turned and asked my listener, if he liked my subject, "The Leafwork of Nature?"

"Oh, yes, yes," he answered, "but it is not so good as the one I gave you. It is not so suggestive. Your illustrations will not be so pointed! Thistles is the subject for you. Draw comparisons from those grand objects in nature; reveal their beauties, and, when you die, I'll see that the newspapers close your obituary with the well-earned commendation, 'She had an amiable temper and was uncommonly fond of thistles.'"

I was suddenly imbued with a far from gratifying realization of the fact, that, if he had heard a word of my dissertation, he had listened only as he would to the vagaries of a fevered brain, the speculation of a garrulous old woman, or the prattle of a precocious miss in pinafores.

Thistles! I felt as if a thousand were pricking me, but I was determined to hide the disappointment occasioned by his conduct and the utterance of what I then considered a savage sarcasm.

Experience has taught me that when I ask for bread and am given a stone, it is better to keep it and treasure it for its worth as a stone than to throw it back at the giver.

I therefore retain the topic suggested by my facetious friend, and have philosophically resolved to make the best possible use of the material in my possession.

Gradually there dawns upon my mind the fact that, in the wide realm of horticulture there is no department, the discussion of whose peculiar characteristics would afford me more satisfaction than that of thistles.

I had thought to say that nature manifests herself in no more imposing form than in the silence of a great forest. I now feel inclined to add, unless it is in the spectacular voice of a bed of thrifty thistles.

It may naturally be presumed that I approach my chosen theme, or rather the theme which was chosen for me, with cautious timidity. And so I should, were I to assail it in an aggressive rather than a friendly spirit. For I am well aware that the subject of thistles, as well as a thistle itself, is difficult to handle.

I am inspired with a proper sense of awe at the outset, and am in no danger of treating my new acquaintance of perrenial roots, decurrent leaves, spherical, involuere and prickly points too familiarly.

Emanating from the thistle, is a subtle atmosphere, not unlike

that which surrounds conventional beings in polite society, which keeps me at a respectful distance, and causes me to feel like an humble supppliant.

In Emerson's essay on "Social Aims," he speaks of *manners* as seeming to say, *you are you*, and *I am I*, and remarks that, in the most delicate natures, fine temperament and culture build an impassable wall.

How perfect are the manners of the thistle! How fine its temperament! Royalty itself must approach it with a supplicating eye.

Instead of tracing out the close analogy between the silent but effective leaf-work of nature and the leaf-work of life, as I had intended, I am grateful to my friend for a perception of yet closer analogies between the leaf-work of the thistle and that of humanity in general.

In this age of daring conjectures, when men search the scriptures but to ask hard questions of each other and interrogate the Creator, claim to possess a monopoly of salvation, declare that new wine can be preserved in old bottles, and long to assert that grapes may be gathered from thorns, no one will be shocked to hear and sound the praises of what is universally regarded as the "greatest pest of the fields."

Although the thistle does not stand for all that is good, it surely does not stand for all that is bad; I therefore contend that this herb is not, as farmers since the days of Linnæus have seemed to think, an example of total depravity.

Among short-sighted, unreflecting people, it meets with bitter hatred, because its deep roots are below the reach of the plow; its abundant seeds furnish it with ample means for spreading; its creeping root-stocks are tenacious of life, and its broken fragments are capable of forming new plants.

It is owing to these very characteristics — strongly marked individuality, generous impulses, tenacity of purpose and regenerating principles — that we can see in the thistle a symbol of a great, if sometimes erring, human soul.

In Castelar's "Life of Byron," we are told that genius is a martyrdom. Castelar speaks of the talent in the soul as throwing its light over the body, and says that all supernatural genius is an internal infirmity. The heroic soul of the thistle throws its light over the body, and shines out in purple splendor, but its "internal infir-

mity" is external! For its leaves are stiff and antagonistic, and the scales on its soft blossoms are all tipped with sharp prickles. How easy for nature to have made those inflicting little daggers less prominent. But no; while other flowers more beautiful, yet with deadly poison lurking in their bosoms, or miniature swords hidden under their deadly sheaths, are false as they are fair, the thistle is free from any deceptive wiles. Before our hands touch it, its aspect awakens strange apprehensions. The thistle is the emblem of unaffected candor, abiding sincerity and simple justice. The survival of the strongest, if not the fittest, is the only reasonable explanation for the present existence of the thistle. It would seem as if the powers of principalities were bound to exterminate the annoying weed, yet nothing prevails against it. In spite of the fact that many states have a law making it obligatory for owners of lands to destroy it, under penalty of its being done by authority, and the cost charged as a tax, there are thirty species in the United States.

Since Adam's sin, when the edict went forth, "Cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life; thorns, also, and thistles shall it bring forth to thee," the woods and waters and deep places of the world have been peopled with foes; evil spirits seem to be in the earth's forces, trying to change her beauties into deformities, and turn her gold into consuming fire. Science penetrates caverns, scales heights, fathoms depths, and forces from nature many a solution of her own problems; but the burdock, the cactus, the sticktight, the burr, the nettle and the thistle still live on, and their mission is unknown. But there are sermons in them, as there in brooks and stones, and good in them, as in everything else, if our finite eyes are not too dim to discern it.

According to Zoroaster, who appears in the *Zend Avesta* as a being of supernatural endowments, receiving from divine authority by personal inquiry and reply the truths which he communicates to men, the rose was created free from thorns until the entrance of the evil spirit into the world. Wickedness was then put not only into the hearts of men, but into the unconscious things of nature.

May not the thistle have been free from prickles until Satan saw fit to use it for a pin-cushion? To be sure he inverted the points of the pins, so that they would wound any person who touched them; but what else could be expected from one of Satan's malicious propensities!

Looking leniently upon the thistle's undisguised faults, we will accept the theory that prickles have been placed upon it gradually as the world has become corrupt. We all delight in dwelling upon the beauty of the water lilies, whose white chalices seem to be held up by unseen hands. We are inclined to believe that the rain and the sunshine, which fall alike upon the just and the unjust in the world of humanity, have special favorites in the world of horticulture.

Poets speak of the sun as tenderly kissing the tears from the eyes of the violet, but no one ever seems to think that the thistle has any tears to be dried by his luminous majesty, though for centuries this prickly plant may have been weeping and mourning over the piercing misfortunes of its race.

I purposed once to show how we all do flourish and fade as a leaf. Now I would prefer to show how we all grow in the sunlight, are beaten down by raging storms, struggle against the giants of temptation, that seek to drive us from the path of righteousness, wound even our nearest and dearest, inflicting upon them bruises that only heaven can heal, and for which, from our very nature, we are not always responsible, and then, when heavy age has overtaken us, silently fall from our places like thistle-down, to seek a resting place — we know not whence — and find another soil — we know not where — from which to spring into perfect life, eternal and everlasting.

Since science is revealing to us so many hidden beauties and treasures, and thousand-handed arts are illustrating her power, may she not yet, as Emerson suggests, find a rose-water that shall wash the negro white?

May we not sometime be able to answer in the affirmative that old, old question, "Shall men gather grapes of thorns, and figs of thistles?"

OUR HOMES.

MRS. MARY L. ARNOLD, GALESVILLE.

When we were young and rich, in the freshness, the ardor of youth, we saw a haven, far out in the future, and there our castle. We buffet the billows, we sing through the storm, for hope, glad and bright, is leading us on. What is it that all of earth's glad and weary ones are seeking but a home? I know it is the one grand thought of every true girl's soul, her greatest incentive to study works of science and art, to toil untiringly through months and years, that at last she find rest in a home, and there reign queen. And every noble boy has a picture that he carefully keeps in the folds of his heart, the only object worth laboring to obtain—a home and its surroundings; he bends to the oar and manfully presses forward and onward. Happy indeed, are those who in a measure have reached their ideal. It is well to aim high, have glorious aspirations for all that is good, true, manly and noble. But whether our homes should be beautiful, a place where there is none like it, to our loved ones, depends so entirely upon ourselves, that it seems almost impossible, after such bright hopes, such working and planning to obtain it that so many fall far short of the realization. How necessary that we make our home what it should be; one that our children may love and seek.

"A helm is a little thing, but it governs the course of the ship." The father may be the head, may be the strong right arm that all else may lean upon, but to the mother is the power given to guide, direct and counsel. 'Tis a beautiful saying: "The mother in her office holds the key of the soul, and it is she who stamps the coin of character." Then how great her influence. To have a healthy, loving, happy influence, we must have refinement in our homes, and true refinement finds its source in that life giving principle which gives character to every grace, love. Early associations of refinement make an impress upon childhood that will always be manifested. That upon us mothers' shoulders rests such a responsibility, should at once make us tremble and rejoice. What a comfort for children to grow up and not only love their mother for the love that bore them, but reverence and respect her for the intelligence and love she brought in their own dear home.

Pitiful indeed is the family with a mother that can not command the love and respect of her children. Men with intelligent, refined mothers, sisters and wives, breathe a different atmosphere, as it were, from those who have not, and cannot always be forgetful of their virtues when mingling with others. It is not hers to don equipments of war and take her place on battle fields, nor to contend with men in legislative halls, yet what a power is her influence to those who represent her there, for good or evil.

Cultivation and thought will manifest itself always, either in its possessor or the thing possessed, generally in both. The lady of thought and refinement manifests characteristics that never accompany the coarse and vulgar; we need not go into her home to see whether she has good books to read, or enquire of her whether she has read them. We shall not be forced to examine her conservatory to learn whether she has the refinement that always accompanies the true lover of flowers. We look in her face, and there read as in a mirror what she is. In every word expressed, she either praises or betrays herself. We are not deceived; nature has endowed each with the faculty of reading leading characteristics in our fellows, and although we may not often read the present thoughts, we can the ruling passion, we cannot ever deceive ourselves. There is a consciousness of mental strength or a consciousness of the lack of it, that ever remains with us, and exists within each individual the same. We need not ask another, we may "see ourselves as others see us." So cultivation will manifest itself in whatever hands touch or minds teach. If this cultivation and refinement is so observable, renders the possessor and those with whom they mingle, so much more attractive and enjoyable, I most earnestly wish that none of our farmer friends would ever withhold from their families the papers, the books, the means to get the many little though comparatively inexpensive things, that nimble fingers can so readily shape into things of beauty, that add much to the attractiveness of their homes. There is so much written on the subject of home decoration, that if we have not natural tact, we can get hints that will materially help us. The agricultural papers have taught many a housewife ways of economy, and have trained her daughters to "love the beautiful and the true."

Please do not ever say those little niceties — those birds, those plants, those little shining gold fish — are not worth the time and

trouble bestowed. You cannot place a value of dollars and cents upon them for the good they will do. Remove them from your homes, set your chairs back mathematically straight, and you will feel like drawing down your faces to correspond with the straight-jacket appearance of things; then tell us, do you prefer a home without them?

That there are men engaged in farming who ought not to be, we know; that there are women who marry farmers who ought never to have done so, we know also. I believe you will agree with me in saying that there is no occupation where the wife works with the husband as much as in that of farming, and in no occupation is it more necessary that she should. If she is not in sympathy with him, and is continually pulling the other way, as it were, success financially will rarely ever crown their labors.

Intelligence is so necessary to success, success in every vocation so necessary to happiness, we may be fortunate blunderers for a time, but thorough study and faithful practice is what will bring the lasting reward.

Those who admire the beautiful within their homes will not be lost to the things of beauty without. The beautiful flowers should bloom around our doors, and little hands be taught to cultivate them and little hearts to love them. We can cast our eyes about us and observe the beauties of nature everywhere. Heaven bends above and is mirrored beneath us; and dull and thankless would we be could we not "look through nature up to nature's God" and say, "we bless Thy great and holy name."

As wives and mothers, keepers of our homes, there is much for our hands to do. The physical wants of our family are to receive thorough attention. As we look about us, we find too many weary housewives, who have attended merely to that to the neglect of all else. The first harvest alone receives their attention. The second, when it is garnered, will not afford the pleasure that it ought. "For as ye have sown, that shall ye also reap."

It is not without heart-ache that any ever pass into complete nonentity, and feel that the dreams of their girlhood are not to be realized. They had hoped to have situated themselves so that they could improve with the times socially and intellectually. Yet with cares gathering around us, we have taught ourselves to think that only our own hands can do what is to be done, and by so doing

imprison ourselves within our own homes. There is a culture and an ease of manner that comes from mingling with others, and that can be acquired in no other way. Our friends and society have claims upon us, and we can but feel that we are appreciated according to our usefulness.

Have a cheerful, happy face; speak only pleasant words. This happiness and pleasantness is catching; the whole family get it, and what is better, they generally keep it. Did you ever notice what a change it will make in a happy social circle by the presence of one sour, dwarfed, jealous or selfish individual? and how quickly we catch the inspiration when one of those whole-souled, jolly ones come in, that know the art of pleasing and making themselves agreeable. The little folks echo their parents' sentiments; they are not slow to catch them either; imitate our actions so closely that it bids us be cautious.

Provide well for their entertainment. Keep from your home all that is pernicious in itself, but indulge in all else under a wholesome restraint. Don't forget in ordering your papers to get some suitable to their tastes. Get books for them that they will enjoy; provide games liberally. For their sakes, read their childish stories, play their innocent games occasionally with them. It will not hurt you to live over your childhood's days by so doing. Remember always, "that little things are great to little folks."

With what watchfulness we should guard them. Their first breath brings with it great care for the parents, nor does this cease; months lengthen into years, years come and go, our babies are gone; grown to be men and women, taking our places; we stand aside, anxiously watching their movements. Their successes bring us pleasure — misfortunes such pain. There is a glorious "hope beyond," when we have done our duty, and with all earnestness and love guided these baby minds through boyhood and girlhood up to noble young manhood and womanhood, with principles born of heaven. And what may we not expect for humanity that is elevating, refining and purifying, when the youth of our land rise up strong, courageous, generous and free.

"Where, then, is woman's sphere? The sweet
And quiet precincts of her home;
Home where the best affections meet,
Where strife and hatred may not come,

Home! of her earliest hopes the shrine
Around which all her heart strings twine.
There loved and loving, safe from fear,
Lies ever woman's noblest sphere,
To bless in every stage of life,
As mother, daughter, sister, wife."

Mr. Plumb — I move that a vote of thanks be extended to the ladies who have presented papers this afternoon.

Mr. Field — I second the motion for the *admirable papers*. It is one of those things we do not often hear.

Mr. Finlayson — The ladies have displayed a refining power that it is impossible for men to display. They have shown a keen intelligence that man, with all his ability and power, cannot show. I tell you, gentlemen, that Wisconsin stands higher to-day than any other state in the intelligence of its ladies. I rise to second this motion, hoping that the ladies of Wisconsin will continue to take an interest in our meetings; their faces will always be hailed with joy. Their presence has an influence upon us which it is impossible for language to describe, and I do trust that our future meetings will be graced by their refining influence. I have great pleasure in seconding the motion.

Motion adopted.

IGNORANCE VERSUS KNOWLEDGE.

By CAPTAIN WILSON HOPKINS, OF CHIPPEWA COUNTY.
(Lecturer of the State Grange.)

From the time that Cain appears as a tiller of the soil and Abel as a keeper of sheep, agriculture has been the foundation of all business, and the true source of all wealth. If to be ancient is to be honorable, it certainly has the precedence, as its origin was simultaneous with that mandate: "Thou shalt eat thy bread by the sweat of thy brow," and in those early days when rulers, chiefs and patriarchs tilled the soil there was no more honorable occupation, nor in fact any but what was subservient thereto.

But time developed in the human family wants other than mere animal gratification, and it was found that by means of instruments in the hands of laborers, that the soil could be made to produce

more than sufficient to supply the food of those actually engaged in its cultivation. Then commenced the struggle for power. Men in older times, like men of to-day, sought to live upon the labor of others, and escape the mandate for themselves, and eat their bread by the sweat of other brows. Many gained a livelihood by war and conquest, and those whom they conquered became slaves, and tilled the soil for the benefit of the conquerors, until the conquerors in turn were conquered and became the slaves of other victors. Hence it became that prowess in arms was honorable because it could revel on the labor of others, and to till the soil was degrading because it was subservient. Yet this was the first advance in the line of civilization! It was by the exercise of brain power that a few could hold the many in subjection, whose muscles were as fully developed, and to whom subserviency was equally repugnant.

It is said that men who labor have little opportunity to think, but men who feel oppression and properly resent it, seldom cease to think; and those who ruled soon learned that their own progress must be rapid indeed to keep in advance of those who served, as it was by mental superiority alone that the servitors could be held in subjection, and it soon became a fixed fact that a proper development of the physical system, by a judicious exercise of the muscles, enlarges the brain and strengthens the mental capacity. But mental power without discipline was as useless as a shot at random, or labor without aim.

Once on the road to knowledge, mankind continued to advance in all that pertains to art and science, as well as a desire for individual independence; and he who wields the spade or other instrument of labor, has long since learned to resent all idea of servitude. God opened the door to a new continent. Those who entered had formed a preconcerted idea that the people should dictate, and those who ruled should serve.

Theoretically, such is our government. Practically, it may be; but the same truism which has ever been, exists in full force to-day. Mental discipline is the controlling power; knowledge is the master, and ignorance is the servitor.

We are sometimes told that capital oppresses labor, or labor infringes upon the rights of capital. But there is not and can be no real contest between capital and labor, because the prosperity of the one depends wholly upon the prosperity of the other — a con-

test between capital and labor amounts to about the same, and will result in no more good than a quarrel between husband and wife. The one being a foolish interruption to the domestic felicity, and the other an equally foolish interruption to general prosperity. But the struggle ever has been, is to-day, and ever will be, between knowledge and ignorance; between mental discipline and uncultivated brains; and there is no doubt as to which will hold the supremacy.

We are further told that money is power. That it wields an immense influence for good or for evil. That it sways the body politic and controls society. That it corrupts legislative assemblies, and warps judicial decisions.

Money is not the power, but the weapon wielded by the same subtle hand that wielded the sword in former times; money bears the same relation to the power that the engine does to the steam.

Now, just as long as self interest predominates, just so long will knowledge exact of ignorance all which it can be made to yield; you may deprive it of one weapon, and it will secure another, and the only true way to deprive it of oppressive power is to leave it no victim to oppress.

The time was when ignorance, oppressed beyond endurance, sought relief in revolution; and revolution, while it might bring a temporary relaxation of oppression, was sure to result in confusion and anarchy with all its attendant train of misery and distress, and for the time being, retarded civilization, and can only result in permanent improvement when it is followed by a more general enlightenment, and the rights of those oppressed are much more readily and securely obtained by mental culture than by revolution. And I trust that education and general intelligence have already elevated the Anglo-Saxon race to that mental and moral standpoint that in the future revolutions may not occur, but will be buried in the oblivion of the past.

Now, as it was in the beginning, agriculture is the foundation of all business and the source of all wealth. It is the fountain from which all other occupations draw their profits. It furnishes the raw material for food and clothing; that which sustains life and protects the body from the elements; that lines the inner and the outer man. Destroy all other occupations and you simply deprive us of the comforts and luxuries of life; destroy agriculture and you take

with it life itself. Life may be burdensome without its comforts, but the comforts are utterly useless without life. Now, without deteriorating other useful occupations, all combined are to agriculture as the comforts of life are to life itself. Yet there is no other occupation that is so bound down by the shackles of ignorance as farming. Storms may sweep over the country and make desolate large sections; pestilence may ravage among live stock and do immense damage; locusts may come in swarms and devastate large portions of the country; drouths may parch, rains may deluge, pestilence destroy and insects devour, but all combined are but as a tithe compared with the incalculable waste, neglect, and damage, arising from ignorance on the part of those engaged in farming. Waste in seed time and in harvest; waste by exposure of tools and farm machinery to the elements; waste of fertilizers, till productive land becomes almost wholly unproductive; waste in burning heaps of straw in autumn, and leaving stock exposed to the storms of winter, and often to perish from cold and exposure, when the straw thus consumed, perhaps upon the same farm, at least in the immediate neighborhoed, could have with little labor been so adjusted as to have given the suffering stock entire protection; neglect of fences till crops are overrun by cattle; neglect of tools; neglect of stock; neglect of growing crops till smothered by weeds; and neglect of crops when garnered. Waste and neglect till it makes one shudder to contemplate it, till it finally ends in a waste of a life of toil and labor, and an entire neglect to have made provisions for the family left to struggle with poverty as best they may.

It may be claimed that this is not wholly attributable to ignorance, but in a measure to indolence; but ignorance is the mother of indolence, and feeds and nourishes it, and all must admit that it arises from a nonexercise of the proper judgment which is so closely akin to ignorance that it is not necessary here to draw the line of demarkation.

Laborers in other occupations may be ignorant, but the managers must be informed, while the farmer is both laborer and manager. If a man tires of employment as a hired laborer, he turns his attention to agriculture, as farming is the only business where ignorance can procure a livelihood, which gives prevalence to the by far too common opinion that any man, no matter how ignorant, may be a successful farmer. But I reassert that of all the obsta-

cles that a farmer has to encounter, there is none other so detrimental to his prosperity as ignorance.

1. Ignorance of the first principles of finance and political economy.

2. Ignorance of the chemical laws of mineral, vegetable, and physical organization, and their application to agriculture.

3. Ignorance of the arbitrary rules and regulaticns which control society and its organization.

And lastly, and more to his degredation, lamentably ignorant of the immutable laws, and their application, of science to agriculture.

Although to overcome the obstacles laid down in the first and second of these tenets is equally as indispensable to the success and prosperity of the farmer, I shall more directly refer in this paper to the third and last, as tending to the solution of those first enumerated.

Now there is no possible manner by which farmers may become familiarized with the rules and regulations of society but by coming in contact therewith. It matters not how much brains a man may possess, or with how much capacity for wit and flow of language nature may have endowed him, he will be a boor in society until he becomes familiarized therewith by actual contact, and that contact must be enduring in order that its effect may be perpetual.

Mingle in society to-day as it is made up out of and formed by those who constitute the learned professions and those who live by mental labor, and you will find that their seeming superiority does not consist so much in brain capacity as in brain culture and mental discipline. Mingle in the society of farmers, and you will find no lack of brain capacity and undeveloped brain power, but a fearful lack of mental culture. Cast the two societies together, and they will mingle much the same as oil and water, until the one becomes refined and purified by contact with the other.

Who of us that served in the army during the late war does not distinctly remember the scoffs and jeers with which the veteran soldiers welcomed the undisciplined recruits upon their arrival to the front. How worthless they were as recruits, yet how effective as veterans. It is the same in civil life; every attempt which the farmer may make to ascend the social scale will be met by suppressed scoffs and jeers. But once let us attain a social standing, and society will extend to us a cordial greeting, and a social stand-

ing we must occupy before we can properly elevate our occupation; for as we are ourselves degraded, so do we degrade our occupation, or in other words, farming is not degrading or dishonorable, unless farmers make it so.

As enlightenment elevates, so does ignorance degrade, and as it is our object to bring farming in this state and country to a higher standard of excellence, it follows that we can only succeed in this by making more intelligent those engaged therein.

But how may we best accomplish this? Already, and for years has the good work been going on and steadily and surely progressing. Agricultural societies have in the past, and are doing much in the present, to lay the mighty foundation for social and intellectual improvement among farmers, and their labors have been crowned with success in the right direction; yet the wailing cry for relief from ignorance and social bondage comes up with a stronger appeal to-day than at any time in the past. And why? The reason is obvious: we chafe under the yoke only when we realize that we are in the harness. Agricultural societies can extend their influence direct only to the few and through them to the many, in an indirect and unsatisfactory manner. Hence, farmers' clubs and granges have become a necessity; the latter being much more complete in its organization is best adapted to the wants of the farmer.

The grange, in its conception, in its educational and social features, was wholly above criticism. But the conglomerated and undisciplined mass which fell into and constituted its organization, so buried from view its underlying principles as to lead many to suppose that its objects were to tear down other, rather than to elevate the farming classes. But as the cloud of dust raised by the confusion and bustle of organizing has at length cleared away, and its aims and objects are brought more clearly to the public view, it will be seen that they were only such as all other occupations have in times past availed themselves of, namely, combined organization for mental and social improvement, while the business feature of the order was afterwards born of the emergency and became a necessity for the proper maintenance of the educational and social features.

Objections have sometimes been made to the order of Patrons of Husbandry on account of its being a secret society. One moment's reflection must convince any thoughtful mind that no organization

of its kind could prosper and become permanent that does not contain within itself an exclusive element which, together with the mantle of protection from imposition which it throws around its members is in reality all that the secrets of any order amount to, and already a neglect to exercise with discretion that exclusive power has been the most dangerous obstruction that the grange has had to encounter. Farmers should stand by farmers' organizations, correct what is wrong in them and sustain what is right.

Agricultural societies have been the means of vastly improving the grade of stock and the quality and quantity of farm productions generally; they have stimulated farmers to bring their land to a higher state of cultivation; they have brought farmers together from different towns and different counties to compare products and results, and to discuss questions of vital importance pertaining to each and every branch of farming. They have introduced lecturers who, from the stand, have dealt out copious and valuable information, acquired only by deep study and research. They have done much to enlighten farmers, not only upon what pertains to the farm and the household, but upon any and every subject that can tend to an advancement in general prosperity.

Branch societies are doing much for the orchard, the garden, and the dairy, and each class of farm animals is honored by its separate association, while the grange has opened the door which has in the past barred the way to that practical knowledge, whereby we may be enabled to dispel that ignorance of the arbitrary rules and regulations which control society and its organization, while through its portals we are enabled to more extensively circulate and encourage the reading of agricultural periodicals, and through grange libraries agricultural literature can be far more generally circulated. Grange lectures are rapidly coming into vogue, and the way is surely being opened whereby we may be enabled to overcome and dispel that more lamentable ignorance of the adaptation of the rules of science to agriculture.

And I here assert without fear of successful contradiction, that no farmer has or can attend the meetings of a properly constituted grange of Patrons of Husbandry for a single year without becoming a better farmer and a better citizen, if there exists within him a single spark of the spirit of progression; nor can any farmer be a regular attendant at the grange without feeling keenly the want of

an enlarged understanding of the business of the farm, as well as a wider and clearer range of information upon general topics; and it is laying naked the fact that farmers can be benefited by a thorough education, which will go far to increase the already growing tendency to properly educate those of our sons and daughters that are intended for the farm.

It is said that we only begin to be wise when we have a realizing sense of our ignorance. If this is true, the grange has placed the farmer in that condition where he begins to be wise, for it has taught him how little he knows and how much he requires to know. It has taught him that (like charity which should begin at home but not end there) his knowledge should begin by a thorough understanding of the farm, but should by no means end there. It has given him a taste of society and taught him to relish it. It is teaching him that unity of purpose demands unity of action, and that which is beneficial to other farmers is also beneficial to him. It is teaching him that the world moves, and that to keep pace with it, he must move also. It is teaching him that he who partakes of a Knickerbocker sedative and a Rip Van Winkle sleep will wake to find himself behind the age.

It is in fact joining hands with other farmers' societies to teach the farmers knowledge — and knowledge will teach them wisdom, and wisdom will teach them to inquire into the mysteries of finance and political economy, and seek to solve the problem of the inadequate distribution of wealth. Wisdom will teach him to investigate the causes of the financial storms of depression that periodically sweep over the country, gathering in the hoarded and accumulated stores from the toiling millions to replenish and refill to overflowing the coffers of the idle few. Wisdom will teach him to inquire if it is justice for a few men in this country and in Europe, representing unproductive capital, to combine, and, for self aggrandizement, to paralyze commere and enslave labor. Wisdom will teach him to inquire if national honor and national credit can only be maintained by a cringing sacrifice of national prosperity. Wisdom will teach him to inquire if the most feasible way to secure the payment of a national debt is to deprive the nation of its resources. In fact, wisdom will teach him to inquire if the manipulations of our national finance during the past decade were not through the efforts of the same power, with the same objects, which

used the sword in former times, that a few might revel on the labor of many, and thereby escape for themselves that God-given mandate — "In the sweat of thy face shalt thou eat thy bread," but rather that they might roll in luxury from the blood and sweat of a groaning, toiling nation.

Wisdom will further teach him that those who live in isolation, embracing indolence and harboring ignorance, will in all time be the servitors of those who cultivate knowledge and combine for power. And from it he will learn that the ballot in the hands of the many, propelled by a disciplined and organized power, working for the general prosperity and the public good is a much more effective weapon than money in the hands of a few, working for self aggrandizement.

Farmers should continue to organize and combine for a more thorough course of mental discipline; cultivate the social and intellectual faculties; grumble less and think more; elevate the standard of their occupation, and men of recognized talent and aspirations for notoriety will no longer abandon the farm and seek other channels of business, that their ability may be appreciated. Then may we hope to be recognized in legislative assemblies, and be enabled to put in practice that theory of our government, "That the people should dictate, and those who rule should serve."

It has been truly said that he who causes two blades of grass to grow where only one grew before is a public benefactor; but he who causes a lively stream of thought to course through the farmer's brain, where before was only a stagnant pool, is much more a public benefactor.

Adjourned to February 8, 1878, at 9 o'clock A. M.

The convention re-assembled on Friday, at 9 o'clock A. M., at the agricultural rooms,

President N. D. Fratt in the chair, who said, as there was but one more paper to be read, we would listen to that, and then the convention could discuss it, and such other topics as to them might seem best.

POLITICAL RESPONSIBILITY OF FARMERS.

BY CLINTON BABBITT, "HEMDOKA," BELOIT.

The grandest feature of American life is the development of its wonderful progress so clearly marked in everything pertaining to the great West, a section of our country, even at the commencement of the last century, but little known. Her majestic rivers, lofty mountains, inland oceans, and trackless forests! Her mines of lead, coal, iron, copper, silver, and gold, awaited, as it were, in long sleep the mighty awakening of civilization. A great and mysterious people passed away even as a shadow; their council fires were extinguished, and the advancing column of a restless energy, raised, where we now stand, the emblem of American liberty, whose every star and stripe represents a principle of a nation of nations, and as its ample folds float from dome of capitol and masthead, we know we can reach down into every family circle, take hold of every heart, and command the allegiance of fifty millions of people to its banner and its faith.

Actuated by divine impulse, and impelled by moral energy, the early founders of our republic adopted the present popular theory of self-government. And although sadly bigoted by early education and prejudice, the good seed was sown, and under the pruning system adopted, the fruitage of its vines must eventually benefit and bless all mankind.

To be a citizen of the United States implies manhood. Our love of home may make the west locally dear to us, and fire our blood with patriotic zeal. The munificence of our wealth, as we send it to the outstretched arms of a world, may indeed make us lavish, but it should inspire a reliant self-respect, and teach us to guard our every right with jealous care. No vituperations or threats, no avarice of exacting shylocks, no demands of greed, no flattery can be able to divert us from self-responsibility.

We know that by divine right we hold the helm, and the world will see that we can outride the storm. If bad laws govern us, we are more or less responsible for their enactment and repeal. If corruption in office goes unpunished or pardon follows quick the wheels of justice — remember popular sentiment is potent and you are slaves and vassals if you do not speak.

The great trouble in the way of success to the agricultural masses, lies in the fact that they are too much engrossed with the cares and exactions of life. They are obliged to give too little attention to general welfare, and while they are exercising their wits to make both ends meet, they place too much confidence and too little scrutiny upon the acts of their representatives. Bless God, the day of scrutiny has dawned, and the demand for faithfulness comes up from every household. Wisconsin has asserted that sovereignty rests in the will of the people; and their will is law. It became apparent when treason and resistance to state law were encouraged by corporate powers, when representatives faltered and senators sold their fair names, that ours was an uncorrupted judiciary, rising up in colossal dignity, before whose searching eye of truth monopolies have trembled, and to whom an oppressed people appealed not in vain. Rome had her senate, Italy her Emmanuel, France her Napoleon, Ireland her O'Connel, Germany her Bismarck, America her Henry, but for Wisconsin is reserved a higher boast — an honest and wise Judiciary. Persistent clamor, however, extinguished the lights of your Assembly Chamber, and a repeal of a law but partially tried is recorded upon its records. Still the great fact remains, worth all the legislation it has cost — that sovereignty rests in the will of the people and not in money and powerful monopolies.

If we are faithful at home, we shall be public spirited and generous abroad. Insist, then, to the *death*, upon your inherent rights, and demand from legislators at home and at Washington a faithful, unshrinking discharge of public trust. Abolish at once all causes of your lessening influence — your close communion cliques, your efforts to advance personal interests at the expense of universal good. Run your granges, your clubs, your labor reforms, your agricultural theories, and your politics upon the "King's Highway," and remember that any party organized exclusively for self interest will ever be at best a cripple and devoid of courage. As the most prosperous days of our national history were passed under constitutional enactments, giving us as a basis for a circulating medium gold and silver, "remove not the ancient land marks which thy fathers' have set." Aye, palsied be the hand that would separate these twin brothers in the march to progress and power. Let the stigma of contempt follow close upon the heel of him who would section-

alize a common interest, and over the ambitious hopes of such men, place the lines drawn in mysterious characters by Jewish fingers upon the "Walls of Belshazzar"—"Mene, mene, tekel upharson." The waste of treasure and of life; the tottering Union cemented in the blood of a common ancestry; the bitterness and hatred engendered by strife; the demands of arrogance and power, and the buried hopes of thousands of our people, proclaim the evil of sectional legislation.

Honesty and fairness alone will cause the north and the south, the east and the west, to remain one and inseperable — the glory of our fathers and the pride of their sons. Wholesome and successful commercial business rests upon confidence, a sound circulating medium, and upon the basis of supply and demand. Then away with protective sophistry and let national pride abolish the offices of customs, and, in your relation with the world as with each other, incorporate a system of universal reciprocity. Our commerce would then be restored and we should not feel our blood tingle and experience pangs of chagrin that not one of the great ocean steamers regularly entering and clearing our ports engaged in the magnificent enterprising lines of Inman, Guion, Star, Anchor, French, Bremen, Hamburg and Cunard is the property of an American taxpayer. Common justice and sound policy also demand that millions of property now exempt from taxation bear its just proportion of burdensome expenses. Bonded wealth, railroad subsidies, college and church property, share alike with the cottage of the poor the protection of government; then let compulsion, if necessary, impose equality. It cannot be that the Divine Giver of all good is too poor to pay taxss with His American subjects; and it is apparent if His self-constituted agents fear bankruptcy if required to walk with us shoulder to shoulder in building up a representative government upon the theory of equal and universal justice, there is danger that the cry of repudiation, when once raised, will usher in a more serious panic than we have yet known. The beautiful proportions of our property idols will shrink to skeletons, emaciated and worthless, and the craven spirit of fear, wild with madness, will sweep over all restraint, and, in its wake, leave waste and ruin.

Common sense and the preservation of the nation itself demands a uniform interest law, and as low a rate as five per cent. It is useless to look for prosperity to the masses as long as half a dozen

men in every community control your interests and are able to loan money for twice the value of service rendered, and for a higher rate than any legitimate business will pay. As long as you allow the present state of things, so long will business be paralyzed and confidence unrestored. Experience and observation assert the opinions of bankers and money lenders, and their views of any man who is willing to obligate himself to pay ten per cent. per annum. The mortgage must be legally scanned and the security must be for five times the amount furnished, for distrust is the result. And that class known as money lenders to-day in Wisconsin are little else than purchasers at twenty per cent. on the dollar of values.

Who shall say that the farmers and agriculturists, whose equity extends to over nine billions of property, while all monopolies combined do not exceed three billions, are not called upon to awake from stupor, and are in honor bound to demand by an intelligent ballot, reform, repeal, reward?

Now that the more intelligent and brilliant divines are taking a broader view of human life and its boundaries, admitting that God's mercy illumines eternity itself, even its darkest regions, making the wrath of man to praise Him; so it is the privilege of agricultural leaders to come out from under the clouds of party and the canopy of secrecy, and to incorporate a living political brain influence into all their acts; to scrutinize well the voice of the press, and to be able to discern what is right, and knowing, dare maintain.

> "Ill fares the land to hopeless ills a prey,
> Where wealth accumulates and men decay,
> Princes and lords may flourish or may fade,
> A breath can make them as a breath has made,
> But a bold peasantry, their country's pride,
> When once destroyed can never be supplied."

Agriculturists of Wisconsin, your position is one of usefulness and honor; your fraternity is too universally extended to be hampered by ignorance or controlled by senseless idiots, for to your class, if to any united effort, comes down the centuries the heavenly salutation, "Inherit the kingdom prepared for you from the foundation of the world. For I was hungered, and ye gave me meat; I was thirsty, and ye gave me drink; I was a stranger, and ye took me in; naked, and ye clothed me." You and your brothers till the fields, and gather the fruits which keep starvation from

every dwelling. Jurists, senators. representatives and people alike receive from your hands their daily food. The timid warbler that never leaves his native groves chants your praise in melody and song. White-winged commerce spreads its sails to bear to other climes the surplus of your indefatigable energy. Patriotism is strengthened and made courageous by the bounteous supplies which your munificence lays at its feet. And all, all inspire you to a nobler heroism, and to the consciousness of exalted self-responsibility.

Mr. Field — There were a great many thoughts presented by Mr. Babbitt that might be discussed for a long time. He speaks of what I suppose he means gold and silver as money. That is all very well. I go, perhaps, as far as he does, and a great deal further. I believe in all the gold being used as money, all the silver being remonetized, and used as money, and all the greenbacks too. By the way, I want to see silver remonetized at 412½ grains to the dollar, just where it was when, I may say, the thieves connived together to induce congress to demonetize it, and to compel us to pay our debts in that which we didn't agree to pay them in. It is enough for you and me, Mr. President, and particularly for the farmers of this country, if we pay just exactly what we agreed to pay; not a single dollar less can we afford to pay, and not a single dollar more ought we to be compelled to pay.

I don't know whether Brother Babbitt will agree with me or not. This question is a question before the country; it is the monetary question in all its branches. I received a letter from a member of congress the other day, and he said the all absorbing topic is finance. I am glad to hear that such is the case. No more important question can agitate congress and the people. Let us use all the gold and silver we have, and then let us have a currency issued by the national government direct to the people. I don't want to see congress delegate their power to issue currency to friend Babbitt nor to any banking institution or corporation in the land, but issue it themselves. The cost of issuing greenbacks is trifling; whereas, if the government delegates its power to the national banks, and issues interest-bearing bonds as security, it costs us a large sum; the aggregate difference between what they pay back in taxes to this government, and what they receive

as interest on those bonds, amounts to millions — probably fifteen millions per annum; but whatever it is, it is worth saving. The greenback currency is just as good as the national currency; both are the faith and credit of the government.

I believe my friend Babbitt is in favor of free trade. Here is my hand, if he will only establish it the world over. Free trade and sailors' rights I am in favor of, if you can have it universal; but if you cannot establish it the world over, then American industry must protect itself. I believe we should have very much less expenditure in this government if we had direct taxation according to valuation and free trade. When you and I, Mr. President, are called upon to pay taxes once a year, or twice, we know what we pay, but when we are called upon to pay at every meal we eat, and upon every article of clothing we purchase, then we do not realize it. Hence I am in favor of free trade and direct taxation. The constitution should be so changed that we should be taxed directly upon property — not upon the population. If we raise taxes by this government to-day, it would fall heavily upon the west, and under these circumstances, I am in favor of the taxation of all property. I would not quarrel over the place of the dead, but I say that church property and school property, and every other class of property should be taxed, and taxed at what it is worth; taxed at its true value. Some say it does not make any difference; you might as well exempt the school and church property, for it is for moral and religious purposes. What is my farm for except to feed the people? Can there be a more benevolent, a more charitable and humane work accomplished by any institution in the world, than what is done by the farmers in producing for and feeding the people?

Great injustice is done in taxation for this reason. A church in the city of Milwaukee, costing $100,000, in which 500 people worship; while there are little churches built in the country in which the same number of people worship, that only cost $5,000. Now it is unjust and unequal, and in favor of the rich as against the poor in the distribution of state taxes.

One word on interest on money. I was glad my friend Babbitt spoke upon that question, as it is one of the most important questions connected with the subject of finance. Interest is what makes money valuable, and, sir, I trust the time may come when money

loaned in this country will be compelled to be loaned, if loaned at all, at a rate of interest that all the leading industries can afford to pay. I would not give a straw for your state loans; I would not give a straw to have the interest on money reduced to 7 per cent. in the state of Wisconsin unless it can be reduced in all the adjoining states. I would like to see our members of the legislature memoralize congress to fix the rate of interest, and make it uniform throughout the United States. I believe it to be their duty, and, sir, I would have it fixed at a rate of interest as low as would be beneficial to the interests of the country. I should be satisfied to see it even reduced to five per cent. at first, and then down to three. Three per cent. is a high rate of interest. As I said before, there should be a uniform rate throughout all the states of the Union, and that rate should not be higher than the average profits arising from the productive industries.

Mr. Flint — I wish to make a few suggestions while we are upon this subject. It will be recollected some eleven or twelve years ago this winter, that invitations were sent from many men to members of the Wisconsin legislature, to meet them at their places of business to consult with regard to the matter of the rating of interest, which was then at seven per cent., to allow the taking of ten per cent. The argument was, that capital was repelled from the state, and in order to save our farms and our homesteads, and promote business interests in Wisconsin, we must change our law and make it admissible to take ten per cent. In this view, for one, I did not concur, and having an opportunity to vote on that subject for my constituency, I voted not to raise the rate of interest. A few years have elapsed, and now we hear it stated by men who are in business throughout the country, that the average productive interests do not yield more than two, three or four, or three and one-third per cent. A man starts without money to buy a farm. What must he pay? If he comes to this city where money is loaned, he is asked to pay ten per cent., and to pay a bonus for the obtaining of the loan. What is the result? Reference has been made to the laws upon taxation. We know throughout this country east and west, that if a man is in debt upon a farm which is purchased at this high rate of interest, he is not only paying that, but paying perhaps on five hundred dollars, or one thousand dollars, possibly three thousand dollars on property that he does not own; here is

the difficulty. Just think of the burden placed upon the productive industry of the country in this regard; the young man, the man of bone, of muscle, and of brain, starting out to hew his way to fortune, or rather to make a home, to make a competency. Think of the difficulties that he labors under, and the whole subject at once will suggest itself to an intelligent mind. The rate suggested by our friend Mr. Babbitt, five per cent., might be regarded very low, going from ten to five per cent., but at least an effort should be made; it seems to me that a recommendation should come from this convention to the farmers of Wisconsin, on that subject. We are talking about reducing the rate of interest practically to four per cent., which does not include taxation. Of course all your property must be taxed, therefore let us make a suitable recommendation in regard to it.

Mr. Adams — In 1862, Mr. Field was in favor of reducing the rate to seven per cent., and I think he introduced a bill in the Assembly to that effect. It passed, and became a law, and was in operation several years, and I had the privilege of voting with him on that question. It has occurred to me, Is this the right principle to regulate the rate of interest, or shall we have free trade in money? For my own part, I still adhere to the opinion which I entertained at that time, in 1862. Now, if there are gentlemen on this floor who have been in states or in countries where there are no laws regulating rates of interest, I would like to hear from such men as to the practical workings and operation of affairs under such a state of things. Here in the United States, so far as I know, the most of the states have laws regulating the rate of interest. I have lived where those laws existed, except during a short period in the state of Wisconsin when they were repealed. I think in 1849, the legislature repealed the laws regulating the rate of interest. The immediate effect of the repeal was this: The rates advanced from twelve per cent., which had been the legal rate, to twenty-five per cent., and in less than a year, thirty and forty and even fifty per cent.

Mr. Smith — One gentleman told me that he took one hundred per cent., and got his pay in gold.

Mr. Adams — It was done, and the law remained upon our statute books some two or three years, but the clamor was so great that the law was repealed.

Mr. Field—I remember very well I was then in favor of fixing a lower rate of interest in this state. I should not oppose it now, and I don't know but what it may be a good thing. I have changed my opinion since that time, and I am frank to acknowledge it. We all make mistakes in this world, and I am always ready to acknowledge mine. I feel that it is the duty of congress to regulate this interest question, and make it uniform throughout the country.

Mr. Robbins—I remember when we had no usury laws; and I recollect very well that the men that had money to loan at that time took whatever they could get; and in the section where I lived, they would take 12, 15 and 20 per cent.; and if you could not pay your blacksmith's bill or any other account, they would make you pay as much interest as they could get out of you. I was also in the state when the law was seven per cent., but I did not regard that of much use. There was a way in which men evaded the law. The penalty might have been too large. I know that they paid 12, 15, 20 and 25 when the law was seven. That was in 1866.

Mr. Field—1865.

Mr. Robbins—It was either 1866 or 1867. I know Mr. Barber advocated in the legislature seven per cent.; but we didn't get it. I believe that seven per cent. was too high, and I can give my reasons very readily why I think so. I am told by the best financiers in Chicago that the interest on the debt of Chicago, in one hundred years, at the rate of interest which they are now paying, would be sufficient to build thirty Chicagos. It is astonishing; I could hardly believe it. If that is true, I tell you it is alarming. What is true of Chicago is true of Madison. A word further in regard to government bonds. There is no laboring man that lays up over $80 to $100 a year. If a man gets $40 on $1,000, that is more than any laboring man, any farmer from his products, can make. I do not care how economical he is, that is more than he can lay up one year with another. A government bond is free from taxes. I think an expression of opinion is worth something. If I was in the legislature to-day, I would work for a law less than seven per cent. I would have it as low as five per cent., and I believe that is too much.

Mr. Smith—Would not that drive capital out of the state?

Mr. Robbins—A farmer had better be ruined at once than be

ruined by inches. When times are good, everybody wants to buy something. Just as quick as hard times come everybody wants to sell something. In hard times, we are all sellers and there are no buyers. What is true of me is true of my neighbors. When times are bad, we have to do the best we can with our money. I believe that the interest question is the great financial question. It is not whether silver shall be remonetized. I am in favor of the remonetization of silver. I don't believe in putting twenty grains into it now. At four hundred and twelve grains, I think it is enough as compared with gold. I am not in favor of having any more. I am not in favor of having the greenback destroyed. I am in favor of having a bushel of wheat dealt out in the same way, sixty pounds to the bushel, and whatever you agree to put in a silver dollar that silver dollar should represent four hundred and twelve and one-half grains. A grain of gold is no larger to-day than it was years ago. It was good enough then. Our national wealth don't consist of gold and silver. I think the farmers to-day would rather have a greenback than any other dollar that was ever circulated. The greenback paid its debt, the greenback carried us through the war, and why should the greenback be burned up? I say not only three hundred and fifty millions of greenbacks, but I say restore the four hundred and fifty millions. I would have the government take them for all dues. That would entirely do away with our hard times. I think we have been too extravagant, and that is another cause of the hard times. But, as I said before, the interest question is at the foundation.

I think hard times and the interest question are making the poor man poorer every day, and the rich man richer every day. The reason that our improvements have stopped is because the government bond is worth more than anything else. Men are taking five, ten, fifteen and twenty per cent. out of business and putting it into government bonds. Why? Because they are safer there than anywhere esle. I do not think we can do much, but the people of the country can, by fixing a uniform rate of interest. I believe three or six is enough. I believe one cent a day is enough interest on one hundred dollars. I think a man that has his gold bond would be satisfied with that. Why? Because there would not be this antagonism between capital and labor. I believe that the time will come when men won't demand such extra prices for the use of

money. We might call assessors figure heads when there are men who have more than $100,000 exempt from taxation. The question is when you come to pay your taxes, what would your property fetch? Would it fetch anything above the assessable value. I pay a dollar an acre on my farm, and I believe we are paying too big a railroad tax. I paid $150 railroad taxes a year on my farm for ten years. How can I make a living when I have got to have my farm assessed in this way? You men are sitting still and doing nothing. My farm don't fetch me two per cent. on the amount invested. If that is the case, why should money be worth ten per cent?

Mr. Field — Why don't you sell it?

Mr. Robbins — I want a home. I have been on it for forty years and I won't sell.

Mr. Babbitt — I wish to reply to a remark in favor of that currency which carried us successfully through the war, and has made us a people, independent and free. You remember my statement with regard to gold and silver as a circulating medium, and if we can have silver and gold as a circulating medium, I will guaranty this convention that the greenback will lose none of its beauty or verdure. You understand that, gentlemen. It is a clear case. We ought to force upon our legislators an expression of our sentiments, and if we send men to congress that don't express our sentiments, for God's sake bring them home, and send honest men there. That is my point, precisely. Mr. Field made a good speech, but I could not see where he made the division between my opinion and my advice.

Mr. Field — I am glad there is not any very great difference between us; I was afraid there was. I desire to offer the following resolution:

Resolved, That we believe it to be the duty of congress to regulate interest on money and to fix the same at as low a rate as arises from the productive industries of the country, and we hereby memorialize congress to so regulate interest, and instruct our senators and members of congress to use their influence in this direction.

Mr. Phillips — I indorse what friend Field says, that it should be made general all over the country. If you make it general, you must go to congress. It is a matter of the greatest importance. I was particularly impressed with Mr. Babbitt's paper, that the interest should be reduced, and I think it should be attended to right

now. People change their views. We are all human. In my county the first settlers are getting well fixed, and, as a class, they take ten per cent. more readily than any other I have ever known. They have managed to pay for their places; they have been frugal and careful, and have got out of debt. They are numerous up there, and, as I said before, they draw a mortgage more readily upon a poor man, and accept the ten per cent., than anybody else. This question of interest goes a long way, and if this thing dallies along it is going to be hard to pass a law. I thought, perhaps, Mr. Field was borrowing money, and not that he had money to loan. It is a matter of great importance, and should be attended to now, and a rate of interest should be fixed that the agricultural resources of the country can stand.

Mr. Field — After consultation with the president and others, I have changed the resolution. I think we had better go straight to congress. I have altered it to read thus: "*Resolved*, That we believe it to be the duty of congress to regulate the rate of interest on money."

Mr. Babbitt — I move for a law authorizing not over five per cent. We will look until doomsday for any relief whatever, unless we go to the congress of the United States.

Mr. Field — There can be no harm in petitioning, anyhow.

Mr. Babbitt — I am in favor of the action, and the time is fast approaching, and we may look upon it with a good deal of solicitude. The time is fast approaching, mark my words, when action will speak, and it will speak in tones of thunder, and in a way which will deprive the farmers, the agriculturists of this section of the country, even of their lives, if relief is not given us. The time is past for this kind of dallying. You may talk, gentlemen, that we cannot borrow money if we reduce the rate to five per cent. in Wisconsin. It is perfectly foolish, when we know that money loaners are not very solicitous after all, when they know they have a first-class security. You know that a large portion of the money is loaned at three and a half and four per cent. The moment that we say we will pay five per cent. interest and no more, we shall be at the bottom of our desires, and we shall have a basis that we can stand upon; and if we agree to pay more than five per cent., we have no basis upon which we can stand. The time has come for action and for advance. If the citizens of Wisconsin, the agricul-

turists of the state of Wisconsin, don't raise their voice in this matter, as I said before, there will be trouble.

Prof. Daniells — If I had ten thousand dollars to-day, I should be willing to loan it at three per cent. It strikes me, after all the discussion I have heard, that a great deal depends upon the nature of the security. In Massachusetts, money only brings six per cent., while money here brings ten per cent., and the difference, I suppose, is in the value of the security. Would it not be well for Mr. Field to put in his resolution that the money loaners of Massachusetts should send their money out here and lend it at the same price. It strikes me that the logic of the thing would then be attained.

Mr. Field — Prof. Daniells talks of the security of Massachusetts as being better than that of Wisconsin. There is hardly a farm in Wisconsin that is not worth more than a farm of the same number of acres in Massachusetts. Hundreds of farms in Massachusetts could not be sold for the improvements they cost, for what their fences cost that surround and divide them. Such is the fact throughout New England. Talk about the virgin soil of Wisconsin and Iowa not being good security! There is not better security this side of heaven. No better can be given. It is impossible. I know one good reason why money cannot be got so cheap here is, we prefer to loan money under our own eyes, at home. We see the security every day; but as to the security in Massachusetts being better, I deny it. I want the government to fix the rate of interest at a just rate, and we shall then be able to get money in Massachusetts at the same price we do in Wisconsin. If we own property in Wisconsin, we have a right to get money to represent that property just as cheaply as they do in Massachusetts.

Mr. Robbins — I prefer to have a rate of interest fixed, I don't think five per cent. is too much to pay.

Mr. Field — Can we ever get it before congress except by petition.

Mr. Robbins — I would have one resolution sent to the legislature of Wisconsin and another sent to congress to have them fix a rate.

Mr. Field — Do you propose an amendment?

Mr. Robbins — It would suit me better if it was fixed at five per cent. The farmer will loan his money at ten, fifteen, twenty and twenty-five per cent. I don't believe the farmer can arrogate to

himself too much honesty. I believe in weighing a hog, and that farmers should do it themselves. We want laws to prevent those things being done. If I had ten thousand dollars, I would not give half of it away. Compared with other industries, I say that money is worth too much. A gentleman asked me how many pounds there would be in a bushel of wheat; I cannot pay my taxes in wheat. When everybody wants money, then you have to sell your property to pay your taxes. I don't believe in going across the water to establish a system of finance. England makes money out of it every year, and she don't care who has the balance of trade. Why? Because she is carrying the raw material and fetching the manufactured material back. Let us have the American system of finance. That is what I believe in. I believe that five per cent. is equal to any productive pursuit you can go into, either as a mechanic or farmer or anything else. In ten years, with my family, I would be a town charge if I had to sell my property. There are a good many things on a farm that we can get a living by, berries and such things. I believe in every man having a home.

Mr. Finlayson — Do you raise sorghum?

Mr. Robbins — We have got the best soil and the best climate in the world. Our soil is better than Massachusetts. With regard to the farmers in New York, I can raise more on my ground than they can, and it ought to be good security. Men that have money doubtless pay some taxes. I think they will tell tremendous stories to get out of paying taxes. The men that have their property in money will cover up four-fifths to get out of paying taxes. The farmer cannot do that.

Mr. Phillips — I feel disposed to say that I am in favor of the resolution as it stands. I don't know but what the principle of a neighbor of mine is good enough. He always looks at the main chance, and takes what he can get. I have very little faith in regard to legislation alone, in this matter, and I don't think it matters much. I don't think you will ever regulate the rate of interest by legislative enactment, so long as you allow Wall Street to dictate. That is the fountain head. I think that it is quite necessary that it should be uniform all over the United States, and that congress is the proper place to settle the matter, instead of having it go this round-about way through our state legislature. The only bankrupt law the farmer has got an opportunity to take advantage

of, is to sell out and go west. He must begin his life over again, and here let me say, you ought to memorialize for the repeal of the bankrupt laws. They are as bad as the usury laws. There was one other idea that came to my mind. I think the assessment law of the state of Wisconsin the greatest outrage that could be put upon the statute books of any civilized community. Mr. Field said he was in favor of exempting nothing but graveyards. I would like to see the assessment law amended so that a poor man shall not be compelled to pay taxes on as much property as he owns, while the rich man may hide ten times the amount.

Resolution adopted.

Mr. Field — I move that the president and secretary of the convention be requested to send a copy to each of our members of congress.

Motion adopted.

Mr. Plumb — I wish to offer the following resolution. A year ago, this matter was brought before the convention. A bill was prepared and passed by the legislature, but, to our sorrow, when it came to appear, we found it worthless. It did not seem what we intended, and after inquiring at the secretary's office, I was told that in passing through the hands of the clerk, it was so remodeled as to become useless. The secretary of state says we will have to try another year, and for the benefit of those who are here, I have drawn out a scheme which is a revision of the statute.

Mr. Plumb here exhibited to the president and members of the convention a schedule which he proposed should be used in the future, showing the numbers of acres, weight and number of bushels of various crops raised in the course of the year.

Mr. Wilson — There appears to be a disposition to discuss this question, and I think we ought to have an opportunity of doing so.

Prof. Daniells — I second the motion. I was going to write an article on the agricultural resources of Wisconsin, containing the statistics of the United States census, but I found nothing that was of any use whatever. I might say that I could find nothing that I could place any dependence upon. The secretary of state told me, as I told you the other night, with regard to those rates which are absolutely false, and so it is with the entire reports which come from the assessor to the secretary of state. There is no reliance to be placed upon them, so the secretary told me, and they are ex-

ceedingly incomplete. Many of the things they ought to report, they don't report.

Mr. Clark — Where is the report?

Prof. Daniells — With the secretary of state.

Mr. Anderson — I want to state for the benefit of those who were not here at the opening of the session, this morning, that this subject will be further discussed, and I am glad to see that Prof. Daniells has spoken upon the subject of statistics. The assessor can put in those figures with very little trouble — the number of acres, the number of bushels of wheat, the number of milch cows, etc. It will cost scarcely anything, as the assessor gets so much a year for assessing.

Mr. Field — In this connection, I desire to say that if we could have a record of that kind which is reliable, it would be worth hundreds of thousands of dollars. Hitherto we could not get at anything that was absolutely reliable. We did the best we could at the State Centennial Board. I don't think, myself, that it will cost but a trifle, and I hope that something will be done in this respect.

Mr. Anderson — I would ask that the assessor be put under oath.

Mr. Crawford — I think there is a gentleman present who could give a good reason why the statistics have been so unreliable. I would like to have him say why he was opposed to that.

Mr. Broughton — Since I am called upon to speak, Mr. President, I will say that it seems to me to be a scheme to expose the property of farmers to taxation, a scheme of some of the assessors, particularly those that live in the villages, to expose the property of the farmers to the knowledge of a class that seems to be acting as against their interests.

Mr. Finlayson — I think this is something that would be a great benefit to the state, if it could be got at correctly. I have had a little experience in assessing, and I tried to do it correctly; of course farmers are all honest, and their wives are honest; but my experience is that a true estimate cannot be given. I get my living by tilling the soil; that is the only experience I have had; and if the farmer and his wife will not tell you what property they have, I do not see how you are going to get at it. You tell them that they are under oath, and that they must give a correct estimate, which some will not do, so you are in the same dilemma as you were before, as far as the assessment is concerned.

Mr. Smith — Have you ever made a beginning?

Mr. Finlayson — If we could educate some of our assessors in this matter of taxation, I think it would be a good thing. I presume it is not intended to increase the taxes. It is only to get statistical value of the products of our country. There is a showing against the farmer, and the more you look upon it in that light the more you will find it so. You cannot draw out the money loaners. I remember instances in my day where I went to men and asked how much money they had out on interest, and they said not a cent. That made a great racket in the town; they will conceal the fact whenever they can. I think we ought to draw out all alike. I think the farmer, when he gets to a certain pitch, gets to be like other men; he is an honest man, whether a farmer or merchant, or a dishonest man. I exclude nobody. If he is an honest man he is an honest man.

Senator Anderson — I do object to what my friend, Mr. Finlayson, says. I have a better estimate of the farmers. The truth is, when Mr. Finlayson was assessor, he was collecting the income tax. Then farmers were a little careful about giving their income, because they had to pay a tax, but now there is not one farmer who does not know exactly the number of acres they have. They are not taxed upon that as they are taxed according to capital. There is not one man in a hundred who will imagine that it is going to effect him in any way, whatever. Supposing the argument was true, that some men would not be at home to give these statistics, is that any reason why we should not *attempt* to get correct statistics? Certainly we must try to do so. There is no reason why we should not try to do right. We now give the number of horses, cattle, sheep, swine, and I do not see why we should not take these other statistics. In reading the reports from the Agricultural Department at Washington, I can never tell whether there is 60, 70 or 90 per cent. Those statistics would be valuable to the farmer himself, as well as to others who read them. He will know about the surplus, and in that way it will be a benefit to him; at the same time, it works injury in no respect. I hold that it should, and believe it would, be given correctly. That is my experience, not as an assessor, but as chairman of my town. We have never had any trouble since the income tax was repealed.

Mr. Finlayson — I must correct my friend Anderson. There

were few men in the town that came under the income tax. I will refer to Kansas. The statistics this year for the corn crop is forty-five bushels per acre. You will find the estimate there is far beyond that of Wisconsin, and we know it is more than that.

Mr. Phillips — We want to get at something that will beat Kansas. It is our duty to educate farmers. We know the devices that loaners adopt to evade paying taxes. The question is this, as was advanced here: Are we to take Senator Arnold's advice, and educate the farmers to be honest men, or are we to go to work and protect these money loaners? Let us try and educate the people up to the proper standard. If the boy sees the old man make out his list for the assessor, and sees that he is dishonest, and swears to a lie, it will have a bad effect.

Mr. Hoard — I have not heard the resolution. I take it that it is for the purpose of securing more statistical information. I speak upon one item alone, that of the dairy department. I am the author of a memorial from the state association to the legislature, asking that the assessors assess milch cows as milch cows. I was confronted with about 500 inquiries — I think that was about the number of letters received — asking me, from every shipping port of the United States, and many parts of Europe, what were the products in butter and cheese in Wisconsin. It is becoming a very valuable interest in this state, and no man can tell to-day, with any degree of accuracy, the number of milch cows that we have in the state. There is a serious injury, in the commercial judgment of the world, militating against Wisconsin, because of the fact that those men who are interested in putting forward a specialty in this line have no reliable, solid means of judging, whereby they can speak intelligently to the world and tell them really what Wisconsin is doing. I think that the same arrangement must necessarily apply in every other direction. I never knew a man to be injured by them, and I never knew how much he was to be injured, because he was doing too well and advertised some assets.

Mr. Plumb — I think the gentlemen are laboring under a misapprehension, to say anything against this resolution. After two years of serious consideration of this matter, I find everywhere a growing interest, and a desire that something of this kind shall be brought about, and if this discussion is to be prolonged, I hope that any man who has any suggestion to make, will bring it out.

Mr. Jones — I am glad to see a discussion on this subject. I have no doubt the gentleman speaks correctly with regard to the prejudice in the minds of farmers in giving no statistics in relation to what they may have on hand. It appears as though the farmer was very slow to learn what is best for his interests. It is of the utmost importance that a farmer should be posted in relation to his business, and in relation to everything that goes to the markets. If the farmer is going to hide the crop of Wisconsin by refusing to give statistics, I don't think he will be able to accomplish any such thing. If we can get a complete set of statistics now, it would be a source of information that would be of value. I have an idea that if assessors did their duty, there would not be so much corruption as there is now. Don't encourage men to perjure their souls year after year in swearing off their property.

Mr. Clark — The object of agricultural societies is to make farmers intelligent. I heard farmers argue years ago that statistics furnished by the assessor would give consumers the advantage over the producers. I take a different view of the subject altogether. I ask the farmers in this assembly if they don't wish to be posted upon what their neighbors are doing. If they do, why then get men who will take a correct assessment and make an intelligent assessment law. I want the people of other states to know whether we are doing anything in the state of Wisconsin in the way of producing or not, and I am willing to give every bushel that I raise, every pound that I gather, for the purpose of furthering this object. Supposing I get in what I raised last year, I will have sold probably most of it before the time of assessing arrives. The majority of farmers eat their profit before they raise it. I have thought for years that this is the very thing which is needed. I want to know how much wheat there is. I claim that it is the demand which regulates the supply in all matters. If we know how much grain is raised and how much is consumed, we know better what the price should be; consequently I think it is the farmer's interest that he should know the amount of grain raised, and where the most is produced. I think that this resolution should pass. Of course we have dishonest men among the farmers, but it is our duty to inculcate right principles, set a good example, and try to bring others up to the same standard.

Mr. Plumb — Some seem to think that this is designed as a basis of assessment.

Mr. Wilson — If it is necessary for those of other occupations to know my business, why is it not necessary for me to know theirs? We want this done impartially.

Mr. Babbitt — I should like to know whether this information will come to me, and when.

Mr. Smith — Just as soon as it can be got here.

Mr. Babbitt — Whether it will come to us as soon as it is possible to send it.

Mr. Plumb — We will get it next year.

Mr. Robbins—We will get the report from the secretary of state.

Mr. Anderson — You can compare the number of acres with the previous year.

Mr. Wilson — We intend to get the number of mortgages as soon as we get the number of acres.

Senator Arnold — I would like to show where the farmers may take advantage of the rise and fall of grain. They may obtain just as much advantage as anybody in Milwaukee, providing they will take the trouble to inform themselves. The reason the Board of Trade work sometimes to the disadvantage of the farmer is, they are simply speculating; they are gambling, and they have just as much right to gamble as I have, or any other farmer. In general, I will say that, perhaps, it is a poor plan for us to get together and lash each other's backs by finding fault with somebody else. We take it for granted that every farmer that is here, is here for the purpose of obtaining information.

Mr. Crawford — Is the commission man supposed to tell the truth?

Senator Arnold — There is very little difference in human nature, and we may go from the path of righteousness according to our temptation. I believe that the farmers are not a bit more honest than any other class of men.

AFTERNOON SESSION, 2 P. M.

Hon. J. M. Smith in the chair.

The committee on fruits presented the following report:

There was shown by Senator B. R. Bones, of Racine county, a fine variety of apples, called Richfield Non-such, which the com-

mittee pronounced a very desirable variety for locations where they can be grown, such as the lake shore region. He also exhibited specimens of Dunn E. Low, and a winter variety for which he wanted a name.

H. M. Thompson & Son, of St. Francis, exhibited specimens of young trees, very nicely arranged as follows: Norway spruce, Scotch pine, Austrian pine, Norway pine, European larch, American white ash, honey locust, Barbary and young apple stocks. The young evergreens were very fine, and the committee would especially recommend farmers and others intending to set evergreens to set young trees, on account of cheapness and their liability to thrive.

Mr. B. B. Olds exhibited six best kind of apples.

Mr. Plumb — In Mr. Olds' list he speaks highly of the Lowell, but this refers only to southern Wisconsin.

Mr. Smith — In my request, I asked him to give us six of the best varieties, two of summer, two of fall, and two of winter, and give us what, in his opinion, is the best variety.

Mr. Plumb — He has construed you to mean, for the southern portion of Rock county. Mr. Olds' is a little south of my location. The soil is an exceedingly rich soil. The Lowell is an apple that we think very highly of, and I have grown a good many, and they are grown upon what we call a white clay. It is one of the finest apples of the Spitzenberg class. I would recommend any man to plant this variety. The Ben Davis does remarkably well on a high hill where the soil is firm, but it grows moderately. I find the Ben Davis on some of those hills is one of the finest fruits in the state, but on our rich soil it is going to be a failure. There is money in it, because it will most always bear.

Mr. Jackson — It bears young.

Mr. Plumb — Yes, and abundantly. As for the other varieties, I think there is no mistake about them. The Isabella is a little more hardy. It is a very hardy apple, but it cannot be trusted very far north. All the rest I think are safe. The Duchess and the Russet are among our best apples; but Mr. Olds fails to mention one apple that I believe, after years of observation, to be the best of all the apples that we have got in the southern portion of Wisconsin — the Walter. If I should speak from limited experience of the last ten years, I should not say much about Walters. It came into Rock county from its original location in Illinois. I,

do not know of any other apple that comes within fifty per cent. of being as valuable in dollars and cents, giving such satisfaction from the first day of December until the first day of May as that apple does. I speak guardedly in this. It is not a tempting apple at all. The farmers who have seen it say, "Oh! that is a little apple and we do not care to look at it." Gentlemen, along about the first day of May, when you have an apple that is satisfactory, even sized, the dealers like to get them because they are so handsome. This could not be said of the Ben Davis or any other apple that we can raise.

Mr. Smith — How far north in the state would you consider it safe?

Mr. Plumb — Mr. Tuttle can speak better, because he is further north than I am. I have no hesitation in recommending it on the firm soils north. The climate is not the thing alone. It is the soil in southern Wisconsin. Mr. Olds speaks nothing of Pewaukee. On the original soil where it grows, it is a valuable apple, but I cannot recommend it for rich prairie soils anywhere.

Hon. I. C. Sloan — I rise for the purpose of relating an instance of my own experience. In 1866, I purchased of Mr. Kellogg, a fruit grower in Rock county, about 75 trees. Among those trees there chanced to be three Lowell apple trees; and what I desire to say is, that each of those three Lowell apple trees has produced more apples, of more value, and of better quality than any other two trees in the lot. With that limited experience, I have never been able to understand why the Lowell apple was not propagated in southern Wisconsin. It is sometimes called the Greasy Pippin, as I understand. It is a fair apple, with the surface a little greasy, and a good eating, table apple. It bore more, and the crop was more valuable than the apples of all the other varieties. In southern Illinois they have not the Lowell. I understand that in regard to fruit growing, isolated facts do not constitute any general rule. It seems almost impossible to devise any general rule which is applicable to different localities and different places. With the limited experience I have had, I should say that southern Wisconsin is more suitable for that apple. They were planted on the prairie, on quite a black soil. It runs into a little whitish clay, and there is a depression.

Mr. Plumb — Give us the location?

Mr. Sloan — On the east line of the city of Janesville, on prairie soil. It was a little mucky, dark prairie soil.

Mr. Plumb — Underlaid by clay.

Mr. Sloan — Underlaid by clay and then gravel, and, from my experience, I should rather have one Lowell apple tree than five of any other variety.

Mr. Plumb — That is a location where the tree will live. That gravel comes near the surface.

Mr. Sloan — It is not gravel.

Mr. Robbins — I think this apple is what we call greasy skin. If that is so, thirty years ago I planted five trees. I sent to Davenport and got my trees, and set them out in one acre of ground, and didn't lose a tree, didn't lose any of those trees, I think, until one cold winter; I don't recollect now what winter. My trees were set upon the northern slope. I lost a portion of my apple trees that winter, but those we call the greasy skin lived. I have now about ten, and when we have any apples at all, we have them from those trees. They are a splendid apple for fall use, but they are good for nothing for winter. They are very juicy, and they are the best of apples. I have also the Golden Russet and the Snow apple. They are the only apples we can depend upon, and this year they failed. Out of 400 apple trees, we have to buy apples for our own use.

Mr. Smith — Your trees are not all dead?

Mr. Robbins — No, they are all alive. It struck me that apple is the one I got from Davenport thirty years ago. We never knew the name, and we called it the greasy skin.

Mr. Tuttle — I think the Lowell is better than the generality of apples. It is an apple that needs to be carefully cultivated to make it a success. It will not grow in grass. It will grow in very few locations. I had it on prairie soil where it is pretty rich, and it lived through a good many years feebly, and died, and then I set some trees upon what I considered was the best ground for an orchard on the top of the hill. I set some six or eight trees, hoping to save them there. They are about one-half of them dead.

Mr. Smith — How far north would you consider it safe to plant Walbridge.

Mr. Tuttle — There may be locations where you may grow the Walbridge. I consider the Walbridge a thorough failure anywhere.

I found in going with Mr. Plumb the Walbridge standing here and there in rocky, mucky prairie soil, which I consider the worst place you can put a tree. I would say a word with regard to the Pewaukee. It behaves well in the nurseries and a good many of the nurserymen in Minnesota and Wisconsin, say the tree was tender. I find the Pewaukee as it grows older puts on an appearance that pleases me; I think it is going to be one of our best trees, and I believe as it grows older it becomes perfectly hardened, and if the apple will keep through the winter, I think it is one of the most valuable trees to plant. I don't believe you will find a crab apple for Wisconsin. I believe the Russian apples are going to take the place of the crabs.

Mr. Flint — Did I understand Mr. Tuttle to say that the Utter was not hardy.

Mr. Tuttle — It is a difficult thing to establish the Utter in our orchard. When it is once established it is one of the most valuable trees you can, perhaps, find in Wisconsin. It is peculiarly adapted to a dry atmosphere, but it does not do well on the lake shore. It does not do well in Michigan. It is a better apple in Wisconsin than in any other part of the United States.

Mr. Smith — I will relate a little experiment that I have been making this winter. Last fall my sons and myself had a large crop of turnips we had raised as a second crop, planted somewhere along about the first of August. Early in the winter my son said one day, "I am giving turnips to my pigs, and they are doing splendidly." I said, "The books say there is no fat in turnips, and not very much nutriment." He said, "My pigs are doing nicely, and not only growing very fast, but they are getting very fat." I put up eight in a pen, and have since then fed them with flat turnips. They haven't had a mouthful of anything else. They were in fair order when I put them there, and when I left home every one was in a good condition to kill, and they were growing as fast as I ever saw pigs grow. A neighbor, without knowing what they were fed on, made the remark, "I don't remember of ever seeing better pigs in my life." It shows, I think, this, that chemical analyses do not always tell the practical value of an article for food. The turnips cost nothing, scarcely, and there was no market for them.

Mr. Field — Is that all you gave them ?

Mr. Smith — I have given them nothing else, not even water. The eight are eating about a bushel and a half a day. They are in a close pen with a floor and boarded over, and the pens are cleaned out every few days. It is six weeks to two months since they were fed on that. They are doing splendidly.

Mr. Field — About what age are they, Mr. Smith ?

Mr. Smith — I think I bought them about the first of November, when they were about six weeks or two months old. I am also feeding three milch cows with turnips, and giving them a bushel a day. I would like, gentlemen, to hear some statement with regard to these apples; to what extent they have been cultivated in any portion of the state, and are not these extra large?

Mr. Bones — That is just about the average size.

Mr. Smith — How long did they keep?

Mr. Bones — They will keep till the last of May. I commenced using them about the first of January.

Mr. Smith — I would like to know whether they ever grow them in other portions of the state. Where do you say this was grown?

Mr. Bones — Racine county, three miles out of the city.

Mr. Finlayson — I would like to hear from Mr. Tuttle in regard to these apples; you must recollect that there is a difference in the apples on the lake and the apples in the interior. It would be desirable, if we could, to grow those apples in the interior of Wisconsin. It is a very valuable apple in my opinion.

Mr. Smith — I wanted to know if it had been proven extensively enough.

Mr. Tuttle — I think it was tried quite a number of years in my neighborhood by Judge Clark, a fruit-grower, proven very successfully. We shall be very glad to see such an apple as that in the interior of Wisconsin; as fair looking as that. It is a thing that we are after, and hope some day to get. We sometimes make an experiment and find that our experience is overturned by something substituted. It has been recommended that we use bandages to prevent destruction by the moth, and I think I could count the moths that I have destroyed in that way very easily. We had some vinegar standing out about the time of the second crop of moths, and I noticed where the vinegar had spilled over there was a quantity of moths. The next morning there were so many moths in

there that they covered it completely. I think there were at least 200 moths in the pan.

Mr. Smith — In the pan of vinegar?

Mr. Tuttle — Yes. I then took oyster cans and put them around. They are not suitable unless they can be opened on the side. The result was that my fruit has not been as free from moths as they were this year, for many years. A neighbor of mine that has an orchard within eighty rods, is full of the moths. I give this for what it is worth. I have full confidence in it myself, and I know as far as getting hold of the moths, I caught more that way than I did any other.

Mr. Finlayson — Where would you put the cans?

Mr. Tuttle — Place them any where. One dish will answer for half a dozen trees. I am sure, from my own experience, that this is a sure remedy, and I would recommend a trial of it. I am so confident that it is a remedy, that I feel no concern about the cotton moth in the future.

Mr. Robbins — You must attract the moths with some feed.

Mr. Finlayson — If it is accepted that this will be recommended for trial, I should move that every one that loves trees report to us next year, so that we may know the results.

Mr. Smith — I hope that a note will be made of this. As an old cultivator, I should be glad to hear from some member of the convention, who will be likely to attend at the next meeting, what the result is.

Mr. Tuttle — I have talked with Mr. Whitney upon this matter, and he agrees with me. What we want is to catch them, and we do catch them by that process.

Mr. Case — I have seen a great many moths, and I think that that experiment should be tried among us, and that a report of the results should be made at the next meeting.

Mr. Hoxie — What time do you do this?

Mr. Tuttle — About the time the fruit begins to drop. I do not do it until July, and then I expect to clear the plantation of the moth. Indeed, I expect to have no moths next year.

Mr. Phillips — There is one matter which I overlooked with reference to sorghum cane, and I have forgotton it every day since when there was a good audience. The question was, where can they get that particular sugar cane? I will state that Mr. Hall, of

St. Paul, has that seed. I will state how it is grown. After that seed has been grown for two years in Minnesota, it grows less each year. The stalks are less. Mr. Miller sends it to his father-in-law in Missouri, and he grows it away from everything else, and sends it back again. Of this seed that has been sent there, Mr. Hollister and Mr. Carter, of St. Paul, had some 300 bushels, and they will sell it to you for 75 cents a pound, post paid. They will sell it for 60 cents per pound at their office. Mr. Clark told me that he raises the same, and he could supply it to everybody that wants it; he had some 8 or 9 bushels.

Mr. Kellogg — I believe that if farmers would take an interest in their strawberries, raspberries and blackberries, their families would be healthier and happier.

Mr. Stone — When do you think the best time to set out strawberries?

Mr. Smith — I have never failed in the spring. I don't want the farmers to do as they used to when I was a boy. I don't think that I ever saw but one strawberry bed in my boyhood. My grandfather used to pick the fruit, and no one else was allowed to touch it. Some two or three years ago, at my farm, we had more strawberries than we knew what to do with, and we gave a large quantity away. There were nearly one hundred quarts disposed of. We had them on our table three times a day from the beginning to the end of the season, and every member of the family, and all our friends that happened to be with us — and we have a good many friends in strawberry time — had just as many as they wanted, just as many as they chose to eat. Years ago, I was in very poor health, and during the strawberry season my sole living was bread and butter and strawberries, and during the whole strawberry season I would be well. That was the case for two or three successive years. I would get better just as soon as the strawberry season came on, and I would feel nicely and comfortably. Strawberries gone, and I was suffering nearly the balance of the year. A friend of mine lately told me the same thing with regard to himself. His entire living was strawberries, bread and butter from the time he could get them. He said it was really the only time in the year he felt well and comfortable.

Mr. Phillips — How long a season for strawberries do you have?

Mr. Smith — The longest season that I ever had was thirty-five

days. If the season is hot and dry, you cannot carry them more than twenty-four or twenty-five days. If it is a wet season, and cool weather, they will last perhaps twenty-six days without watering. Three years ago, by watering, I carried mine thirty-five days. Have plenty of water; it is a sure thing. I recommend the Wilson, although my experience has been that they are not reliable for making money. I think I have never made a dollar by them, although I have expended considerable money. The advantage of the Wilson is, that they will grow where you can raise a good crop of potatoes.

Mr. Jackson — How do you usually set them out?

Mr. Smith — I would advise farmers to set them out in rows three feet apart, and eighteen to twenty inches apart in the rows. Every farmer ought to have a little hand cultivator.

Mr. Clark — It has always been my practice to set them in rows.

Mr. Adams — Our strawberry season has extended over a period of forty to forty-five days during the last few years, and we have two varieties.

Mr. Smith — How long have the Wilson been bearing with you? How long will they continue bearing with you?

Mr. Adams — Just about the same length of time. We have extended the season here four or five days with very little variation.

Mr. Smith — Have you tested the Kentucky?

Mr. Adams — I have. It is ten days later.

Mr. Smith — Would you recommend it to farmers for an extended season?

Mr. Adams — I have a very favorable opinion of it. I have not had that experience with it that I have had with others. I am inclined to think that it is worthy of attention.

Mr. Smith — I was going to recommend farmers to try it. I tried it three years — same as you. Last year I think they stood the ravages of the insect perhaps better than the Wilson, and I think I got more fruit from them than I did the previous year from the same extent of ground, and I extended the season.

Mr. Clark — What variety?

Mr. Smith — The Kentucky. I want something a little earlier than the Wilson, and some good variety that would come a little later. I did not succeed unless it is with the Kentucky.

Mr. Clark — How much later is the Kentucky than the Wilson?

Mr. Smith — I don't know.

Mr. Clark — I want to get at what is the best for an early bearing, either for market or gardening.

Mr. Adams — The variety that I have tried is the Charlotte, and they are very solid little berries. I cultivate it quite extensively.

Mr. Clark — How much earlier than the Wilson?

Mr. Adams — It is a week.

Mr. Smith — Is not that the same as the New Jersey Scarlet?

Mr. Adams — I cannot tell you. I think perhaps it is. It is known as the Baltimore Scarlet. The early scarlet is foreign to this latitude, and does not run in the same style.

Mr. Smith — I think that it is the old New Jersey, which ripens very early. It is a moderate size.

Mr. Adams — It is green for some time and then white.

Mr. Smith — It used to be cultivated very extensively previous to the Wilson. It was driven out by the Wilson.

Mr. Plumb — Are you prepared to say that it is superior to any other variety that has been on the market?

Mr. Adams — I have sufficient confidence in it, and I have planted it, and I have found it productive.

Mr. Clark — I proved it last year and it bore pretty heavy. My Wilson, especially those on the south side, have turned out very favorably, even more so than the Kentucky.

Mr. Adams — No doubt if a proper system of manuring could be introduced, we might do a geat deal better. I am in favor of manure, as I think by that process you always get the best results.

Mr. Greenman — I protest against advising farmers to continue old beds with manure. You are fooling away your time if you undertake to do so. I would advise you to get a nice new piece of ground and set it out every year.

Mr. Wood — Don't touch anything but the Wilson.

Voice — I would like to know how to cultivate currants. The gentlemen were very explicit on the cultivation of strawberries.

Mr. Greenman — You must put in plenty of manure, which will have the effect of keeping the ground loose.

Mr. Smith — Perhaps I can add a few words. I put out some currant bushes twenty-two years ago next spring; I set them about six feet apart, in rows. My practice has been to trim them every spring, and put some manure around them. They throw out a good

many sprouts, and I cut them out the following spring; sometimes during the summer. I sometimes pluck them off with my fingers, all except three or four. I cut out the old sprouts and manure every year, and cultivate to keep the weeds down; I let my poultry run among them the year round. The result has been, that ever since my bushes got large enough, they have not failed a single year to load themselves with fruit. There is not a single year but some of the bushes are lying on the ground perfectly overburdened with fruit. I picked some twelve or fifteen bushels last summer, yet other people had very little fruit.

Mr. Jones — I think that the currant has not been noticed enough in cultivation. I believe Mr. Smith has struck the only mode of raising the currant in the principle that he has followed. I mulch in the spring.

Mr. Smith — I put usually coarse manure around, but my chickens scratch it all away.

Mr. Boyce — I cut back the top of the bush every year, and I may say that I raise currants plentifully, in fact more so than anybody in my section of the county. The black currant, I think, is one of the greatest fruits that we grow. Some people turn up their noses at it. It is like eating an oyster, the more you eat it, the more you like it. It is the easiest fruit to grow that we have. To illustrate the advantages of the black over the red currant, we sell our black currants at fifteen cents a quart, and it is hard to peddle out the red at five cents.

Mr. Smith — What use do you make of them?

Mr. Morrison — I think there is no richer fruit than the black currant.

Mr. Adams — I wish to make another remark with regard to strawberries. I think that the advice given to the farmers is good, but I am of the opinion that good paying crops can be grown in the same bed, two, three, four, five, and even seven years.

Mr. Smith — Do you include the Wilson?

Mr. Adams — Not for a longer term than two years; still, I am of the opinion that a good paying crop can be grown in two years — in three years. I know it can be in two years. For several years I have had an old bed, covering from half an acre to two acres, covered by the Wilson variety, from which I have taken good fair crops, not the largest yield, still, at the rate of one hundred and fifty and one

hundred and seventy-five bushels to the acre; and I think the gentleman is mistaken when he says that no crop will grow for more than two years as a paying crop. It is a common practice with the English gardeners to continue their strawberries on the same ground for a term of years, raising each year good paying crops. Of course, there is a difference in varieties. With such varieties as the Charles Dunning — Charles Dunning Prolific — you might not succeed. I am inclined to think that better crops can be raised the second, third and fourth times than the first. I had a better crop the second year than I had the preceding year, and the fruit was better and fully as large as the first crop. Of course, it requires some labor, some attention, to renovate the ground aud prepare it for a second crop, but still, very little, if anything, more, is needed.

Mr. Greenman —I would take two crops from each bed. I would plow up after the second crop.

Mr. Adams — In regard to the length of time we can continue to cultivate on the same ground, I am somewhat in doubt. I have at the present time a third crop in progress, and I can see no reason as yet why I should not have a good crop. The plants look thrifty and healthy, and I see no reason why they should not produce as good a crop as the last. The method is this: mow the vines soon after fruiting; rake the field clean; cultivate the ground with a double shovel plow between the rows, drag it thoroughly until it presents the appearance of a newly sown field, and then dress the rows with compost.

Mr. Smith — What time of the year?

Mr. Adams — Immediately after the growth; rake them all off the ground before you commence plowing.

Mr. Smith — Immediately after you have done the picking?

Mr. Adams — It is essential to do it at that time.

Mr. Smith — With what advantage to your crop?

Mr. Adams — I think they are a dead loss on the plant. Mow off immediately after fruiting, and cultivate as I directed, and at the end of the season you will find a well, thrifty, healthy vine. That is my experience.

Mr. Smith — Suppose the season should come on very dry, what is the result then?

Mr. Adams — The same result.

WHEAT CULTURE.

G. P. PEFFER, PEWAUKEE.

I promised you last year a few hints on the deterioration and fertilization of the wheat plant. The same rules apply to grain that apply to fruits, flowers or stock of any kind. I will not discuss the varieties or soils that will grow wheat, or how much can be grown per acre. Land that will grow wheat should always be plowed deep, so that drouth will not affect it, especially for spring wheat, and the surface should always be smooth and fine, so that grain can be put in even and uniform; if plowed in the fall, the surface, before planting in the spring, should be cultivated a few inches deep, and made fine with the harrow, and leveled so that no clods or deep holes are visible; if plowed in the spring, after leveling with harrow, the land should be rolled so as to make the surface compact, before the seed is sown; harrow only in May, cover the seed well but not too deep — as the wheat plant is very particular (especially in the spring), as to how deep it is covered. The sooner the kernel sprouts and gets above ground the better and stronger the plant and the thicker it will stand; to illustrate: in our younger days, we made experiments, with the depths of planting wheat; we planted the kernals of a whole head in this manner: in one of our garden beds (ground spaded twelve inches deep) 1st, kernel on the surface; 2d, one-fourth inch deep; 3d, one-half inch deep, and so on (a quarter of an inch deeper each time) until the kernels were planted — the result—the one on the surface laid nearly two weeks before it sprouted and made roots; the 2d, one fourth inch deep, and up to three-fourths came up the 4th and 5th day, while the next were later; the last one up, was fourteen days in reaching the surface, and was three and one-half inches deep; none came up after that time; on examining, I found that the three next kernels were sprouted, but rotted before they got the sprout to the surface; the kernels planted from five to seven inches deep rotted without a sign of sprouting. We had the kernels planted six inches apart in two rows. At the end of six weeks, the plants stood thus (see cut): the first had three straws quite strong; the one-fourth, 21 straws; the half inch, 17 straws, and so on; three and one-half inch, a very

weak single straw; it never got strong, although it grew a small or short head, the few kernels it contained were plump and good; the one inch had eleven straws at six weeks, but only perfected seven good heads, while the one-fourth inch perfected twenty-one good heads. The one on the surface made three good heads, the same as the one planted two inches deep. If the land can be leveled, the surface made fine, and the seeds sown so they will not be covered over, one and one-half to two inches deep, one bushel and a peck will sow one acre, and there will be a thick stand, while if two bushels are sown on an uneven surface, and cultivated and harrowed before leveling — will be thin and uneven in growth unless there is very favorable weather; certain it is, that seeds covered too deep will never come up.

To keep varieties pure and from deterioration, no other varieties should be sown with it or near it, that will be in bloom at the same time, or they will fertilize the same as corn will. If any one wants to keep a variety pure, he will have to start with a single stool, or one kernel, that is sown either earlier or later than his regular crop, that is, if in proximity, or it will be of no account; although some varieties of wheat have larger sheaths or chaff than others, and are closer together than others, yet they will mix, as the pistils or female is ready to receive pollen before the pollen is ready, from the same head or from the same flower, so that the seeds or kernels in a wheat head may be fertilized from adjoining ones in its vicinity, and if of different varieties, no two kernels will be alike, although they are grown in the same head.

Crossing and hybridizing this grain to insure success, the operator must be very precise in rubbing off the pollen as soon as they show themselves above the sheaths or capsoles that cover the charm and pistils, as seen by the plate, Nos. 1 to 4; and not only once, but every few hours, as the charms in one head don't all flower at the same time. The lower ones are first, and the top of the head is generally last, if carefully done, and the other variety that is to be used for the pollen is near, or if got from a distance, and the straw end kept in water to keep fresh, and kept in the vicinity of the head or heads thus treated, the fertilizing will be certain; but if not fertilized, there will be no kernels in the head or capsoles; the grain that is to be so treated must be alone, away from any of its genus, or must be covered with something, so that no

pollen that may be in the air will come in contact with the variety worked upon.

We worked some varieties in this way last spring: we planted two varieties (two kernels each) in a box ten by ten inches, and in flowering time set them in the green house for a few days. The varieties were white Russian (bald), and Canada club; the pollen rubbed off of the Russian; we had done nothing with the club, and only rubbed the Russian; but on examining, found quite a number of capsoles without kernels, and presume if they stood out doors where there was air stirring, they would all have been fertilized; or if I had disturbed or shaken them after they were indoors, they would all have been supplied with pollen; but being busy with other work I did not think any more about the wheat until I wanted something at the green house, when the grain was already formed, and too late. But enough of this. You all can see why wheat degenerates when sown year after year, and different varieties raised. Any farmer with a little gumption about him can keep pure seed, or can raise a new variety if he wants to, by observing the natural habit of the grain he wants to improve or keep pure, by these simple hints as before mentioned.

[I regret that I am unable to have engraved the very fine drawings presented by Mr. Peffer upon this subject, but any person desiring can see them by enquiring at the agricultural rooms in the capitol. G. E. B.]

Mr. Broughton — As the day is far spent, and this convention will soon adjourn, I desire to say a few words upon the "off" side of some questions that have been discussed. I have for some years attended these conventions, and do not know as they have been of any real benefit to me, or to the common farmer of the state. The man who raises blooded stock, and sells it for fancy prices, helps no one but himself. I think, rather, that he injures his more common neighbor. So universities and high schools are a benefit only to a *class*. My sons could not attend the State University, as they would not be able to dress or sport as do the sons of the rich. It seems to me that in this world there can be no equality; that a few will always live off from the muscle of the many. Farmers' sons have feelings, and they don't like to attend schools and universities

where they will be laughed at on account of their homespun clothes or awkward ways.

President Bascom — There is no place in the world where there is such pure democracy as in a college or university. Having been engaged as a teacher of youth for years, I think I may say truthfully, that I have never known a community of better behaved young men and women than are the students of the Wisconsin State University. A great majority of the students of colleges are the sons and daughters of farmers. And I think there are less *class* associations in a college than in any other institution in the land.

Wm. C. Kiser — I desire to add my testimonial to the general good behavior of the students of the University for two years I was the chief police officer of this county, and I never knew a better behaved set of young men than are they. I am one of those who believe that agricultural societies are one of the great educators of the peoole, and if the state would do as well by this society as it does for its other institutions, it would aid it to a much greater extent than it does. I think the state should aid this society in every way possible, and it seems to me that if the farmers in our legislature looked to their own interests, and the interests of the whole people, they would never permit this society to struggle with the debt incurred on account of the rainy weather at their last fair in Milwaukee. A country is rich and prosperous in proportion to the wealth of its farmers; and the farmer's wealth consists in the good things that are produced on his land. It is idle to say that good stock is no better than scrubs. As well say that the wooden moldboard of our fathers was the equal of the polished steel of today; that the iron steamboats of this day are no better than the ships of Columbus, or the "dug-outs" of the Aborigines; that railroads add nothing in transportation, and that the printing press is no better than the hieroglyphics of the ancients.

We must not expect the agricultural department of the University to leap at once to the front of the other departments in that great institution. The college of arts and science have been generations attaining their present positions, and while I believe the farmers have kept pace with other professions, in improvements, an agricultural department to a university is of recent growth, and we must not expect too much from it in its infancy. I know some good that has come out of it already. The two last volumes of

your transactions show it has weighed and measured, and that its experiments are not made by guess, as most of farmers' experiments are. The regents should of course, in part, be composed of men who take an interest in and have a taste for agricultural pursuits. It makes little difference whether they be active farmers or not, if they have the taste and give the time duty would require of them. I know lawyers, doctors, and ministers that are as well posted in agriculture (farming, if you choose), and take as much interest in it as the most practical farmer.

Secretary Bryant — I was glad to hear the president of the University speak as he did. If there is any one thing the farmers of this country want to disabuse their minds of, it is that their children are not as good, and smart, and pretty as city-bred children. If a young man from the country goes to town, to church, to the theater, or to the lecture, it is proper that he dress in his best, and, as near as he can, as other folks do; but if he is going to mill or to the store, let him wear his frock and overalls; in other words, dress as becomes his vocation. Mothers in the country are prone to inculcate false pride in their sons by this fixing up for town. A young man can be a gentleman as well in his work as in his Sunday clothes, and his city friends are as pleased to see him, and take as much real comfort in visiting with him with his load of grain as they do in his carriage. Neatness everywhere is to be commended, but false pride is wrong, and ought not to be encouraged. It is brains, and not clothes or rich parents, that win class respect and position in universities and colleges.

Mr. Adams —So far as the University itself is concerned, it needs no commendation at my hands after what the president has stated in your hearing. I can corroborate the statement that he makes, so far as the general deportment and conduct of the students of the University are concerned. Living in close proximity to the University grounds, I have an opportunity of observing the deportment of these young people, and I say that it has been correct. I had, in former years, some knowledge of other institutions. I was connected with one in this state, and I never saw a body of students that, as a whole, conducted themselves with such propriety as do the students of the University of Wisconsin; students who frequent our institutions of learning, as a rule, are drawn from the ranks of those whose circumstances are moderate; many are poor,

and work their way through and obtain an education by their own exertions, and it is true that a large number of the students of the University of Wisconsin have to exercise the closest economy to get along. The majority of the students of the University board in clubs to save expense. Our children, as they grow up, scatter into the various occupations of life according to their tastes, dispositions and circumstances. We may talk about educating farmers and doctors and lawyers, but after all there is a great deal to be said about those whose occupations are not in accordance with their inclinations. The best we can do is to give them all the advantage that we can, and I tell you that our sons and daughters do need intellectual culture, and they can obtain it in these high institutions of learning, and if we can possibly give them those advantages, whether they enter an agricultural department or not, I think it will be a benefit to them to have those opportunities. Mental culture will give us a power over men, and an influence. I want this idea advanced by my friend here to be dissipated in the mind of every one present.

Mr. Field — I don't think it needed dissipation.

Mr. Smith — I think the farmers themselves are more to blame than all the colleges and all the schools. I have heard farmers say all my life that their business was the poorest paying business on God's earth. I don't believe in any such doctrine. If some persons went into any other kind of business than farming and didn't display any more intellectual education or ability than they do in farming, they would fail worse than they do in farming. There is no doubt of it at all. They get into a rut and there they stay, and you cannot get them out. They teach their children that farming is a miserable business, and want them to do something else, and it is no wonder that they get such ideas. My wife and I have seven boys. We have made it the pride of our life to bring them up in the path of rectitude, and to think that farming was an honorable vocation.

Mr. Plumb — We have some further business to do, and perhaps gentlemen would like to hear some further papers read.

Mr. Smith — I think that we have pretty well exhausted all the subjects contained in the programme for to-day, and as the hour is growing late, I think we had better adjourn. There will be a meeting of the Horticultural Society to-night, and as this conven-

tion is now about to close, I would state that we shall be happy to meet any of you gentlemen of the convention in the Agricultural Rooms at 7 o'clock, when a paper on Ornamental Fruit Trees, by Mr. Bryant, will be presented for your consideration.

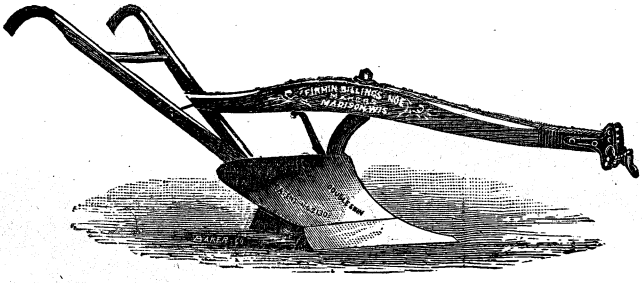
Mr. Greenman — I offer the following resolution:

Resolved, That the thanks of the convention be tendered to the Hon. Senators and Assemblymen for the use of their chambers.

Resolved, That the thanks of this convention be tendered to the different railroad companies for their courtesy in granting reduced rates of fare to those in attendance.

Unanimously adopted.

The Convention then adjourned.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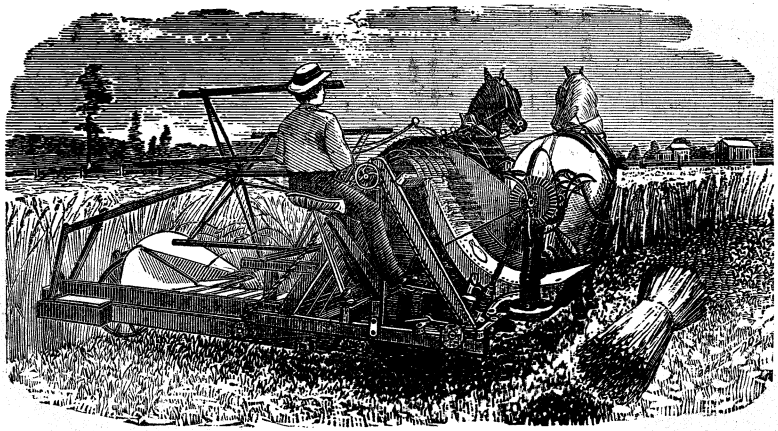
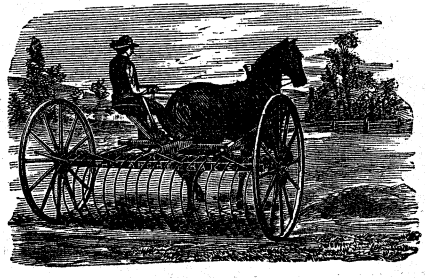
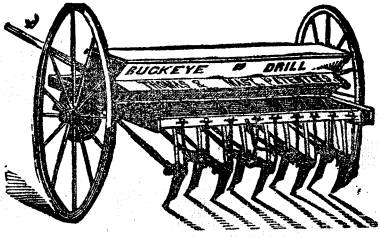


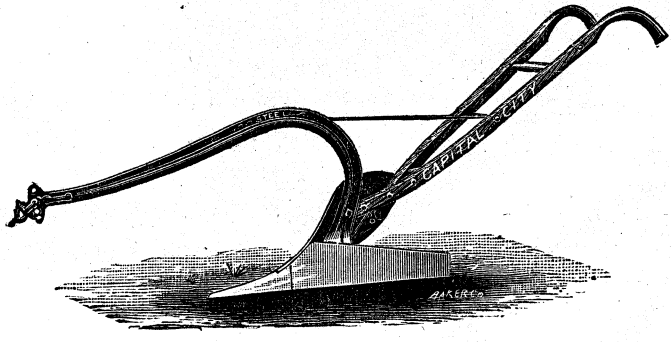
ABSTRACT OF COUNTY AGRICULTURAL SOCIETIES FOR 1877.

COUNTIES.	OFFICERS OF THE SOCIETY.			PLACE AND DATE OF FAIR.		FINANCES.			
	Presidents.	Secretaries.	Treasurers.	Place.	Time.	Receipts.	Expenses.	Premiums.	Am't in Tres'y
Adams	W. W. Burhilt	W. R. Newton	A. F. Hill	Friendship	Sep. 26–27	$208 00	$43 17	$150 57	$57 43
Baraboo Valley	P. Lake	A. F. Lawton	A. P. Ellinwo'd	Reedsburg	Oct. 10–12	942 75	455 00	497 75	.....
Barron	W. W. Flinn	Fred Telke	E. C. Colman.	Barron	Sep. 25	103 75	26 45	23 00	54 30
B's'bl Ag. & D. P. A	G. F. Hildeb'nd	T. J. Brooks	T. Bromley	Boscobel	Sep. 26–28	4,641 89	2,711 98	1,200 00	729 91
Buffalo	F. Gilman	J. W. DeGroff	H. Wealty	Alma	Sep. 19–21	879 40	335 05	673 00	244 52
Clark	J. S. Dore	J. F. King	J. F. Cannon	Neillsville	Sep. 18–20	944 23	385 48	455 75	3 19
Crawford	G. Stuart	F. Mills	T. W. Briggs	Pr. du Chien	Sep. 18–20	654 40	274 85	275 25	.....
Columbia	F. C. Curtis	E. S. Baker	J. L. Adams	Portage	Sep. 18–20	3,278 84	2,612 34	666 50	.....
Columbus	J. Foster	C. L. Dering	M. Adams	Columbus	Oct. 3– 6	1,730 55	563 73	1,166 82	.....
Central Wisconsin	J. Stone	F. F. Brook	J. Solick	Watertown	Sep. 24–28	7,099 45	769 00	2,578 40	.....
Dane	M. H. Anders'n	G. C. Russell	W. T. M'Con'l.	Madison	Sep. 25–28	3,622 24	1,620 27	2,000 45	19 14
Door	B. M. Wright	H. T. Scudder	C. A. Masse	Sturgeon Bay	Sep. 21–22	200 00	34 77	168 50	.....
Dodge	S. Eastman	W. T. Rambush	.....	Juneau	Sep. 18–20	1,019 05	324 62	689 11	5 30
Eau Claire	G. E. Porter	H. M. Stocking	C. Backman	Eau Claire	Sep. 18–20	2,833 49	1,237 74	1,193 80	401 95
Fond du Lac	C. Hazen	Dana Lamb	D. R. Curran	Fond du Lac	Sep. 18–20	2,439 84	977 59	1,451 26	11 00
Grant	H. A. Moore	T. F. Baldwin	J. Reed	Lancaster	Sep. 12–14	1,237 10	455 89	781 21	.....
Green	W. S. Wescott	A. S. Douglass	S. W. Abbott	Monroe	Sep. 5– 8	2,438 84	924 58	1,461 00	53 26
Iowa	J. Elwood	I. I. Haskins	S. Haskins	Dodgeville	Sep. 25–27	2,035 56	1,105 38	1,106 00	313 69
Juneau	H. E. McComb	F. S. Veeder	M. Temple	Mauston	Sep. 19–21	733 10	212 02	436 00	85 64
Jefferson	W. Green	D. W. Curtis	S. Brown	Jefferson	Sep. 18–21	3,748 78	2,362 78	1,386 00	83 72
Jackson	J. K. Harswill	J. Parsons	W. T. Price	B. R. Falls	Sep. 20–22	975 57	183 75	559 75	201 67
Kewaunee	.....	J. A. Whittaker	W. Seide	Kewaunee	Sep. 20–22	282 13	178 44	54 50	44 55
Kenosha	F. Robinson	H. H. Tarbell	W. S. Maxwell.	Kenosha	Sep. 17–19	1,948 81	604 94	1,256 00	87 87
Lodi Union	J. A Eaton	E. W. Gardner.	J. Caldwell	Lodi	Oct. 2– 5	941 55	321 41	582 00	51 74

La Crosse	J. W. Losey	W. I. Dudley	F. W. Stiles	La Crosse	Sep. 25-27	1,139 75	349 30	634 74	362 78
La Fayette	N. T. Parkins'n	D. S. Rose	D. Schreder	Darlington	Sep. 12-14	1,993 94	781 83	993 90	.....
Manitowoc	Wm. Curey	F. O. Halleran	R. Arrmals	Clark Mills	Oct. 1- 3	650 00	220 76	555 60	.....
Marathon	B. Ringle	H. Miller	J. Kulber	Wausau	Sep. 19-20	342 40	332 49	445 13	72
Monroe	C. E. Hanchett	W. S. Blyton	T. B. Tyler	Sparta	Sep. 18-20	103 22	313 59	182 20	281 17
Marquette	W. O'Neal	S. A. Read	.....	Montello	Sep. 26-27	181 05	308 30	127 25	.....
Oconto	W.G. Donalds'n	M. Finnegan	C. S. McKenzie	Oconto	Oct. 2- 4	332 44	368 85	59 75	23 34
Outagamie	J. H. Carvet	J. C. Harrison	R. H. Randall	Appleton	Sep. 18-20	292 13	462 00	273 00	.....
Ozaukee	A. M. Alling	C. Wilke	Wm. Bryant	Saukville	Sep. 26-27	127 67	504 85	337 75	99 43
Portage	W. V. Fleming	A. J. Smith	Wm. Losing	Amherst	Sep. 19-21	123 60	508 60	385 00	.....
Pierce	J. S. Copley	D. J. Dill	G. M. Teuchant	Prescott	Sep. 27-28	200 11	418 05	241 50	62 08
Richland	F. M. Thomas	W. M. Fogo	D. L. Downs	Richland Cen	Sep. 19-21	620 49	1,230 10	693 18	15 55
Racine	T. G. Fish	E. D. Perkins	W. E. Chipman	Burlington	Sep. 5- 7	3,099 08	1,239 78	2,029 00	320 29
Ripon	C. F. Hammond	H. W. Wolcott	C. F. Wheeler	Ripon	Sep. 7-10	673 38	1,466 26	890 00	.....
South. Wis	W. M. Benson	M. S. Kinsman	G. A. Hanston	Beloit	Sep. 3- 6	1,137 75	2,584 00	1,446 25	124 46
Sheboygan, Ger	C. Wipperman	F. S. Wesser	Carl Ruder	Sheboygan	Sep. 25-27	.....	11 10	356 91	.....
Sauk	C. H. Williams	G. A. Pabodie	J. M. Highland	Baraboo	Sep. 26-28	281 32	790 25	509 40	.....
South W. Wis	J. H. Vivian	T. S. Ansley	T. Priestly	Mineral Pt.	Sep. 4- 7	4,237 55	1,526 27	2,457 50	169 78
Shawano	D. Noble	H. M. Loomer	S. Wiley	Shawano	Sep. 18-20	339 26	.....	199 50	.....
St. Croix	S. W. Turner	R. R. Young	A. D. Richard'n	N. Richmond	Sep. 25-27	1,157 80	.....	719 60	.....
Sheboygan	J. F. Moore	B. Sanford	J. D. Parish	Sheboygan F.	Sep. 19-21	859 35	.....	431 00	96
Trempealeau	A. R. Arnold	R. A. Odell	A. H. Kneeland	Galesville	Sep. 18-20	805 22	.....	321 90	137 82
Vernon	P. McIntyre	W. F. Perham	E. Powell	Viroqua	Sep. 19-21	636 40	297 84	785 25	57 31
Wood	G. F. Witter	A. A. Brundage	S. Reeves	Gr. Rapids	Oct. 5-14	1,050 07	.....	228 56	3 60
Waukesha	John Porter	G. C. Pratt	M. S. Hodgam	Waukesha	Sep. 4- 7	1,564 42	.....	969 60	30 18
Washington	L. F. Frisby	John Pick	C. H. Meke	West Bend	Oct. 2- 4	1,344 94	.....	638 75	65 91
Waushara	N. P. Bird	W. S. Monroe	S. M. Olds	Wautoma	Sep. 25-	958 39	677 64	280 75	.....
Waupaca	J. M. Baxter	Wm. Woods	L. L. Post	Weyauwego	Sep. 27-29	633 00	490 64	226 50	31 90
Walworth	A. Foster	S. G. West	H. Latham	Elkhorn	Sep. 25-28	5,567 62	2,734 70	2,368 25	460 97




BUCKEYE DRILL


CAPITAL

PRACTICAL PAPERS.

REPORT OF THE BOARD OF VISITORS TO THE UNIVERSITY OF WISCONSIN.

The undersigned, members of the board of visitors to attend the annual examination of the University classes, respectfully submit the following report:

The University has fortunately outlived, to a great extent, the prejudices and hostility with which it had to contend during the early part of its history. For some years past, it has been rapidly gaining the confidence of the people of the state, as is shown by the more generous policy pursued with reference to it by their representatives, and by the increasing number of students who are availing themselves of the opportunities it offers for enlarged through courses of study. From such observations as we have been able to make during the recent examinations, we do not hesitate to affirm that this confidence is well merited. The high reputation of its faculty, as a corps of accomplished and zealous teachers, who keep in full rapport with the latest developments of learning and science, and the largely extended educational facilities, which, by the wise liberality of the state government, have of late been given it, in the form of natural science collections, apparatus, and increased room for laboratories, work shops and cabinets. make it an institution in which the state may feel a just pride, and which presents great advantages for students who desire to pursue a thorough course of training and study. The more and better it becomes known, the more highly, we feel assured, will it be appreciated. Such at least is the impression we carry away after having attended the examinations and the commencement exercises.

In regard to the examinations, we think it proper, at the outset, to express our sense of the manifiest fairness with which they were conducted. There was evidently no pre-arrangement by which the student was enabled to prepare in advance for certain questions, or

for examination upon some special chapter or division of a text-book. He was expected to have a general knowledge of the subject under consideration, and to answer, not by an exercise of verbal memory, reproducing the language of the text-book, but as one who had mastered it, and was, consequently, able to develop clearly, in his own language, the points upon which he was questioned. There were, of course, some instances of failure by students to meet the requirements of such an examination, in part obviously arising from temporary embarrassment, and, in other cases, the consequence, doubtless, of having imperfectly assimilated the instruction they had received.

It was our aim to observe whether the students had been trained to think or to repeat; whether they had been storing up principles or rules; whether they had been mastering systems or particulars, and it gives us pleasure to report the very high character of training indicated by what we saw of the examination in the several classes. Nothing was done, it would appear, with a view to effect and show, but the purpose kept in view seemed to be to give, as far as was possible within the necessarily narrow limits of the examination, a fair indication of the acquirements of the students. The character of the training to which the students had been subjected appeared to be in conformity with the most modern and approved methods. Upon one or two points we may venture a word of criticism. In some cases the pedagogic maxim that "the *maximum* of talk on the part of the pupil, and the *minimum* of talk on the part of the teacher, is the perfection of a recitation," was violated. The active, trained mind of the teacher seemed intolerant of the slower action of the mind of the pupil, and to prevent the gaps in the recitation from becoming too great and too frequent the teacher hastened, as we thought, prematurely, to his aid. In a few instances, also, leading questions were put, or a hesitating pupil was jostled and pushed hither and thither, by a rapid succession of questions, until he suddenly found himself on the right ground, though apparently not having a very clear conception of the route which led to it. Such instance, however, were the exception and not the rule, and due rather to a not unnatural impatience than to design.

In this place, we would suggest whether it would not be practicable to adopt some system of vocal training in the University, by

which students would gradually acquire the habit of a clear and distinct utterance, while attaining a certain quality of culture in the tones of the voice. We do not venture this suggestion on account of any noticeable deficiency, in these respects, on the part of the students of the University as compared with the students of other similar institutions, but because it must be admitted that, as a people, whether owing to some climatic or physical cause, or to transmitted habit, we are inclined to nasal drawling, clipping syllables, and flattening our vowels. These are peculiarities not deserving to be cherished as national characteristics, and which may be modified and gradually eradicated, if those who have the education of the people in their charge can be brought to feel that such a result is of sufficient importance to justify the labor which would be necessary in order to attain it.

The limits of this report, as well as the circumstance that it was impossible for the members of the board of visitors to attend the examinations of all the classes, or all the examinations of any one class, will preclude us from attempting a notice in detail of the several classes. We think it proper, however, to state that nowhere in the University were the results of earnest and critical study more apparent than in the classical department. Clearness of perception and accuracy of expression were noticeable in the examinations of the classes in Latin and Greek. In both, we observed a cheerful earnestness on the part of the students, betokening a thorough interest in the work, and showing that the study of these noble languages has lost none of its old power to quicken the intellect, and enkindle an appreciation of whatever is best in human culture.

The examinations, in the scientific department, gave evidence of careful training, and the method of conducting the examinations merits approval. This was particulary noticeable in the classes in physics, zoölogy, chemistry, applied mechanics, and mathematics. We are aware that the exact character of the studies taught in this department leave but little room for the student to exercise freedom in answering the questions, and his proficiency or ignorance of the subject must be quickly apparent. Nevertheless the examinations indicated that the student was thrown wholly on his own resources, and thus gave a good opportunity of determining the proficiency of each.

We have only words of praise to bestow on those who have labored for the erection of Science Hall. It is a building in every way well adapted to the purposes for which it is intended. Substantial and excellent throughout, we cannot but congratulate the Board of Regents upon having secured the construction of an edifice of such size, and so solidly and thoroughly well built, as it seems to be, at so small an expenditure of money. It must be borne in mind, however, that the building alone cannot accomplish the ends which its erection was designed to promote. In order to attain the results sought for, the professors in each department must have proper apparatus to work with, and this apparatus is so essential to the attainment of the best results that it ought not to be obtained from time to time; it should be procured at once. Some of the apparatus now on hand in the department of physics cannot be made available until additional apparatus is secured. This assertion applied especially in reference to a spectroscope, an instrument of undoubted utility, and each day becoming more useful in the arts and sciences. It cannot however, be made available for class illustration without the use of a heliostat. Again, in the study of the composition of crystals, a highly important branch, the polariscope is absolutely essential. As there is now but one such instrument in the University, it is, of course, impossible for each student to familarize himself with the subject under these circumstances. Now a cheap form of polariscope is manufactured for class use, and it would seem advisable that a number of these instruments should be obtained. It is a well understood fact that instruction "imparted through the eye" is a most important method. In nearly all the departments of science, a good lantern is essential. The lantern on hand has many good features, its principal defect being the small size of the condensing lens. It is doubtful whether lenses of the proper sizes can be found already manufactured, and, in any event, a superior lens can be obtained only by having it made to order.

The electric apparatus is sadly deficient in many essentials. For example, the electric light cannot be used without a regulator, and the battery power cannot be properly utilized for want of it. The battery in use is by no means what it should be. An institution designed to afford instruction in all the important facts concerning electricity should have one of M. Gramme's magnetic electric ma-

chines, which can always be relied upon, and replaces the troublesome, and always dirty, Grove's battery.

There should also be procured a standard galvanometer, a quadrant electrometer, and such other instruments as are absolutely requisite to equip a good physical laboratory — such a one as students can work in, and practically familiarize themselves with the essential details in heat, light, electricity and chemistry, which they cannot fully do with the apparatus now on hand.

With the addition above suggested, the department of Physics, in Science Hall, will be as well equipped as that of any other institution in the country, and we must be satisfied with nothing else.

The departure of Chemistry and Zoölogy require more apparatus and material to equip them thoroughly, and now that the new building is ready to receive them, it would seem to be an appropriate time to supply the defieiencies and make it what it should be.

We were much interested in inspecting the magnetic observatory constructed by the University, but supplied with instruments and superintended by the United States Coast Survey Bureau. As it is the only observatory of the kind in the United States, it cannot but add to the attractions of the University as a scientific center,

It is now several years since the experiment of the coeducation of the sexes was begun in the University. In respects to the proficiency shown by the young women in the several classes during the recent examinations, as compared with the young men, our impressions coincide with former boards of visitors. They sustained the test at least as creditably as the young men, and if there was a difference, we are inclined to think it was in favor of the young women. In the main, they excelled in the precision and promptitude with which they responded to questions. We were, however, deeply impressed with the appearance of ill-health which most of them presented. It would not seem probable that, by mere coincidence, so many young women should be congregated together offering this peculiarity. There are a few notable exceptions, but as a whole, this appearance is unmistakable, and has given rise to considerable comment among the members of the board. There can be nothing about the hygienic condition of the University, in any of its parts, which would give rise to ill-health. Every part examined presented an appearance of cleanness; the food in the Ladies Hall was wholesome and well prepared; the service rooms

clean; the dormitories well lighted and aired, and of sufficient capacity. We are, therefore, compelled to look elsewhere for the cause.

Every physiologist is well aware that, at stated times, nature makes a great demand upon the energies of early womanhood, and that at these times great caution must be exercised lest injury be done — an injury which, it is well known, may prove permanent. In order to keep place in the University classes, where the sexes are educated together, no account is taken of the fact that the woman labors under a double disadvantage, as compared with the man. 1st, in the circumstance that nature compels compliance with its well established laws, and, as above stated, makes demands upon her energies; and, 2d, that to keep her class standing, the girl must devote more energy, and consequently, work harder, to accomplish her task, making drafts upon her system, which, by the very nature of the case, is already taxed to meet the physiological demands made upon it. It is also well known that over work in whatever way induced, at the times indicated, will produce deterioration of the system, which generally manifests itself by bloodlessness, followed by a train of evils which it is not necessary here to enumerate. It is this very condition of bloodlessness which is so noticeable in the women of the University at this time; the sallow features, the pearly whiteness of the eye, the lack of color, the want of physical development in the majority, and an absolute expression of anæmia in very many of the women students, all indicate that demands are made upon them which they cannot meet.

Education is greatly to be desired, but it is better that the future matrons of the state should be without a University training than that it should be procured at the fearful expense of ruined health; better that the future mothers of the state should be robust, hearty, healthy women, than that, by over study, they entail upon their descendants the germs of disease. And there is no more certain law than that of heredity. The overwrought nervous system undermines the general health stealthily, but certainly, and its evil consequences are prolonged in many cases through llfe.

We are aware that the law organizing the university provides that it shall be open for the education of men and women. It is not therefore necessary that both classes of students be subjected to the same systematic course of training, mental drill being at

tained in a variety of ways, each leading to adequate results; and the thought impressed itself upon some of the members of the Board that the curriculum could be so ordered that both sexes might obtain university drill — adjusted in such a manner that each sex should be enabled to secure that form of education best fitted for his or her respective sphere — and that the system of compelling men and women to fare alike might be so modified as to preclude the possibility of causing disease. We are forced to the conviction that there is, at present, a marked disparity between the health of the men and women of the university, and that, as a class, the women present undoubted evidences of physical deterioration. If the Board of Regents, however, consider it expedient to alter the curriculum in any way, we would earnestly recommend that particular attention be paid to the physical well being of the female students.

In the Department of Military Science, the visitors observed with regret that there seemed to be a want of interest in the exercises on the part of the students who participated in them. To whatever cause this is due, an attempt should be made to correct the defect. Omitting all consideration of the benefits which might accrue, in the contiugency of war, from a more general and hearty participation in the drill exercises, the immediate results of such a course upon the students, as an excellent system of gymnastics, giving vigor to the body, firmness and manliness of bearing and grace of movement are of very high importance. An earnest effort ought, in our judgment, to be made to arouse a warmer interest in this department than appears to exist at present.

The examination of the law class embraced a wide range of topics, and was of a very satisfactory character. It gave evidence that the young men composing it have been under the care of competent instructors, and that, in addition to the oral teaching they have received in the form of lectures, they have profited by diligent study of the text-books.

In general, the impressions received respecting the discipline which prevails in the university were favorable. The orderly movements of the students, in the several buildings and on the grounds, and their conduct while entering or leaving the class rooms, left little scope for criticism. In the classes, during recitations, there were some instances of a lack of attention, and of a

strict observance of the proprieties of the occasion, such as one student communicating with another or abruptly changing his place, which suggested that there was still room for improvement in the matter of deportment. As a rule, however, the conduct of the students was considerate and courteous, indicating a high regard as well as respect for their instructors.

The experimental farm, under the supervision of the agricultural department, presents a variety of soils, surfaces and exposures, which admirably adapt it to the purpose for which it is devoted. Many important experiments are conducted upon it, the results of which, if properly utilized, must be of great value. Thus far, however, they have attracted less attention than they merit. This is probably due to the fact that their publication has been mainly confined to an insertion among the documents accompanying the annual report of the Board of Regents of the University, a place where they are not likely to attract the attention of any considerable number of those who are most directly concerned in agriculture. If the results of such experiments could be communicated, in a popular form, from time to time, as they are concluded, to agricultural journals having a large circulation in the state, or to leading newspapers, they would be more effectively brought to the notice of the class of persons most directly intesested in them, to the advantage both of the farmers and of the university.

A serious inconvenience is felt at present from the lack of a hall or chamber, sufficiently large to accommodate the whole body of students when assembled. It is often necessary to address all the students together, and, in institutions where the opportunity exists, such meetings are of frequent occurrence for purposes of instructiou, advice, etc. It would, therefore, seem to be eminently proper that this deficiency should be supplied as speedily as possible. The rooms now used for the library are altogether too small, and the books cannot be properly arranged. The books are increasing, from year to year, and the demand for more room will shortly make it necessary to provide a place for them elsewhere than in the narrow quarters now afforded in the main building. We would accordingly suggest that steps be taken to secure the construction at a early day, of a suitable building for the library, and arrange the plan so that a general assembly chamber may form a feature of it.

We would further suggest whether it would not be well to desig-

nate the members of the board of visitors as is now done in the case of the visitors of the normal schools, at the beginning of the academic year, and authorize them to visit the university and attend the recitations of classes, whenever it might suit their individual convenience, in addition to attending the examination at the close of the year. Doubtless, competent persons, interested in the educational progress of the state, and whose business or inclinations bring them from time to time to the capital, might be found, who would perform such duties without additional expense to the university. Were such a course adopted, it would enable boards of visitors to obtain a much greater familiarity with the methods and condition of the university, its efficiency and its needs, than is practicable under the existing system, and to submit recommendations and criticisms with greater confidence than they are able to feel at present.

In concluding our report, we desire to express our warm appreciation of the many courtesies and attentions which we have received from the board of regents, and from the president and faculty of the university, while engaged in the discharge of our duties.

MOSES LANE,
GEORGE W. EASTMAN,
W. H. BORDEN,
HORACE RUBLEE,
HENRY JANE,
D. G. HOOKER,
WALTER KEMPSTER,
O. R. SMITH.

UNIVERSITY COLLEGES.

BY JOHN BASCOM, D.D., LL.D.
President of the University of Wisconsin.

The period covered by this report is the fiscal year closing September 30, 1877. The instruction of the year has proceed in each of its branches without interruption, and has, we believe, been successful in its leading aims. Some secondary changes have been made in the courses, designed to make each a little more distinct-

ive, and especially to give the scientific students an opportunity for extended practical work. In connection with these changes, we hope also to be able to give students in each course more freedom of selection and substitution from other courses. While we value highly well-defined and harmonized courses of study, it is also our desire to give large liberty to individual predilections. Science Hall now affords abundant opportunities for all forms of practical work, and a corresponding freedom of choice is called for to enable us to avail ourselves fully of them.

The number of students during the past year was reduced by higher conditions of admission and their more strict application. This we anticipated. The present year opens with an increase of seventy-two, and we believe also with better conditions of scholarship than have ever before been attained by us. The spirit of the students, as shown by their attention to their work and by their general behavior, has been every way commendable. This fact has made the past year a very pleasant one to the Faculty.

The proportion of young women to young men in the classes of the university year now opening is a little less than one-fourth. They easily maintain their rank in scholarship with the young men, and constitute an entirely satisfactory portion of our students.

In the entrances of the present fall, an unusual number of high schools are represented, and we have most pleasant evidence of increasingly good work in these intermediate and most valuable portions of our school system. We trust that many of them will soon appear on our accredited list. Very sure we are, that good preparatory work for the University will greatly aid the high schools in their larger and more direct service to the communities in which they are situated. We would appeal to facts on this question. It will be found, we believe, that the most vigorous high schools, as a rule, are those which feel the influence of higher institutions.

The Magnetic Observatory has been finished during the past year, and very complete observations are now taken in it. It is, in its appliances, a scientific curiosity. Science Hall is also in full occupation, and we are daily more and more gratified by its resourses, and the possibilities of growth which it offers. Our present apparatus enables us to commence our work to advantage, while there are constant suggestions of new wants and enlarged instruction. The present material for our Mineralogical, Geologi-

cal and Zoological Museums is sufficient to furnish the basis of a fine collection; yet their is room left for the work of many years.

Ex-Gov. C. C. Washburn has expressed his purpose to erect and thoroughly furnish an Astronomical Observatory during the coming year. This very liberal gift, for which Mr. Washburn has our most hearty thanks, will meet another urgent want; will help to give the University a higher standing among kindred institutions, and, in due time, we trust, an interest in the scientific world. We hope that this liberality, so commendable in itself, will prove contagious, and that many of our citizens will, in a like way, identify themselves with the progress of higher education in the state.

One great want, which we will once more mention without repeating its reasons, is an Assembly Hall and Library. These can be united to advantage in one building, and when secured in good form, will advance the University on its literary side as much as Science Hall has already advanced it scientifically. The body of our students can not be reached in discussions and lectures on the broad range of subjects open to us, till we have a room that can contain them all; nor can they otherwise, in their own exercises, exert over each other the influence they ought. In consultation and study, an open, well furnished library is a first condition of earnest inquiry and a quickened literary taste. We are impatient for these most needful things, and would gladily accept the economy in other directions which is necessary for their early attainment.

Our thanks are due to the Board of Visitors that they did not allow their critical function to suffer by disuse. Nor, perhaps, are criticisms to be regarded as less valuable, because they are not altogether palatable. It is not to be expected that we should clearly see or freely acknowledge all our faults. We are in this condition in reference to a portion of the criticisms of the Board. The students had been during the past year unusually attentive to military drill, and cheerful in it. This spirit we have striven personally to encourage, and were hoping that their efforts, in an exercise ordinarily so irksome, would win recognition. In this we were destined to disappointment. Doubtless our drill is not like that of professionals, but it should be remembered that we contend with great difficulties in this enforced military training.

One thing we profoundly regretted in the report of the Board of Visitors, and that was the opinion expressed by them as to the health

of the young women. There were some passing appearances, arising from the excessive studiousness of a few not naturally strong, that gave the criticism a color of truth, and were, doubtless, the grounds of the conviction in the minds of the committee. These reasons, however, were very partial and by no means sufficient for the broad conclusions drawn from them; conclusions arising from exceedingly limited observation, and which did not command the assent of all the committee. We regret these opinions because they tend to open a controversy just closed, and to compel us to travel a second time over ground already painfully trodden, and this with the prospect of no other or better issue than that already reached. To be pushed back into the water, when we have just reached shore, is trying,

The Faculty, most of whom were in the outset opposed to co-education, and who have had years of observation both as to its relation to education and to the health of young women, pronounce earnestly and unanimously in favor of the maintenance of our present method.

Contrary to the opinion of the visitors, the young women do their work with less, rather than with greater labor than the young men, and certainly do uot fall below them in any respect as scholars. We also believe this labor to be done by them with perfect safety to health, nay, with advantage to health if ordinary prudence is exercised. The young women, whose health was primarily the ground of criticism, have improved in strength, rather than deteriorated, since they have been with us, though they have burdened themselves with extra work which we do not counsel.

We confess to some surprise that so many of the medical profession bring forward for the first time in connection with co-education, a function familiar from the dawn of human life as if it had the force of a fresh discovery in putting down this form of progress, when, in fact, it has no more to do with co-education than with separate education, can as well be provided for in the one form of instruction as in the other, and bears with ten-fold force against the labors of women as operatives, clerks, teachers, housekeepers, in which callings continuous hard work has been allowed to pass utterly unchallenged.

Through my conviction has been, previons to this report, that the health of the young women as a whole was better than that of the young men, and that there were striking instances of graduation

among the young women with robust strength, I am striving to test this opinion by facts, so far with the following results. All excuses for ill health are given by me. The exact number of students in our collegiate and dependent courses is 357. Of this number, 93 are young women, a trifle more than one-quarter. During the past eight weeks, the most trying weeks in the year for students, there have been 155 days of absence from ill health on the part of young men, and 18 on the part of young women. The young women should have lost, according to their nnmbers, 54 days, or three times as many as they have actually lost. The students were not aware that any such registration was being made. It may be felt that the young men are less conscientious in pleading ill health than the young women, and this is doubtless true; but I sharply question a young man, and rarely ask any questions of a young woman. I explain the facts in this way. The young men are not accustomed to confinement, and though sun-browned and apparently robust, they do not endure the violent transition as well as women. Study is more congenial to the habits of young women, and the visiting committee are certainly mistaken in supposing that they have to work harder in accomplishing their tasks. The reverse is true. In addition to the above bill of ill health against the young men, a corresponding large number of them has been compelled, from the same causc, to leave the University altogether.

A second showing of the registration, which I had not contemplated, but one very interesting, is this; the absences of the young women are almost exclusively in the lower classes. Of the eighteen, two are in the Sub-Freshmen, fourteen in the Freshmen, one in the Sophomore, one in the Junior and none in the Senior. The absences of the young men are evenly distributed, on the other hand, through the entire course. The young women do not then seem to deterioate with us in health, but quite the opposite. I do not belong to the number of those who set lightly by health. I would not sacrifice any measure of it for scholarship; but it has long seemed to me plain, that a young women who withdraws herself from society and gives herself judiciously to a college course, is far better circumstanced in reference to health than the great majority of her sex.

I repeat my thanks to the visiting committee for their labors, and have no doubt that even the mistakes which such Boards may in-

advertently make, will ultimately be productive of more knowledge and more sefety.

EXPERIMENTAL FARM.

BY W. W. DANIELLS, M. S.
Professor of Agriculture and Chemistry in the University of Wisconsin.

Report of experiments conducted upon the University Experimental Farm for the year ending September 30, 1877, *together with a summary of meteorological observations taken under my charge at the University, for the year ending October* 31, 1877.

WINTER WHEAT.

The following varieties were sown September 21, 1876, one-half measured bushel of seed per acre being used. Soil, a clay loam upon which wheat had been raised the previous year. Twelve loads of well rotted stable manure were put upon each acre before plowing.

Fultz — Weight of seed per bushel, 60 lbs; harvested July 11, 1877. Weight of straw and grain per acre, 6,616 lbs. Weight of grain, 2,846 lbs. Weight per measured bushel, 63¾ lbs. Yield per acre, 47.4 bushels. Percentage of grain to weight of straw and grain, 43.

This variety was first sown in 1872, when it yielded 33 bushels per acre; in 1873, the yield was 20 bushels per acre; in 1874, 35 bushels; in 1875, 17.5 bushels; in 1876, it winter-killed. The mean yield for the six years we have raised it, is 25.4 bushels.

Prussian —Weight of seed per bushel, 56½ lbs. Harvested July 17th. Weight of straw and grain per acre, 5,798 lbs. Weight of grain, 2,001 lbs. Weight per measured bushel, 59 lbs. Yield per acre, 33.3 bushels. Percentage of grain to weight of straw and grain, 33. This variety was slightly injured by the winter.

Diehl —Was entirely killed by the winter.

Clawson —Weight of seed per measured bushel, 56½ lbs. Harvested July 14th. Weight of straw and grain per acre, 5,850 lbs.

Weight of grain, 2,567 lbs. Yield per acre, 42.6 bushels. Percentage of grain to weight of straw and grain, 43.8.

WHITE WINTER RYE.

Sown September 28, 1876. Weight of seed per bushel, 56 lbs. Harvested July 12th. Weight of straw and grain per acre, 6,097 lbs. Weight of grain, 2,280 lbs. Yield per acre, 40.7 bushels. Weight of grain per measured bushel, 58½ lbs. Percentage of grain to weight of straw and grain, 37.3.

This appears to be a superior variety of rye. It has a large, plump, white kernel, and yields well.

SPRING WHEAT.

The following varieties were sown with 1½ measured bushels of seed per acre. Soil, a light clay loam. Cereals had for several years previous been raised upon the field. Twelve loads of well rotted stable manure were spread upon each acre before plowing. The land was fall plowed, and cultivated in the spring before sowing. The seed was sown broad cast by hand.

Red Mammoth Spring — Sown April 17th. Weight of seed per measured bushel, 52 lbs. Harvested July 28th and 31st. Weight of straw and grain per acre, 5,796 lbs. Weight of grain, 1,684 lbs. Yield per acre, 28 bushels. Weight of one bushel, 59 lbs. Percentage of grain to weight of straw and grain, 29.

White Michigan — Sown April 17th. Weight of seed per measured bushel, 56½ lbs. Harvested July 26th. Weight of straw and grain per acre, 5,776 lbs. Weight of grain, 1,720 lbs. Weight of one measured bushel, 58 lbs. Yield per acre, 28.6 bushels. Percentage of grain to weight of straw and grain, 29.8.

Oran — Sown April 17th. Weight of seed per measured bushel, 56½ lbs. Harvested July 26th. Weight of straw and grain per acre, 5,236 lbs. Weight of grain, 1,262 lbs. Weight of one measured bushel, 56½ lbs. Yield per acre, 21 bushels. Percentage of grain to weight of straw and grain, 24.

Odessa—Sown April 21st. Weight of seed per measured bushel, 54 lbs. Harvested July 31st. Weight of straw and grain per acre, 6,116 lbs. Weight of grain, 1,912 lbs. Yield per acre, 31.8 bushels.

Weight of one measured bushel, 61¼ lbs. Percentage of grain to weight of straw and grain, 31.

German Fife — Sown April 21st. Weight of seed per measured bushel, 54 lbs. Harvested August 2d. Weight of straw and grain per acre, 4,696 lbs. Weight of grain, 1,250 lbs. Weight of one measured bushel, 54½ lbs. Yield per acre, 20.8 bushels. Percentage of grain to weight of straw and grain, 26.6.

April — Sown April 21st. Weight of seed per measured bushel, 55 lbs. Harvested August 1st. Weight of straw and grain per acre, 5,724 lbs. Weight of grain, 1,448 lbs. Weight of one measured bushel, 53 lbs. Yield per acre, 24 bushels. Percentage of grain to weight of straw and grain, 25.3.

Arnautka — Sown April 21st. Weight of seed per measured bushel, 57 lbs. Harvested August 1st. Weight of straw and grain per acre, 5,776 lbs. Weight of grain, 1,812 lbs. Weight of one measured bushel, 58½ lbs. Yield per acre, 30.2 bushels. Percentage of grain to weight of straw and grain, 31.4.

Bismark — Sown April 21st. Weight of seed per measured bushel, 55 lbs. Harvested August 2d and 6th. Weight of straw and grain per acre, 5,636 lbs. Weight of grain, 1,548 lbs. Weight of one measured bushel, 56 lbs. Yield per acre, 25.8 bushels. Percentage of grain to weight of straw and grain, 27.4.

Oseca — Sown April 21st. Weight of seed per measured bushel, 59 lbs. Harvested August 27th. Weight of straw and grain per acre, 4,976 lbs. Weight of grain, 1,592 lbs. Weight of one measured bushel, 57½ lbs. Yield per acre, 26.5 bushels. Percentage of grain to weight of straw and grain, 32.

Touzelle — A new variety from France obtained of the commissioner of agriculture. Eight quarts of seed, weighing 15½ lbs., were sown April 21st, upon one-fourth acre of ground. Harvested August 27th. Weight of straw and grain per acre, 4,096 lbs. Weight of grain, 1,072 lbs. Weight of one measured bushel, 59 lbs. Yield per acre, 17.9 bushels. Percentage of grain to weight of straw and grain, 26.1.

All these varieties of wheat were injured by the chinch-bug to some extent. The last two varieties being very late were most seriously injured.

BARLEY.

The following varieties of barley were sown April 21st, with two measured bushels of seed per acre. The soil is light, clay loam, which for several years has been in cultivation to cereals. The land was fall plowed, and dressed with twelve loads of well rotted stable manure per acre. All varieties were more or less injured by chinch-bugs.

Manshury.—Weight of seed per measured bushel, 50 lbs. Harvessed July 20th. Weight of straw and grain per acre, 5,980 lbs. Weight of grain, 3,120 lbs. Weight of one measured bushel, 48¾ lbs. Yield per acre, 65 bushels. Percentage of grain to weight of straw and grain, 52.2.

Chevalier.—Weight of seed per measured bushel, 44 lbs. Harvested July 27th. Weight of straw and grain per acre, 5,540 lbs. Weight of grain, 2,126 lbs. Yield per acre, 44.3 bushels. Weight of one measured bushel, 47 lbs. Per centage of grain to weight of straw and grain, 38.4.

Common Scotch.—Weight of seed per measured bushel, 49 lbs. Harvested July 21st. Weight of straw and grain per acre, 5,760 lbs. Weight of grain, 2,488 lbs. Weight of one measured bushel, 46½ lbs. Yield per acre, 51.7 bushels. Percentage of grain to weight of straw and grain, 43.2.

Saxonian.—Weight of seed per measured bushel, 49½ lbs. Harvested July 23d. Weight of straw and grain per acre. 5,900 lbs. Weight of grain, 2,522 lbs. Weight of one measured bushel, 47½ lbs. Yield per acre, 52.5 bushels. Percentage of grain to weight of straw and grain, 42.7.

Probstier.—Weight of seed per measured bushel, 44 lbs. Harvested July 24th. Weight of straw and grain per acre, 6,380 lbs. Weight of grain, 2,684 lbs. Weight of one measured bushel, 49 lbs. Yield per acre, 57.6 bushels. Percentage of grain to weight of straw and grain, 43 3.

OATS.

The following varieties were sown May 5th, upon land that was fall-plowed, and thoroughly cultivated before sowing. The soil was clay loam, and was dressed with 12 loads of well rotted stable man-

ure per acre. They were all badly lodged by severe wind and rain storms, which caused them to shell badly while being harvested. 2½ measured bushels of seed were sown to the acre.

White Schonen — Weight of seed per measured bushel, 29 lbs. Harvested August 4th. Weight of straw and grain per acre, 6,885 lbs. Weight of grain, 3,024 lbs. Weight of one measured bushel, 38¼ lbs. Yield per acre, 89.5 bushels. Percentage of grain to weight of straw and grain, 42.8.

White Waterloo — Weight of seed per measured bushel, 24 lbs. Harvested August 3d. Weight of straw and grain per acre, 7,357 lbs. Weight of grain, 2,753 lbs. Weight of one measured bushel, 38¾ lbs. Yield per acre, 86 bushels. Percentage of grain to weight of straw and grain, 37.4.

Canada — Weight of seed per measured bushel 25 lbs. Har vested August 4th. Weight of straw and grain per acre 8,728 lbs. Weight of grain 2,866 lbs. Weight of one measured bushel 37½ lbs. Yield per acre 89.2 bushels.

Somerset — Weight of seed per measured bushel 32 lbs. Harvested August 5th. Weight of straw and grain per acre 7,216 lbs. Weight of grain 2,700 lbs. Weight of one measured bushel 37½ lbs. Yield per acre 84.3 bushels. Percentage of grain to weight of straw and grain 37.4.

Houghton — Weight of seed per measured bushel 25 lbs. Harvested August 17. Weight of straw and grain per acre 7,176 lbs. Weight of grain 1,906 lbs. Weight of one measured bushel 31½ lbs. Yield per acre 59.5. bushels. Percentage of grain to weight of straw and grain 26.5.

Early Fellow — Weight of seed per measured bushel 30 lbs. Harvested August 20th. Weight of straw and grain per acre 7,140 lbs. Weight of grain 2,280 lbs. Yield per acre 71.2 bushels. Weight of one measured bushel 35 lbs. Percentage of grain to weight of straw and grain 32. A large tree near the center of the plat upon which these oats grew diminished the yield somewhat.

Black Norway — Weight of seed per bushel 25 lbs. Harvested August 6th and 13th. Weight of straw and grain per acre 7,456 lbs. Weight of grain 2,772 lbs. Weight of one measured bushel 32 lbs. Yield per acre 86.6 bushels. Percentage of grain to weight of straw and grain 37.2.

CORN.

The following varieties were planted May 14th, upon clay loam that was dressed with twelve loads of well-rotted stable manure per acre. The first three varieties were planted in hills 4x4 feet; the White Australian, being a much smaller variety, was planted 3½x4 feet. In other respects, the cultivation was the same. The seed of White Australian and Cherokee varieties was poor, requiring twice replanting.

Yellow Dent — Ripe September 14th. Yield in pounds of ears per acre, 5,434, in bushels of ears of 75 lbs. each, 72.4. This variety stood next to wheat, and was quite severely injured by the chinch-bug, after the wheat was harvested.

Cherokee — Ripe September 16th. Pounds of ears per acre, 5,116. Yield, in bushels of 75 lbs. each, 68.2.

Lysaght's — A large yellow variety obtained of William Lysaght, Esq., of Belleville. Ripe September 8th. Pounds of ears per acre, 5,044. Yield in bushels of 75 lbs. each, 67.2.

White Australian — Ripe September 10th. Pounds of ears per acre, 6,041. Yield in bushels of 75 lbs. each, 80.5.

IMPROVEMENT OF SOILS BY MECHANICAL MEANS.

This experiment was begun in 1871, to be continued five years, upon four adjacent plats of an acre each, which have been cultivated as follows:

Plat 1, to be plowed to the depth of five inches only.

Plat 2, to be plowed twelve inches deep.

Plat 3, to be plowed twenty inches deep by trench-plowing.

Plat 4, to be plowed twenty inches deep by subsoiling.

Plats 1 and 2 have been cultivated in the prescribed manner from the beginning.

Plat 3, in 1871, was plowed twelve inches deep only; in 1872 and '73, seventeen inches; in 1874 and 1875, eighteen inches, which is as deep as it was found practicable to plow.

Plat 4 was subsoiled sixteen inches deep in 1871; seventeen inches in 1872 and '73, and eighteen inches in 1874 and 1875.

The cultivation of these plats has been the same in all other respects than those mentioned.

The soil is clay with heavy clay subsoil; the land is level and rather low. In the fall of 1873, an underground drain was laid through each of the plats to carry away water that formerly flowed over them all, after heavy rains.

During the first four years these plats were in cultivarion to corn exclusively. In 1875 a portion was in cultivation to corn, and a portion to oats.

The five years through which the experiment was to be continued expired in 1875. During the past two seasons these plats have been in cultivation to corn, all of them having been plowed alike, about eight inches deep, except that plat 1 was plowed no deeper than before, in order that no unstirred soil should be brought to the surface. The following table gives the yield per acre for the respective years, the corn being in bushels of ears, weighing 75 lbs. each.

Depth of Cultivation.	1871.	1872.	1873.	1874.	1875.		1876.	1877.
					Corn.	Oats.		
Plowed 5 inches.....	55.4	43.5	53.4	53	67.7	60.2	45.7	75.9
Plowed 12 inches.....	50.6	50.3	52.8	58.1	67	65.5	46.8	75.5
Trench-plowed 18 inch	44.9	54.7	51.3	65.3	60.5	65.1	43.6	67.8
Subsoiled 18 inches...	41.2	56.8	51.1	65.8	57.2	64	44.1	67.5

In 1875 the last two plats were severely injured by chinch-bugs.

The average yield for the entire seven years, in bushels of ears of corn, weighing 75 lbs. each, is:

For 5-inch plowing, 56.3.
For 12-inch plowing, 57.3.
For 18-inch trench plowing, 56.8.
For 18-inch subsoiling, 54.2.

POTATOES.

The following varieties were planted May 5th, in rows 3½ feet apart, hills 18 inches apart in the row. The time of ripening and yield per acre is given in the subjoined table:

VARIETY.	Time of ripening.	Bushels per acre.
Alpha	July 23	242
Early Rose	July 30	279.6
Early Favorite	July 30	213.6
Extra Early Vermont	Aug. 1	208.9
Snow-Flake	Aug. 7	282.5
Brownell's Beauty	Aug. 9	139.5
Compton's Surprise	Aug. 10	157.7
Eureka	Aug. 12	222.1
Nonsuch	Aug. 3	246.3

The following are varieties that have never before been in cultivation in this vicinity. One pound of seed of each variety was cut into single eyes, and received the cultivation usually given to field potatoes:

Ruby, ripe August 2d, yield 108¾ lbs.
Improved Peachblow, not ripe Oct. 6th, yield 88½ lbs.
Superior, ripe Oct. 1st, yield 75¾ lbs.
Centennial, ripe Sept. 12th, yield 44 lbs.

I would express my obligation to Mr. E. G. Hayden, farm superintendent, for his care and attention in carrying out the details of these experiments.

METEOROLOGY.

The meteorological observations formerly taken under the directions of the Smithsonian Institution, are now taken under the direction of the chief officer of the United States signal service.

The morning observation is taken at 6:45 local time, to correspond with 7:35, Washington time, at which hour an observation is taken at all stations through the country. The hours of afternoon and evening observations are still 2 and 9, local time, respectively.

The temperature is given in degrees and tenths, F.

The amount of cloudiness is expressed by a number indicating the tenths of the sky overcast. The following abbreviations are used:

The direction of the wind is taken for eight points of the compass, the figures accompanying represent the force on a scale from 1, a very light breeze, to 10, a most violent hurricane. In the summary of observations, the percentage of wind from each direction is given for each month and for the entire year.

The heighth of the barometer is indicated by inches and decimals and corrected for the expansion above 32°.

"Relative humidity" is the percentage of complete saturation existing at the time when the observation is made.

Latitude 43° .4′, 33.1.″

Longitude 12° .20′, 58.5.″

Height above the sea, 1,088 feet.

Maximum observed temperature for the year, 88°.

Minimum observed temperature for the year, 22°.

Range observed temperature during the year, 108°.

Mean temperature for the year, 45.4°.

SUMMARY OF METEOROLOGICAL OBSERVATIONS

Taken at the University of Wisconsin, for the Year ending October 31, 1877.

Months.	Thermometer in Open Air.				Barometer, Height Reduced to 32°.				Inches of rain and melted snow.	Inches of evaporation from an open vessel.	Amount of cloudiness.	Pressure of Vapor in Inches.			Per centage of Saturation.			Percentage of Winds.								
	Max.	Min.	Mean.	Variation.	Max.	Min.	Mean.	Fluctuation.				Max.	Min.	Mean.	Max.	Min.	Mean.	S.	S. W.	W.	N. W.	N.	N. E.	E.	S. E.
November	56	14	35.6	42	29.293	28.463	28.929	8.300	2.31	.....	7.0	.394	.052	.113	100	48	84	11	11	20	32	23	1	2	0
December	38	—22	11.1	60	29.635	28.415	29.064	1.230	2.59	.....	5.3	.160	.017	.069	100	58	90	8	16	16	46	7	4	0	3
January	48	—16	12.9	59	29.500	28.700	29.067	.800	1.00	.....	4.3	.278	.022	.085	100	32	87	24	29	21	4	17	2	0	3
February	52	15	32.6	37	29.560	28.472	29.108	1.088	.30	.....	3.7	.282	.076	.160	100	31	86	6	7	32	9	37	0	6	3
March	54	—2	23.2	56	29.331	28.049	28.988	1.282	3.40	.....	4.2	.320	.025	.112	100	36	84	11	11	19	9	26	15	2	7
April	74	18	45.3	56	29.354	28.360	28.977	.994	.....	.....	4.5	.500	.082	.227	100	29	74	19	5	10	2	36	15	8	5
May	83	34	60.7	49	29.398	28.542	28.991	.856	1.02	.....	3.9	.758	.065	.390	95	41	73	49	0	3	2	9	9	23	5
June	81	47	65.9	34	29.592	28.589	28.866	.503	4.77	.....	4.2	.785	.221	.514	100	53	79	38	16	15	6	11	3	9	2
July	88	57	73.0	31	29.275	28.687	28.921	.588	3.84	.....	3.1	1.010	.270	.588	100	37	73	19	16	19	21	8	4	5	8
August	86.5	59	67.8	27.5	29.156	28.508	28.842	.648	3.76	.....	2.9	.717	.352	.575	91	47	69	15	12	13	25	23	3	5	4
September	86	47	65.8	39	28.934	28.456	28.705	.478	.64	.....	3.0	.732	.185	.458	92	34	71	23	23	14	11	2	16	2	9
October	78	33.5	51.2	44.5	28.974	28.396	28.702	.578	4.12	.....	6.4	.604	.131	.301	100	43	75	3	25	10	24	12	18	2	6
Sums	.....	.....	.....	.....	.....	.....	.....	.....	27.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Means	.....	.....	45.4	.....	.....	.....	28.930	.....	.....	.....	4.4	.....	.....	.....	.....	.....	.....	19	14	16	16	17	8	5	5

RAILROAD LINES AND PARTS OF LINES IN WISCONSIN.

With their locality, length of track, width of track, etc., for A. D. 1877.

NAME OF ROADS, And divisions of roads in Wisconsin.	LOCATION OF LINES. From.	To.	Mileage of divisions in Wisconsin.	Mileage of total lines operated in Wisconsin.	Length of division.	Total mileage of lines operated.	Width of track in feet and inches.	Weight of rail in lbs. per yard.
CHICAGO, MILWAUKEE & ST. PAUL—								
La Crosse Division	Milwaukee	La Crosse	196 00	.....	196 00	.....	... .	.....
Prairie du Chien Division	Milwaukee	Prairie du Chien	193 00	.....	193 00	.....	.....	.....
Madison Division	Watertown	Madison	37 00	... .	37 00	.....	.....	.....
Northern Division	Milwaukee	Portage	96 00	.....	96 00	... .	.....	.....
Northern Division	Horicon	Berlin	43 00	.....	43 00	.....	.....	.....
Northern Division	Rush Lake	Winneconne	14 00	.....	14 00	.....	.....	.....
Northern Division	Milwaukee	Schwartzburg	6 00	....	6 00	.....	.....	.....
Northern Division	Ripon	Oshkosh	20 00	.....	20 00	.....	.....	.....
Southern Wisconsin Division	Milton	Monroe	42 00	.....	42 00	.....	... .	
Chicago Division	Milwaukee	Chicago	38 00	.....	85 00	.....	.....	.....
Iowa and Minnesota Division	McGregor	St. Paul	.....	.....	212 00	....	... .	
Iowa and Minnesota Division	Conover	Decorah	.....	.....	10 00	.. ...	.....	.....
Iowa and Minnesota Division	Mendota	Minneapolis	.....	.....	9 00	.....	.....	.....
River Division	North McGregor	McGregor	.....	.....	1 00	.....	.....	.....
River Division	La Crescent	St. Paul	.. ....	.....	128 00	.....	.....	.....
Iowa and Dakota Division	Calmar	Algona	.....	.....	126 00	.....	.....	.....
Iowa and Dakota Division	Austin	Mason City	.....	.....	40 00	.....	.....	.....
Hastings and Dakota Division	Hastings	Glencoe	.....	.....	75 00	.....	.....	.....
Illinois and Iowa Division	Sabula	Marion	.....	.....	87 00	.....	.....	... .
			685 00	685 00	1420 00	1420 00	4 8½	36 to 60

PINE RIVER VALLEY & STEVENS POINT.	Richland Center.	Lone Rock.....	16 00	16 00	16 00	16 00	3	.....
PRAIRIE DU CHIEN & MCGREGOR.....	Prairie du Chien.	State line	1 75	1 75	2 00	2 00	4 8½	56
SHEBOYGAN & FOND DU LAC	Sheboygan.....	Princeton	79 00	79 00	79 00	79 00	4 8¼	45 to 56
WESTERN UNION —								
Main line.....	Racine	Rock Island Jun.	68 70	.....	192 00	.....	.....	... .
Eagle branch.....	Eagle.....	Elkhorn..... ...	16 50	.....	16 50	.....	.... ..	.....
Eagle branch.....	Watertown.....	Hampton C'l Mns	.....	.....	4 25	.....	.....	.....
			.....	.....	212 75	212 75	4 8½	56
WEST WISCONSIN —								
Main line	Elroy	St. Paul.....	177 50	.....	197 40	.....	.....	.....
Branch.....	Stillwater Junc'n.	Stillwater (leased)	.....	.....	3 80	....	.....	.....
			.....	.....	201 20	.....	4 8½	50 to 60
WISCONSIN CENTRAL —								
Main line.....	Menasha.....	Ashland.....	249 30	... .	249 30	.....	.....	.....
Main line.....	Stevens Point....	Portage..	71 20	.....	71 20	.....	.....	... .
Milwaukee & Northern Railway....	Schwartzburg ...	Menasha & G. Bay	120 00	.....	120 00	.....	.....	.....
Chicago, Milwaukee & St. Paul R'y.	Milwaukee	Schwartzburg ...	9 00	.....	9 00	.....	.....	.....
			.....	.....	449 50	449 50	4 8½	54 to 57
WISCONSIN VALLEY.....	Tomah.....	1⅛ miles north of Wausau.....	89 90	89 90	89 90	89 90	4 8½	50

Railroad lines and parts of lines in Wisconsin — continued.

NAME OF ROADS. And divisions of roads in Wisconsin.	LOCATION OF LINES. From	To	Mileage of division in Wisconsin.	Mileage of total lines operated in Wisconsin.	Length of divisions.	Total mileage of lines operated.	Width of track in feet and inches.	Weight of rail in lbs. per yd.
CHIPPEWA FALLS & WESTERN.....	Eau Claire.....	Chippewa Falls..	10.33	10.33	10.33	10.33	4 8½	56
GALENA & SOUTHERN WISCONSIN.....	Galena	Platteville.	20.00	20.00	31.00	31.00	3	35
GREEN BAY & MINNESOTA —								
Main line.....	Green Bay.....	Winona	213.90	.....	213.90	.....	.....	.....
Branches.....	Marshland Junc..	La Crosse.....	29.70	.....	29.70	.....	.....	.....
			243.60	.....	243.60	.....	4 8½	52 to 56
MILWAUKEE, LAKE SHORE & WESTERN—								
Main line.....	Milwaukee	New London	140.70	.....	140.70	.....	.....	.....
Two Rivers division.....	Manitowoc	Two Rivers.....	6.00	.....	6.00	.....	.....	.....
			146.70	.....	146.70	.....	4 8½	50 to 56
MINERAL POINT —								
Main line.....	Mineral Point...	Warren	31.00	.....	33.00	.....	.....	.....
Branch.....	Calamine.....	Platteville.....	18.00	.....	18.00	.....	.....	.....
			49.00	.....	51.00	.....	4 8½	56
MADISON & PORTAGE —	Madison	Portage City.....	39.00	39.00	39.00	39.00	.....	.....

CHICAGO & NORTHWESTERN —								
Galena Division	Chicago	E. end Miss. R.B.			137.00			
Galena Division, Freeport Line	Chicago	Freeport			121.00			
Galena Division, Fox River Line	Elgin	Geneva Lake	8.70		44.50			
Galena Division	Batavia	St. Charles			5.60			
Iowa Division	E. end Miss. brdg	Clinton			1.10			
Iowa Division	Clinton	Cedar Rapids			81.30			
Iowa Division	Cedar Rapids	Missouri River			271.60			
Iowa Division	Clinton	Lyons			2.60			
Iowa Division	Stanwood	Tipton			8.50			
Madison Division	Belvidere	Madison	48.80		68.90			
Madison Division	Madison	Elroy	74.20		74.20			
Madison Division	Elroy	Winona Junction	54.90		54.90			
	Winona Junction	Winona	29.90		29.90			
Milwaukee Division	Chicago	Milwaukee	40.00		85.00			
Wisconsin Division	Kenosha	Rockford	27.50		72.10			
Wisconsin Division	Chicago	Ft. Howard	171.40		242 20			
Peninsula Division	Ft. Howard	Mich State Line	49.45		49.45			
Wisconsin Division	Chicago	Montrose			5.20			
Galena Division	Chi. So. B'ch Jc.	River			4.50			
Peninsula Division	Mich. State Line	Escanaba			64.65			
Peninsula Division	Escanaba	Lake Angeline			68.00			
Peninsnla Division	Branches	Mines			39.80			
Total, Chicago & Northwestern R'y			503.95	503.95	1531.10	1531.10	4–8½	56 to 60
PROPRIETARY ROADS.								
Winona & St. Peter R. R.	Winona	Lake Kampeska			327.00			
Winona, Mankato and New Ulm R. R.	Mankato Junct'n	Mankato			3.75			
Iowa Midland R'y	Lyons	Anmossa			68.80			
Northwestern Union R'y	Milwaukee	Fond du Lac	62.63		62.63			
			62.63	62.63	462.18	1993.28		

MENTAL FACULTIES OF DOMESTIC ANIMALS.

By HEBRON VINCENT, OF MASSACHUSETTS.

A treatise on the Mental Faculties of Domestic Animals may properly be denominated comparative mental philosophy, analogous to comparative anatomy and physiology. There is a similarity between such animals and human beings, in the cerebral organism. But a more striking proof of corresponding elements in animals is seen in the outward manifestations of those qualities, going to show, as I think, mental faculties to some extent, and in some degree similar to such powers in the human species. In any examination of this subject, it would be proper first to state what the acknowledged mental faculties of man are, and then to show, by known facts, as exhibited by the animals themselves, the evidence of the existence of such corresponding faculties in them, and, as far as might be, their extent. The human mind is our conscious existence, and its powers we denominate its faculties. The senses of touch, vision, hearing, smell and taste are commonly regarded as the main channels through which impressions are made upon our consciousness. But ideas are not received through these alone. The mind, by its innate powers, profiting by what it already knows, evolves new thoughts, new ideas. Nor is this all. Our minds are the receptacle of impressions stamped directly upon them by the spirit of the Great Supreme, independently of the senses, and also of their own cognitions. One has said that "mental philosophy has for its object to ascertain the facts and laws of mental operation." The mind is not in parts, it is one. "For this," says Leibnitz, "there is no necessity that there should be different parts in the soul, as it is not necessary that there should be different parts in the point on which various angles rest." Aristotle is represented as remarking: "But it is necessary that that which judges should be one and the same, and that should even apprehend by the same the objects which are judged." And Addison is thus quoted by Stewart: "Although we divide the whole soul into several powers and faculties, there is no such division in the soul itself, since it is the *whole soul* that remembers, understands, wills, or imagines. Our manner of considering the memory, understanding, will, imagination, and the life faculties, is for the better enabling us to ex-

press ourselves on such abstracted subjects of speculation, not that there is any such division in the soul itself." Again he says: "What we call the faculties of the soul are only the different ways or modes in which the soul can exert itself."

The late Joseph Haven, D. D., formerly a professor in Amherst College, defines a faculty of the mind to be "simply the mind's power of acting, of doing something, of putting forth some energy and performing some operation." He claims that the "mind has as many distinct faculties as it has distinct powers of action, distinct functions, distinct modes and spheres of activity. As its capabilities of action and operation differ, so its faculties differ." He holds, as before expressed, that the mind is not complex, nor divided, but one in all its acts, which varied acts indicate its varied powers, called faculties. And Sir William Hamilton says: "A *faculty* is nothing more than a general term for the causality the mind has of originating a certain class of energies; a *capacity*, only a general term for the susceptibility the mind has of being affected by a particular kind of emotions. All mental powers are thus, in short, nothing more than names determined by the various orders of mental phenomena." Again he says: "The end of philosophy is the detection of unity." And again, "The faculties are special modifications under which consciousness is manifested."

Such, in brief, are some of the views held by several writers on mental science, relative to the oneness or unity of the mind itself, and the nature of what are called the faculties of the mind. Not altogether unlike these in the human being, is the mind with its manifestations in domestic animals, as shown by the animals themselves. But here I am met by contrary views. Mr. Hubbard Winslow, whose text-book on mental philosophy is well known, advances the idea that animals have no reason, but only instinct; that reason and instinct are set off against each other in animal and human races; that man has rational powers to guide him, while animals have those of instinct. He traces some of the differences between reason and instinct, thus: "1. Instinct is mature at once; reason matures gradually. 2. Instinct is a blind impulse; reason is a reflective power. 3. Instinct is *limited;* reason is universal. Indeed, that the entire range of instinct embraces only four objects — *nutrition*, *protection*, *motion*, *propagation;*" while "reason, on the contrary, is applied in all directions, and embraces all subjects."

Now I contend, that however correct the foregoing definitions of the two words may be, and however true it is that all that is accorded to man is properly done, full justice is not meted out to the mere animal tribes. This author does indeed hold, that man has something in him in the nature of "instinct," and I shall endeavor to show, as intimated, that on the other hand, the animal creation possess elements of nature which, in character, if not in number or degree, answer to *some*, at least, of what are styled faculties of the human mind. Professor Haven, before referred to, in his work on Mental Science, advances views quite similar to those of the last named writer; while on the subject of "instinct," he at first admits the idea of intelligence of some kind in brutes, as well as in the human species. He says: "How far the two resemble each other, and how far they differ, it is not easy to determine, not easy to draw the dividing line, and say where the brute intelligence stops and human intelligence begins." And yet he afterwards denies to animals intelligence in the true acceptation of the term. He claims that many of the acts of animals and insects develop even greater skill than can be seen in man, and yet he contends that they do not perform them by the light of intelligence. He maintains that instinct is a law of action put into the animal at its creation, which works in him, not by reason or reflection, but by a blind impulse; that bird or bee does nothing by the force of education or progress in knowledge; that the one builds her hive alone, and at first as well as she ever will afterwards, and the other her nest the same. The intelligence is not that of the creature, he says, but of the Creator, and that it is given as a law of the animal's being, by which he blindly acts.

This author raises the question as to whether the difference between man and the brute are those of *kind* or *degree*. After some discussion of the question, he arrives at the conclusion that the intelligence of the brute differs in *kind*, and not in *degree* merely, from that of man. The use of the word "*merely*" seems to be quite an admission; and yet he labors to show that the beast does not possess any of the higher faculties, but only those of sense.

He begins his detail of denials by saying that the brute is not "a moral and religious being." With this I presume we all agree. For to be a moral and religious being, one must be a moral agent, which neither domestic animals nor any others of the lower species

are supposed to be. Says the late Rev. Richard Watson, of England, one of the most profound writers: "He is a moral agent who is capable of moral actions; and an action is rendered moral by two circumstances — that it is voluntary, and that it has respect to some *rule* which determines it to be good or evil." And Sir William Hamilton tells us, "wherein the moral agency of man consists. Man is a moral agent only as he is accountable for his actions; in other words, as he is the object of praise or blame; and this he is only inasmuch as he has prescribed to him a rule of duty, and as he is able to act, or not to act, in conformity with its precepts." And thus we say, that while on the one hand a law, or rule, has been made known to man, and power and liberty to act under it given; the mere animals in question, on the other hand, having no such revelation that we know of, cannot be supposed to have moral faculties, which would imply moral accountability, and the awards of approval for obedience, and condemnation for sin or disobedience. There is another thing these animals do not possess, and the lack of which does not seem to be computed by these writers, and that is the power of speech. Did they have this, it would be much easier for those who now merely theorize upon the subject to tell *how much* real intelligence these creatures possess. Some of them do almost talk, and so far as we can understand their language, indicate much more of real intelligence than the two writers, from whose opinions we dissent, concede to them.

Without pretending to follow the most approved order in the arrangement (and I find others differ as to this), I will here name some of the more prominent manifestations or activities of the human mind denominated faculties. Take the following: perception, conception, imagination, reason or the reasoning power, reflection, memory, judgment, will (which includes desire), attention (accompanied by meditation), intuition. I will begin with the last named. One has said that "reason is instinct in man." At this I demur. But it is admitted, I think, on all hands, that man has something in his mechanism properly called instinct, although it is said to be in some respects weak. And yet in the craving for food by the child, and in that which tells him how to obtain it, it is certainly quite apparent. But I would say that that faculty of our mind which bears the greatest resemblance to instinct in the animal is intuition. Intuition, or the intuitive power, is that which calls

into use first presentations and primary ideas. It is the first thought or principle which the mind grasps without reflection or reasoning of any kind. And, as an intellectual element, does it not answer to "instinct" in the mere animal, taking Professor Haven's definition for our guide? He maintains that instinct is a law of action in the brute, which comes to him without reflection, without his own agency, and yet that it is that upon which he acts. So we, after receiving them, act upon our own intuitions. But I must just here take exception to another of his positions, which I can but regard as an unwarranted assumption, namely, that the brute does not "*think*" in the proper acceptation of that term. Taking the expression, as he evidently meant it, to comprehend all dumb animals — domestic ones included — I would ask how the ox would ever come to his fodder, the bee construct her hive, or the bird build her nest, without *thinking* of the object aimed at.

The five senses are all possessed by the *mere* animal, as we denominate him. These, by means of nerves, as in man, communicate with the brain, the seat of mental activities, and thus the animal makes up judgment as to his own course of action to be pursued, and often, also, as to what will be that of others. If he sees danger, he will avoid it. If he tastes food which he does not like, he will reject it. He manifests his pleasure or displeasure at the different sounds he hears, accordingly as they are agreeable or disagreeable to him. So of the other senses. His brain, although relatively small, compared with that of man, is subject to all this variety of impressions, as the seat of consciousness. Does he not, then, *think*, in the proper acceptation of the term?

Let us take some actually known facts as demonstrating the existence of faculties in animals, corresponding in nature to some of those enjoyed by men. They are indeed abundant, but we can here present only a few. Some years since lived a friend of mine in the town of Nantucket, who kept a cow. The animal was much of the time in a small lot inclosed by a high board fence, the outlet being a gate with a large wooden latch. Just under the latch was a hole through the board in the door, so that a person on the opposite side could put a finger through and raise the latch. Outside of the lot was good grazing. That cow, having had access there, learned the art of puting one of her horns through that finger hole and raising the latch, and of thus making her egress to the place

of feeding. Finally, after trying other means to break up this habit of the animal, the owner closed up the aperture. The cow, not to be outwitted, then accomplished her object by putting her horns under the gate and raising it from its hinges. Now, are there not manifest in the conduct of that cow, first, *perception?* she perceived the way in which her owner passed; secondly, *conception?* she conceived her plan of operation; thirdly, *will?* she willed to put her plan into execution; fourthly, when she had done it once, her *memory* was brought into requisition, and she remembered how to do it again; and fifthly, when foiled in her first method of accomplishing her object, her *imagination*, or perhaps we should better say, her *inventive genius*, was put to test, and she attained it in another way. Professor Haven insists that the brute never learns anything; he is mature at birth. A chicken is a hen when first hatched; the spider spins her lines, the bird builds her nest, the bee constructs her cells, the beaver his dam, and the ant its subterranean arch just as well the first time as ever afterwards. But did not that cow progress somewhat in knowledge after she was a calf? And does not the ox learn to follow the cartway and the furrow, and to obey his owner or driver?

Take the everywhere-known examples of the horse. He shies the place where he has been affrighted or injured; he plays the "old soldier" with a timid or inexperienced driver (as I have occasion to recollect), knowing he is not his master. In these he shows both *memory* and *reason*. He remembers the scene of danger, and his reason teaches him to avoid it. And also in the latter case he *knows* he need not go fast unless he is pleased to do so, and he *wills* that he will not. Then, too, the too-heavily loaded animal, either ox or horse. He tries to take the load along, at the bidding and whip of his "task-master," and failing tries again and again, by turns turning his head and trying to make his driver understand that the load is too large, using every persuasive in his power, and would speak if he could, while his *less* rational master persists.

Take an illustration from the lamb. It may be a sheep when born, and would ordinarily keep with the wild sheep; but let the parent sheep die, and some matron or maiden of the household take the little bleater to the door-yard, and nurse and feed it: does it not learn something which it did not know at first about the manner

of life and the voice and ways of its friend and protector? And why did a certain cat I once knew take her kittens away up behind a chimney and beyond the ceiling, where no mortal could reach them, and keep them there till they were quite large, if it were not to prevent their being dealt by as other kittens had been? Call that instinct, if you please. That was present; but were there not manifest, also, both *reason* and *will?* Another, the property of my nearest neighbor, found a comfortable home with us from winter to winter, while her house being closed, the good lady was making her annual visit with her friends in Boston. After a year or two, "blacknose," who was in the interim neighborly, became, in some way, so cognizant of the near approach of the time at which her mistress was to leave, that she would come of her own accord and take up her abode with us a little in advance of the event. Were there not in the act, evidences of a retentive memory, and of keen powers of observation?

The late Hon. Thomas Bradley, of Vineyard Haven, was aroused from his slumbers in the night, by the intense scratching and other boisterous noises of his cat at his lodging-room door. At first he did not heed it, but the persistent noise of the cat induced him to arise and open the door, when he was met by a volume of smoke. He rushed down stairs and found the wood-work in his sitting-room ablaze. He was just in time to save his house from entire conflagration. What intelligence less than human prompted that act in the cat?

But of all animals, perhaps there is none which illustrates our position so well as the dog. The other domestic animals named evidently understand many of our words, having *learned* to understand them. This animal would seem to be more intelligent and more tractable than they. A highly respectable gentleman, who lived near me, now deceased, had some years since a dog which he had petted and set by, but which had become old and undesirable in the house, and he said to his family one day in the hearing of the animal, "I shall have to get some one to shoot this dog." "Bose" immediately went out of the house, and never returned. Did not that dog understand the full import of the words of his master, and did he not *reason*, and base his conduct upon that understanding and that process of reasoning, with a view to the saving of his own life? Another man, my neighbor, from whom I

have the story direct, living in town, and owning a wood lot near, was accustomed to cut the wood in the forest, and to employ another man living about a third of a mile off, to cart it. The dog, as other dogs do, usually accompanied his owner in those walks. Having occasion one morning to have some wood carted, but being called another way, and thus unable to go and inform the other man of his wants, he spoke of the matter and of his regrets in the case, the dog being within hearing. He went to his day's work, but what was his surprise when he came home to his dinner, at noon, to find his load of wood tipped down in his yard. The wife knew that Mr. R—— brought it. On inquiry, his friend reported that the dog came up to his barn, to the stable where his horse was, then went out around his truck-wagon, repeating these movements, and apparently intent on making him understand what was wanted, insomuch that he harnessed in his horse, and went to the woods and brought the load. How could human being have done the errand more intelligently, except to utter the words of his master, which the dog understood, but could not express.

Another gentleman in the town where I reside now, has a dog that at the bidding of his master will place either one or both of his fore-paws, as told to do, upon his master's knee, or stand erect upon his hind feet, and perform various other feats. When one of his family sits at the piano-forte and plays, he often comes in and takes a position in front of it, and makes a noise evidently the nearest he can to that of singing. Is there no exercise of *mental faculties* such as we possess in all that? Is there no understanding of *language?*

One of the mental faculties is called by writers "*attention*," which is the power to concentrate and continue thought upon a single subject or object for a long time. This is sometimes evinced by long-continued action for the accomplishing of a specific purpose. We have in history some very remarkable instances of this kind,—such as that of Socrates while accompanying Alcibiades in a military expedition; that of Archimedes at the storming of Syracuse; that of Joseph Scaliger while a Protestant student in Paris at the time of the St. Bartholomew massacre; and that of Napoleon Bonaparte, who, when at the military school in Paris, having a very difficult problem given him for solution, shut himself up seventy-two consecutive hours, and mastered it. We have something of

this kind in the dog that will dig the earth for hours together to secure a muskrat which he knows to be there, far up in his recess, or watch for a long time an article left in his charge, and even long days and nights, the living cripple or the dead remains of his cherished master or mistress. A reliable gentleman of my acquaintance, when at the age of eight years, lived in the town of Chilmark. One day, during a blinding snow-storm, having occasion to go some rods from the house, on attempting to return, he could not see it, and knew not which way to go; but starting in the direction which he thought was right, the little Spanish house-dog soon appeared and caught him by his clothes, and urged him in the opposite direction, which proved to be the right one, the dog ever and anon pressing down the snow, then quite deep, to make him a path. The other course was a dangerous one, and, but for the dog, he would in all probability have perished. What, perhaps, is the most remarkable feature of the story, was, that the animals being in the house when the little boy went out, seemed presently to become alarmed, went to the door, jumped up to the latch, and made every possible demonstration of his anxiety to get out, and on being let out by one of the inmates, sprung away to the rescue of his young friend.

I refer, not to uncertain stories, but to authentic accounts. And I presume every one present knows facts similar to those I have given. But I must relate one more. A near relative of mine recently lost a lovely daughter, who had wasted away by consumption. He has a large dog. When, at the funeral, the casket containing the remains was carried out to the hearse, the dog followed out and went under the hearse, moaning; and, accompanying the procession, when the box was let down into the grave the animal went up to the open grave, pawing the sand near it and making a mournful noise. Call that "instinct" if you will, but how could an act be more expressive of intelligence such as is in man, or how could human grief be more *reasonably* shown? Instances might be multiplied; but my limits will not allow of this. It must be apparent, that, with the exception of the moral and religious faculties in man, such as hold him to a high accountability, and any marked resemblance to which we do not claim for even domestic animals, these do possess many of the attributes of mind corresponding with those enjoyed and exercised by members of the human

race, in what degree, we will not pretend to say. But had such animals the power of speech, I doubt not they would quite astonish us by the exhibition of those faculties in a degree of which we do not now even dream; and thus showing that their likeness to the human, in addition to other considerations, entitles them to humane treatment and the protection of the law.

WISCONSIN PINE.

Among the many treasures contained within the borders of Wisconsin, the vast forests of pine found in the northern part of the state constitute a most important element. It has been estimated that there are twenty-six thousand square miles of pine-bearing land in the state, and deducting from this amount for swamps, lakes, rivers, etc., there are left twenty thousand square miles of pine land — a larger portion of territory than is contained within the borders of any other state in the Union. If the annual cut were six hundred million feet, which is larger than the present average, it would take at least seventy years to exhaust the supply. The highest amount cut from a section of land, six hundred and forty acres, is fifteen million feet, and the lowest, one million.

Taking one-third of the largest estimate, five million feet for every square mile of land, there were one hundred thousand million feet when the forests were in their primeval state. Allowing fifty per cent. of this for the amount already cut and for windfalls, fires, etc., there is still fifty thousand million feet, and at the rate of six hundred million feet a year there is pine enough left for seventy years.

The length of time this supply will last, depends of course upon the cut, but young pine is continually growing and good sized trees would be found from present sprigs in seventy years. At $2 per thousand feet stumpage, the aggregate value of the pine of Wisconsin would be worth one hundred million dollars, or one billion dollars when worked into lumber at the average price of ten dollars per thousand feet. The bulk of this timber has to be floated down streams to mills, then cut and again either floated down the

Mississippi river, shipped on vessels on Lake Michigan, or carried on railroad cars to the interior of the state.

A great deal depends on transportation, and to market the lumber, it is necessary that freights be low, and rafts have a stream of sufficient depth to float them without damage.

What of the men who own these vast treasures, that live in these primeval forests — and that every winter bank their millions upon the shores of the swift frozen rivers of the north? They are the great hearted, open-handed *princely* fellows, you see every winter in our legislature. They are the men who always stand by, uphold and defend the public institutions of the state! In the halls of congress, gracing the gubernatorial chair, or presiding at the speaker's desk. They are the peers of the best. Touch with a ruthless hand one of their *lumbermen's bills* in either house of the legislature and you will find that their ability to battle for their rights is great as their forests are vast. Take them to your broad prairie farms and show them your Normans, Clydesdales and Short Horns, and you will soon have more money than stock. All honor to these men of the woods; may their days be long in the land.

CLOVER AS A FERTILIZER, AND SOURCE OF WEALTH TO WISCONSIN FARMERS.

BY B. S. HOXIE, OF COOKSVILLE.

As this is the season of the year when the seed is sown into the fallow ground, and the subject assigned to me at this time is "Clover," I will not shrink from the task, nor would not if I could, because I believe it to be the duty of every member of the grange to do his or her part as the work is assigned to them for the benefit of the whole — and if I fail to enlighten any one, or to add any new fact or thought to the fund of knowledge you already possess, I shall at least have gained two points; first, to attempt to do the work assigned to me; second, to improve my own mind as I have been gleaning from the experience of others, and if the third point is gained by entertaining or instructing you, then I am doubly paid for my effort.

It is not intended that this paper shall be a treatise on the clover plant in all of its species, or the different plants of Trifolium by their various names, but the kind we as "cultivators" and "husbandmen" are more interested in, as possessing more of wealth and value than any plant we can raise, is the common red clover. We can not say to what particular country we are indebted for this plant, but it is certain to be of European origin, as it was used in France as a fertilizer and fodder more than three hundred years ago, or even before the first white settlement was made in this country; but however hardy and wide spread it is found, it never goes in advance of the white man, but clings to him like a true friend.

The chemist tells us that the clover plant and roots, whether it be the mammoth, red or smaller varieties, is composed of lime, magnesia, carbonic acid and potash, also considerable quantities of phosphoric and sulphuric acid, chlorine and nitrogen. These combined, are the principal reasons why it is so valuable as a fertilizer or for a forage crop. While it is necessary for most every kind of plant that it should have its existence or its roots in the soil, it is a well established fact that only a small portion of the elements of the tree, in its bulk or proportion, is derived from the soil. The principal plant food is carbon, which all plants absorb from the atmosphere through their leaves, decomposing it and giving back again the oxygen. The oxygen of the soil is the oxygen of the mineral matter, and the reason that the soil organic matter assists the growth of the plant, is because this organic matter holds it in solution. We often hear farmers talk about the soil being worn out, when the fact is simply that the plant has taken all it could get, or all that was ready for its use; but generally enough remains for untold generations, and all we want is something to stimulate it so the plant can take it as food. To make this more plain, Prof. J. J. Mapes gives an analysis of the elements contained in wheat, grain and straw, which are as follows: Silica, potash, phosphoric acid, soda, peroxide of iron and chloride of sodium. It will not be necessary at this time for my subject to give the proportion of each, but simply to say that of all the elements, it requires about two hundred and forty-five pounds of grain and straw on an acre yielding say twenty-five bushels, and of this two hundred and ten pounds are required for the straw.

Now a chemical analysis of this same loamy soil, taking a depth of ten inches, shows it to contain silica enough for 221,400 crops of wheat, potash enough for 2,484 crops, phosphoric acid enough for 775, lime for 85,880, magnesia for 855, sulphuric acid for 26,222, soda for 37,775, peroxide of iron for 296,656 crops, and chloride of sodium for an indefinite time. These are facts which any chemist can demonstrate, and yet in the face of this we hear farmers sometimes say of a certain farm, "it is all run out, exhausted," etc., and twenty years ago we remember that the theory of summer fallowing was somewhat advocated, and by some practiced as a means to retrieve the soil, give it rest as they told us, as though it were tired like its owner by hard work.

The intelligent farmer now considers this a practice only fit for the dark ages, and I will venture the assertion that two crops in one year, one for fodder the other for seed of clover, with the clover straw and roots plowed under for manure, is worth more than the summer fallows the best farmer ever gave to his land, and before I get through I hope to demonstrate the fact more fully, and to show why I make this assertion.

I have stated on the science of chemistry that the constituent elements of plant life are found in abundance in most all alluvial soil, but they are not all alike productive.

A certain proportion of plant food is lime or the carbonate of lime. But because a man has a lime stone quarry on his farm, it is no sign that his soil contains lime fit for plants to thrive on. Grind a marble to a fine dust, then take old plastering that has long been exposed to air in our buildings, which by such long, exposure has become carbonized, give a sample of this to the chemist and he analyzes and calls them both carbonate of lime. One is food for plants while the other is worthless. Again a bone calcined and ground fine, shows 95 per cent. of the phosphate; rocks show the same percentage, but place them both before a cow whose food lacks bone material and she will soon tell the difference.

One has passed through fifty stages or degrees of organic life and progressed to plant food, and is a substance to build up the physical system, while the other is an inorganic substance.

One other fact of that kind will be sufficient on this point to make myself understood as to the properties of plant food. Feldspar contains seventeen per cent. of potash; perhaps in whatever

form it exists it is identical with it but not one particle of this feldspar, however finely pulverized, can be taken as plant foood. Lichens, and mosses and other low types of plant life may absorb some of it, and they by decay may fit it for a still higher life, until the wheat plant can take it up as food for man. All plant food must be taken up by the rootlets in the form of solution or from the atmosphere by inhalation and absorption through its leaves, and that this is mainly (I mean the element of plant life) taken from the atmosphere, has repeatedly been demonstrated by taking a portion of earth, weighing it, in which a tree or shrub is planted, and the earth carefully protected so that nothing can be added except by pure water, and after a term of years when the tree has attained many pounds weight, the earth in which it grew has scarcely lost anything either in bulk or analysis, while the ash of the tree shows all the elements necessaay to the growth of similar trees. I consider it to be true that the progressed elements must exist in the soil for the proper growth of trees. But this shows clearly the fact as stated by Prof, Mapes, that there is abundance of food in the soil for almost endless generations, and it is only poor when the plant can not take it up as I have said in the form of solution.

And that certain crops or kinds of plants are necessary to fit the soil for other is also a fact.

In many parts of New Jersey, on their new sandy land (and I doubt not it is just as true of any similar soil) they cannot raise a crop of corn until a crop of rye is first sown and plowed under, then it will produce a good crop. I have stated, and facts are abundant in proof, that growing crops derive a great source of nousishment from the atmosphere, and that one kind of plant is necessary to acquire this and store it up for a succeeding crop of a different kind, perhaps, or to more perfect its own kind. And now let us look at this particular plant, which more fully relates to this paper. It has been ascertained by actual test that a crop of clover in one season will yield in tops and roots from five to ten tons per acre. This plowed under or fed to stock is more than four times the value of wheat straw, with the same treatment becomes richer in nitrogen or ammonia, and why it is better to form flesh and blood is because of the nitrogen. A column of air floating over a corn or wheat field is the same as that over the clover field containing the same amount of carbonic acid and ammonia. They only receive a

small portion of nitrogen, while clover stores it up in abundance, leaving much of it in solution for the future plant or a crop of wheat, for, as I have stated, all mineral matter in the soil capable of plant food is the same as in the atmosphere, but it must be changed into an acid before it can enter into the structure of a plant by its roots — or in other words this organ matter of the soil must be changed with the matter in solution. You are all aware of the fact, and doubtless have witnessed the rapid decomposition of bones by placing them in contact with diluted sulphuric acid; strong wood ashes moistened, will have the same effect but not so rapidly, and this same decomposition is constantly going on in the organic particles of the soil by the various acids coming in contact with it. It is a fact known to every cultivator of the soil that to ensure large crops of most all kinds of grains or vegetables, the soil must be made mellow, to a considerable depth, and the finer it is pulverized, the greater the yield, other considerations being equal. And no plant grown on the farm is so well adapted to do this work as the clover plant; for the roots are of large size, and have been found to extend downward to the depth of four feet; and a few days since I dug one from my one field which measured twenty-six inches in length and half an inch in diameter near the crown of the plant; and as clover is a biennial plant, these roots decay whether the soil be turned over or not, thus leaving the soil porous, and easily permeated by the grasses and moisture. The leaves are large and numerous, so completely shading the ground, that ammonia does not escape as freely as it does from a dry surface. Some have mistaken the nature of clover and complain that it soon dies out, either not knowing, or forgetting, that to insure a permanent growth, the seed must in some way be renewed every two years; neither will it do to feed the young plant very close the first season. I remember a number of years since, I had a rank growth on a small peice seeded with clover and wheat, and told one of my neighbors if he would mow it he was welcome to do so, but the next spring showed an entire lack of clover on the portion thus mowed; and I concluded the dying out of clover is largely our own fault. Mr. Allen, of Fox Lake, says he makes a practice of sowing clover with every crop of sowed grain he raises. It helps to shade the ground, and is better every way than weeds, and certainly this year with the low price of clover seed, none need have an ex-

cuse for not seeding more or less clover, and then no farmer should be without seed. W. W. Field, late secretary of the Wisconsin Agricultural Society says: "That he knew a field that had been under cultivation for eighteen years, without any fertilizer being used, which began to show signs of sickness and exhaustion. The owner at this time concluded to sow clover seed and it produced an abundant crop, showing that it sought its food where the corn could not find it. And also showing very clearly that it required different constituent elements upon which to feed. After restoring in fertility and renovating the soil with two or three crops of clover, he again planted it to corn and it produced a better crop than he saw growing upon it twenty years ago." From actual facts of science and experience of our best farmers, it has been proved that clover is the only crop we can raise that will not exhaust the soil. Buringault, the French chemist, experimented with some clover plants by putting them in a soil which had been deprived of all organic matter and giving them only distilled water.

They were found to grow and thrive in this condition, showing very conclusively that the clover plant is the only one which can in any degree for the farmers' use receive and store up this vast supply from the atmosphere, needed for farm crops. Now if every farmer firmly believed that by sowing clover he would enrich his farm, he would sow clover. But some will say, "I have sown clover and it died out, or did not do well, and makes poor hay." Perhaps it does, and possibly his hay was poorly cured and taken care of, and he lays it all to the clover, and not to himself. Do not suppose that because clover is so good a fertilizer and all I have claimed for it, you can raise it year after year for an indefinite time, and have it continue to enrich the soil in the same proportion, for it demands a change and rotation with other crops, for this is a law of nature, with everything that has life; indeed, change is marked on everything. Perhaps I have trespassed too far on your time with this paper, and yet many points have been omitted or lightly passed over, but I hope what has been said will bring out further discussion. If any assertion has been made contrary to your experience or practice, see which is wrong. I do not claim the practical experience of many here. Though from a boy to nearly my majority I always worked on a farm and only a few years of my life have peen passed without owning something in the way of a

farm, though it be a small one, and though circumstances seem to make a mechanic of me, and I hope not the poorest in my line, yet for nearly twelve years I have taken an agricultural paper, and sometimes two, during this time, so that in an agricultural or horticultural convention I do not quite claim to be a novice, for with some experience, I have tried, by the aid of science, the writings of others, and my own observation, to possess facts which do not always come under the head of agriculture.

WATER, AND THE WATER-SUPPLY OF WISCONSIN.

(With the replies of Correspondents.)

BY G. F. WITTER, M. D., OF GRAND RAPIDS,
Member of the State Board of Health.

When we consider how general is the presence of water in all created matter, "that it forms the larger portion of the globe, more than three-fourths of all animal and vegetable matter, 795 parts in 1,000 of the blood, 789 parts of the brain, 750 of the muscles, 116 pounds of the whole weight of an average man of 150 pounds averdupois," we cannot wonder at the important part it plays for good and evil, for life and death, in the history of the world, nor can we fail to recognize it as the most potent and prevailing of all the elements.

"If the character of the supply be good, there is life and health in every draught; if it be poisoned or polluted in its hidden sources, it spreads pestilence and death along its course."

When we study it more closely as it exists in the dew-drop, the rain, the rivulet and the river, when we trace it through its hidden channels in the fissures of the primitive rock, and above all in the super-saturated soils that surround us on every side, we are forcibly impressed with its amazing powers of dissolving solid matters and absorbing gases, and with its equally wonderful power as an erosive agent of carrying mountains down to the plains, and washing the plains into the rivers, lakes and seas.

THE COMPOSITION OF PURE WATER,

as given by the chemist, is one part of oxygen and two parts of hydrogen by measure, or eight parts of oxygen to one of hydrogen by weight, but as such water does not exist in nature, it seems hardly possible to take it as a standard of purity for our water supply. Water which has been carefully distilled approaches the above composition, but it contains at least 1.8 per cent. by volume of atmospheric air, and not unfrequently traces of ammonia; and even if these were not present, the same objection to its use as a standard exists, i. e., that such water is not found in nature.

All known natural waters possess other constituents, such as salts of lime and other bases, which are left as a solid residue after the water has been evaporated, more or less organic matter, and traces of ammonia. How, then, can we avoid the conclusion *that such elements are natural to water*, are a part of water — ARE water as far as they go? If so, water containing them cannot be reckoned impure.

Moreover, it may readily be shown that many of these substances, particularly salts of lime, magnesia, soda, etc., are required by the body, and must be obtained from either solid or liquid food. From the valuable and detailed experiments made on various animals by M. Papillon with the view of testing the action of certain phosphates given in distilled water on the bony structure, it is not only shown that the character of the food eaten affects the composition of the bones, but that mineral matter in dilute solution is capable of being assimilated.

These experiments were, in fact, experiments on different kinds of artificial drinking waters, and they illustrate how profoundly the bodies of animals are influenced by the mineral constituents of the water which they drink.

They seem to show that the alteration of the composition of the water-supply of a community may involve consequences of vast importance to the organic structure of the body; that the very composition of the bones is affected favorably or otherwise by the quality of the water drank. If water contains lime, lime will be taken up, and will appear as phosphate of lime in the bones; if strontia or magnesia be held in solution, phosphates of those earths.

If by any combination of circumstances these salts are wanting

altogether or be in deficient quantity, the bones will be imperfectly supplied with mineral matter. It is said that cases of such deficient supply have occurred in Holland, in districts where the inhabitants can obtain only rain-water for drinking purposes, and, as bearing upon the same point, it may be mentioned that the examining surgeons of the French army report that conscripts coming from districts where hard waters are used almost exclusively are men of larger and firmer bony structure than those taken from sections in which soft waters prevail. Absence of all mineral matter in drinking waters combined with absence of lime in the food can hardly fail to occasion softening of the bones, together with all the formidable disturbances of the general system consequent upon that state. It may even be possible by varying the character of the water-supply, to alter or profoundly to modify the whole physical organization of a community, or to determine, by an examination of the bones of by-gone generations the character of their water-supply.

So much attention is now being directed to organic impurity in drinking-waters, that the character of the inorganic constituents has been almost lost sight of, although the instances are numerous in which serious consequences have followed the incautious use of deep spring waters; and just here a word of advice or warning, to a very large class in our community, seems in place. If, as seems almost certain, the whole organic structure of the human body is liable to alteration by the introduction of more or less mineral matter, is it not the part of prudence in the crowds of health-seekers who throng the mineral springs of the country to know, more precisely than it is feared they do know, the character and effects of the waters they drink so freely? Will it not be wiser for them to place themselves under intelligent medical supervision and advice in regard to the amount and quality of the water they shall use, than to wander, as too many do, from one mineral spring to another, to-day drinking at Waukesha, and to-morrow at Prairie du Chien, and with no better reason for using the water at either than that "Mr. A. was at death's door, and went to" one place or the other, "and became well!"

Dr. Letheby, after devoting many years to an investigation of the properties of the waters introduced into English cities, and a study of the sanitary aspects of the subject, comes to the con-

clusion that a moderately hard water is less likely to absorb organic substances, sustain the life of zymotic organisms, exert solvent properties upon salts of iron or affect leaden conducting pipes, than soft water.

Dr. Wilson, of Edinburg, who has also collected much valuable material, takes the ground that the human organism requires for its proper nourishment and support a supply of certain mineral salts, among which carbonate and phosphate of lime play an important part in adding to the compactness of the skeleton, as well as in the proper performance of other functions.

Interesting and important as is this subject of the mineral constituents of our ordindary drinking water, the limits assigned this article will not admit of its further discussion at this time. We turn, therefore, to the no less important question of the various organic matters found in water, which, existing only too unsuspected, form the sources of disease, and affect whole communities in a way which is frequently ascribed to the visiting of chastisement of "an inscrutable Providence," when it is really the inevitable consequence of the grossest violation of the laws of nature on the part of men.

It is far from being our desire to awaken any unnecessary anxiety in regard to the character of the water-supply, but there are some sources of contamination which must be avoided at whatever cost, if we wish to avert the danger of suffering and death from ourselves, our families and the community in which we live.

A minute quantity of putrescible organic matter may often do incalculable harm, because the fact is now generally recognized that in such matter the specific germs which produce specific diseases find the vehicle for their conveyance into the human organism, and investigation has repeatedly shown that typhoid fevers and other zymotic diseases have again and again been spread through a neighborhood by germs contained in the water used. A very striking proof of this fact is found in the Swiss case mentioned by Dr. Marks, in the report of the State Board of Health for 1876, but other proofs of the same character are unfortunately only too common, nor do we need to go to Europe to obtain them. An experiment, designed to ascertain approximately the rate at which filtration through soil takes place, will be described hereafter.

The people of Wisconsin have a most abundant supply of water whose quality is unsurpassed by that of any other state in the Union. The many rivers that flow through our territory with their tributaries will compare favorably in the purity of their waters with the Croton of New York, the Cochituate of Boston, or the Schuylkill of Philadelphia. We have absolutely no excuse for using impure or unwholesome waters for any domestic purpose.

The waters of our rivers attain to a standard of purity as high as that of any other territory of equal extent in America if not in the world. We have only to take what is so freely provided for us (and only prejudice on the part of some of our citizens in favor of wells prevents our doing so in very many localities), to raise the standard of health and decrease our death rate, which already compares favorably with that of our sister states, until we attain the proud position of being indisputably the most healthy state in the Union. In the month of July, 1877, a circular was prepared, modeled upon that prepared by the Board of Health of the state of Michigan, a copy of which is appended hereto, and sent to leading physicians in every part of the state, requesting information upon the subject of the water-supply of Wisconsin.

Replies were received from a large number of those addressed, and copies of the more important of these replies are published herewith. The committee on Water and the Water Supply of the State take this method of acknowledging the kindness of the many gentlemen who responded so fully, and from whose answers to the circular in question so much valuable information was gathered; and to assure them that it is only owing to the insufficiency of the means at the disposal of the Board that their communications are not published in full. It is hoped that means will be provided in the coming year which will render it practicable for the Board to lay before the people of the state all the answers now in the hands of the committee, and also the large additional number which it expects to receive during the coming year.

In view of its inability to accomplish this object at the present time, and as the next best thing, the following digest of the omitted reports is herewith presented.

By far the larger part of the supply-water for drinking and general culinary and domestic purposes throughout the state is drawn from wells, which vary in depth, in the character of the soil

in which they are dug or bored, and in that of the underlaying strata. The least depth mentioned is in the report of Dr. Wilber, of Mineral Point, Iowa county, and is six feet, while the greatest depth of common wells is that of 150 feet, as mentioned in Dr. Edwin Ellis' communication from Ashland.

In a very large majority of cases, wells are curbed with pine plank of greater or less thickness, in most instances not exceeding 1½ or 2 inches; and little or no care is exercised in preventing the decay of this curbing, or in removing any portion of it which may become rotten, and it often becomes a fruitful, though wholly unsuspected source of sickness. Decaying organic matter of any kind is not an agreeable or healthful addition to our drinkIng water, and rotting wooden curbing not only contributes of its own substance to the water of wells surrounded by it, but, as every entomologist well knows, it affords shelter and food for many different kinds of beetles and often insects, which, living, contribute their excreta, and dying, their own bodies as further flavoring materials to the infusion, which often is boasted of as being far superior to any in the neighborhood!

Many will say in answer to this, that pine lumber is often the only accessible material for curbing their wells, and ask what they are to do. We think that in many cases this plea will be found untenable, as stone of sufficiently good quality for such uses is to be had in many localities where wood is exclusively used. Nevertheless, it is possible to use wood for curbing, and to preserve it so that its decay will be postponed for many years; let the planks used be at least three inches in thickness, and let joists to which they should be fastened, and preferably with galvanized nails, be at least six inches square; then by charring both sides and edges of the plank to a depth of about ⅜ or ½ inches, and treating the joists in the same way, a lining will be provided for a well which will not only remain sound for many years, but will for a time have the power of absorbing and oxidizing many noxious gases from the soil, and thus preventing their solution by the water. We may add that if galvanized nails are not to be had, any nails may be prevented from rusting by heating them to a temperature a little below red-heat and plunging them while thus heated into almost any oily or greasy matter. Common observation shows that iron-rust exercises a specific action upon wood, which promotes decay. Dr. Selden,

of Tomah, also gives a method of digging wells which may prove valuable for many localities.

In many places bored and driven wells are taking the place of the old-fashioned dug and curbed wells, and we can but think that the change is a most desirable one, so far as the health of the community is concerned, provided that hard-glazed tubes, well cemented and fitted into each other are employed in the case of bored wells; if this be not done, they are no better than the common dug well.

Another very serious source of contamination of our drinking water is found in filtration from cess-pools, privies and other receptacles of filth. In one report a case is mentioned of a privy, recently constructed, which is *only ten feet from a well*, and it is inferred that this well furnishes water for many individuals besides those who occupy the premises upon which it is located. It is a privy dug for the use of a store in Waupaca county, and both it and the well are probably used more or less by the customers of the establishment. It is impossible to prevent the passage of fecal matter from a vault to a well in such close proximity, let the character of the soil be what it may. Every man who has ever drained a piece of land knows that water will make its way through any soil, however impervious it may seem to be; a very high authority says upon this point: "As to the entrance of the water, the drainer need give himself no trouble; experience will prove that *you can't keep it out*, and it is astonishing how soon the water will 'learn how' to get in even if strong clay is rammed tight over the pipes." This being the case, it is needless to use argument to show that water will filter from a privy to a well, especially through a soil described as a sandy loam, and of which it is said that it "absorbs everything," and where no precautions are taken to prevont its passage, nor is it necessary to say much to prove that a well so located may be, and too probably is, a focus from which originates many a case of disease, which the most skillful physicians may try in vain to trace to its source.

From the various reports which have been received, it would appear that the average distance of privies from wells throughout the state is not much over forty feet. This distance is decidedly too small, especially when the fact is taken into consideration that privy-vaults generally are mere holes in the ground, without curb-

ing of any kind, whatever may be the character of the soil; our own observation goes to show, moreover, that these receptacles are rarely if ever emptied except it may be in the larger cities; a vault is used until it almost overflows, and is then covered over with a shallow layer of earth, or as in one case within our knowledge, with boards, a new hole is dug, over which the old building is placed, and this proceeding is renewed again and again until a large body of the soil is contaminated, and, through the soil, the water used for all domestic purposes. Let it not be supposed, either, that contamination, and contamination of the most fatally dangerous character, does not exist where a chemical analysis fails to show any source of peril. In the case of certain organic poisons which affect the system through the blood, the experiments of Mons. Chauveau and Dr. B. Sanderson, on vaccine matter, render it well nigh certain that no amount of dilution can destroy the power of infection which these poisons possess. From these experiments it appears that if inoculation be performed with vaccine lymph after it has been very much diluted, the chance of the production of postules is rendered somewhat less, but when the vaccination is successful, the postule presents all of its normal features and passes through all the usual stages of development.

It is plain that there is a limit to the delicacy of our tests for organic poisons, marvelous as is the sensibility of the reagents which are at our command in the organic kingdom. There is a point beyond which the chemist is unable to pass, a region where he is powerless; in the present state of knowledge, a chemical analysis is not enough to determine the character of a given water supply as to its desirability. The rice water evacuations of a cholera patient diluted with no very large amount of water form a liquid in which chemical tests would probably fail to indicate the presence of anything which could be pronounced injurious, while yet the poison would be there, undestroyed and ready to do its deadly work the instant it might find its appropriate field for development. It would be still in the liquid, although unrecognized and unrecognizable, and physicians are now generally agreed in considering that such water is the most direct and certain, perhaps, indeed the most usual vehicle for the transmission of Asiatic cholera.

There are, moreover, many instances which might be quoted wherein cases of sickness have been traced directly to the fact that

the water used for drinking purposes has been rendered foul by decomposing excremental matter which had found its way into the source of supply, and a most striking case of this case is referred to by Prof. Daniells, of the city of Madison, where it is said that "the sky is the bluest, the air the purest, and *the water the sweetest* ever found within city limits." Prof. D. says: "A family using the water of a certain well in this city were all but one sick with typhoid fever during the past spring. Three persons died. Of another family living in the same house, *using no water from this well*,* none were sick. *There were five privies within a radius of six rods from this well, and it was upon lower ground than any of them.*"

In order to settle the question of filtration through a body of soil beyond all doubt, the following experiment was devised and carried out: A spring in this place was chosen, and its water first tested for soluble chlorides, which were found present in exceedingly small quantity. At a point 42 feet distant from the spring-head, a crowbar was thrust down into the soil to a depth of two and a half or three feet, and into the opening thus made a pailful of a strong solution of common salt was poured; when this had all been absorbed, a gallon of kerosene was poured into the same aperture. *Three hours afterwards* a sample of the water showed some increase in the amount of sodic chloride, and upon careful distillation a very small amount of kerosene also was obtained; a sample taken from the spring eighteen hours afterward showed a greater increase of sodic chloride, and distillation gave about two fluid drachms of kerosene.

Thus, in three hours, an appreciable quantity of two substances had made its way through soil and water a distance of 42 feet.

From this, as well as from kindred experiments tried in Switzerland, it would seem that no possible doubt can remain in regard to the filtration of various fluids through the soil, nor can there be any question of the fearful risk of disease and death involved in using water from wells located as are those mentioned in the reports from Waupaca county and from Madison.

Did our space permit, it would be easy to draw further facts of great interest and importance in a sanitary point of view, from the material so abundantly furnished in the replies to our circulars.

*The italics are the writer's.

Here, however, albeit with great reluctance, we must bring our work to a close for the present, hoping to resume it at an early day, and to lay before the people of Wisconsin other facts in relation to their water supply.

We cannot, however, stop without acknowleding the assistance which we have received in the course of our work from Prof. Thos. W. Chittenden, principal of the high school in the city of Grand Rapids, who kindly undertook the labor of analyzing the many samples of water received from various parts of the state.

*Circular No. 5, Relative to Water Supply.**

WISCONSIN STATE BOARD OF HEALTH,
JULY, 1877.

DEAR SIR: The Board of Health of the state of Wisconsin, desiring to obtain as full and accurate information as possible upon the water used for drinking and similar purposes, have appointed a committee to obtain such information and report thereon. Will you, therefore, at your earliest convenience, give answers to the questions which follow, or to as many of them as possible? In answering, it will only be necessary to give the *number* of the question without repeating it. Please forward answers by the first of September, 1877, and oblige, Yours very respectfully,

G. F. WITTER, M. D.,
Chairman of Committee on Water Supply.

GRAND RAPIDS, Wood county, Wis.

1. What is the name of the village, town, or city in which you live?
2. What is the name of the county?
3. What is the geological character of the district in which you live?
4. What is the character of the soil?
5. How is your district supplied with water for drinking and culinary purposes?
6. If you live in a city, or other place, which has a system of water supply, please furnish as full particulars as may be practicable in relation thereto.
7. If there be any system of sewerage, drainage, etc., in your locality which has any connection with the system of water supply, give all particulars as far as known to you.
8. If the water supply be derived from wells, what is their average depth; general character, i. e., common, bored, driven or artesian; mention strata passed through in digging, boring, etc. Angle and direction of inclination of strata as far as known; character

*The circular is substantially the same as that issued by the State Board of Health of Michigan.

of strata underlying wells generally, together with any other information which you may think pertinent.

9. Is the water used for drinking hard or soft? If hard, give as nearly as possible the degree of hardness; i. e., the number of grains of lime salts per gallon.

10. Is rain water used in your locality to any extent for drinking purposes? If so, give particulars in regard to receiving and storing thereof and details known to you concerning filtration or other purification prior to use.

11. Is any system of filtration or purification in use in your neighborhood, and how do those using water so purified or filtered compare with their neighbors as to general health?

12. How far, upon the average, are privies, cesspools, open or other drains, etc., placed from wells in your district?

13. What is the least distance between wells, privies, etc., that has come under your own notice?

14. Do you know of any case or cases of disease in your neighborhood, due to filtration from drains, cesspools, privies, or the like, into wells? If so, give full particulars.

15. How are graveyards, cemeteries, etc., situated with relation to any sources of water supply in your locality?

16. Are metallic pipes used to any extent in your neighborhood? If so, of what character?

17. Have the waters used for drinking and culinary purposes in your neighborhood ever been analyzed? If so, furnish, if possible, a report of the result of such analysis?

18. If no analysis has been made within your knowledge, as above, give your own opinion as to the fitness of the water used in your locality and within the range of your own observation for drinking and culinary purposes, with special reference to the quantity of organic matter contained therein.

19. Please use your influence in your district to have the test detailed below (Heisch's test for organic matter) applied to as many samples of drinking water as possible, and PARTICULARLY TO THE WATER OF WELLS WHICH ENJOY A HIGH REPUTATION IN THE VICINITY, collating and reporting results as far as convenient.

Filter, through filter paper, flannel, or some similar material, into a clean, clear glass, jar or bottle from ½ pint to 1 pint of the water to be examined; add pure cane sugar in the proportion of 25–40 grs. (say ½ teaspoonful to 1 pt.) cork or cover to prevent the entrance of any extraneous material, and set aside in a warm place, from 70° Fah. upwards, for 24 or 48 hours. At the end of that time observe whether any milkiness, opacity or bad odor has become perceptible. Water sufficiently pure for drinking should be clear and transparent, and free from all odor at the end of 48 hours.

20. Do open springs supply water to any extent?

21. Has any or all of the water supply of your district been, at any time within your knowledge, contaminated to an extent which has rendered it offensive in any way? If so, give full particulars, including cause, etc., as far as known to you.

22. Have any cases of contamination from decay of wooden

pipes, curbing, etc., oxidation of metallic pipes of any kind, or any similar cause come under your observation? If so, give particulars.

23. Do you know of any case of arsenical poisoning arising from the use of Paris green for the destruction of the Colorado Beetle, and its solution and filtration into wells, etc? If so, give details.

24. What influence have such meteorological phenomena as prolonged rains, heavy snow-falls, droughts, etc., upon the water supply?

25. If there be any system of water supply, what is the amount per diem by each inhabitant? What is probably the consumption per diem by each individual in any case in your district?

26. Give any information which may be pertinent to the subject of the water supply in your district, upon any point which may have been omitted in the above interrogatories.

27. Please put this circular on file for future reference, and communicate any information of interest or importance bearing upon the subject of water supply which may hereafter come into your possession, to the committee as above.

By order of State Board of Health.

Answers to Circular No. 5, on Water Supply.

A.

TOMAH, August 4, 1877.

DR. G. F. WITTER:

My Dear Dr: With a copy of your catalogue of queries respecting water supply before me, I still prefer to answer in my own way. * *

The water used in this town for drinking and culinary purposes is, so far as I know, derived entirely from wells. They are on an average from 15 to 20 feet deep, extending through the super-stratum of sand, which is about 10 feet, on an average, and about 6 to 10 feet into a conglomerate sand rock. Largely the common well prevails, although many are bored — more now than formerly. These common wells are almost universally curbed down to the rock, and many of them become unfit for use from contamination of the water by decay of the wooden curbing.

There is no system of sewerage or drainage in this place and, notwithstanding my position as health officer, I have so far been unable to influence the town officers to enforce a thorough cleaning up, although cases of disease are constantly occurring that are clearly traceable to impurity of the water and bad odors from dung heaps, pig sties, and other sources of filth. One peculiar feature of our wells is, that when first dug or bored the water is very soft and pleasant, but it gradually becomes hard and unfit for washing. The cause is as follows: our sandy soil is largely mixed with lime-

salts, and these are carried by percolation and washing from the surface into the wells; hence the change in the water from soft to hard. So far as I can learn, no analysis of the water used in this town and vicinity has ever been made, but it is not too much to say that it is very hard.

I have seen but two or three instances in which privies were placed nearer than 20 feet to a well, but, with our sandy formation, this is of course much too near. *One was only ten feet from the family well*, and you can imagine the result. After much effort, I had the well condemned by the town authorities and filled up. Our cemetery is one mile from town.

From what I have written, you can infer that our water supply is about as bad as it can be, and it must continue to grow worse until a new order of things is instituted. It does not need Heisch's test or any other to detect the filth in a majority of our wells. A pitcher of the water placed in a temperature of 70 ° Fah. will in six hours give off the peculiar odor of organic matter. Instances of disease brought on by the use of bad water can be given if required.

Now the best water in the world is within reach of us all if we only choose to get it. It is the water in the sand-rock under the superstratum of sand. I have proposed a plan of putting down wells that is working well, and, so far as carried out, furnishes as good water as can be obtained anywhere. It is as follows: Dig down to the rock, then bore into it till sufficient water is obtained, then enlarge the bore at the top for about two feet, and insert a six inch galvanized iron tube long enough to reach to the top of the ground. Around this tube, within rock, put water-lime cement, which entirely excludes surface water, and allows only the pure element which percolates through the sandstone rock to reach the well. * *

I think that the plan of putting down wells detailed above is the only practicable way of obtaining good water for the use of towns built upon the light porous soils of this part of the state. I think that this plan, or some modification of it should have the sanction of the board of health, and be strongly urged upon communities so situated.

As to the reputed purifying power of our soils when used as filters, let me give you an experiment of my own. From one gallon of water taken from a public well which enjoyed the reputation of furnishing pure water, one pint was passed through filtering paper and 25 grains of pure cane sugar were added. After standing in an atmosphere of 70 ° Fah. in a glass stoppered bottle for 12 hours, the water was very turbid and emitted strongly the characteristic odor of decomposing organic matter. A filter was then prepared of the subsoil surrounding the well, and packed even more closely than it was before disturbed. Through this filter water from the same well was passed until a pint was obtained which was filtered through paper, and subjected to the same test as the other. In the same time the same turbidity was noted and the same odor was given off, showing that no change in the water took place during its filtration through the soil.

Even if the soil did naturally possess some merit as a filter, yet in towns where imperfect policing is the rule it must soon become saturated with the leachings of filth.

Very sincerely yours,

O. G. SELDEN.

B.

RACINE, Wis., September 16, 1877.

Dr. G. F. WITTER:

Dear Sir — In answer to circular No. 5, State Board of Health, I can simply say that a careful examination of the water of this city has never been made.

It comes, however, from common wells of a depth from 15 to 30 feet. Beneath the first two feet of surface soil, the area of the city is about equally divided between clay and sand; therefore about one-half of the wells are dug directly in the clay, receiving water at such a depth as a stratum of gravel may be reached, which ordinarily is not greater than that given above. The remaining half are dug in the sand to the depth of 8 to 10 feet, when the clay bed is reached and sufficient water found; three or four feet of clay are then removed, simply making a receptacle for the water already flowing in. Only a few of these are carried deep enough to find a stratum of gravel in the clay itself; they are merely basins holding water which flows into them from the surface of the clay-bed — water that is filtered through the eight or ten feet of sand above. Parts of the 1st, 2d, 3d and 4th wards receive water from such wells.

There has been thus far no known contamination from the soakage from privies, cess pools, or other receptacles of filth, through the sand, but that this will occur, in my opinion, is certain: it is only a question of time.

A few wells bored to the depth of 75 to 100 feet, furnish an abundant supply of pure water to the breweries. The water in these wells does not rise to the surface.

An Artesian well, 1,400 feet deep, supplies water for fire purposes. The stream is 5 inches in diameter; preasure, 50 lbs, per square inch. The water is used to some extent for drinking, but not for general household purposes. I cannot give you the analysis, but it contained some iron. * * *

Respectfully yours,

J. G. MEACHEM,

Sec'y Board of Health,

C.

MADISON, Wis., Sept. 25, 1877.

1. Madison.
2. Dane.
3. Drift, overlying lower magnesian limestone and Potsdam sandstone.
4. Clay, clay loam and sandy gravel.
5. By wells and cisterns, mostly wells.
8. Depth varies from 20 to 75 feet in the drift; clay, sand and gravel.
9. Well water is hard.
10. Yes; stored in cisterns, filtered in cistern or house filter, or both.
11. Through a brick partition in cistern; sand and charcoal; Kedzie's patent house filter. Nothing noticeable as to health.
12. Seldom more than four rods; often within 20 feet.
13. Eighteen feet.
14. A family using the water of a certain well in this city were all but one sick, during the past spring, with typhoid fever. Three persons died. Of another family living in the same house, using no water from this well, none were sick. There were five privies within a radius of six rods of this well, and it was upon lower ground than any of the privies. The water has not been analyzed.
15. Not so as to affect wells.
16. Only lead pipes from cisterns.
17. Many of the families in this city use water from the artesian well in the capitol park, which has been analyzed. No others have, to my knowledge.
18. They are generally good.
20, 21. No.
22. none.
23. No.
24. They increase it.

W. W. DANIELLS.

D.

WAUSAU, Wis., September 24, 1877.

Dr. G. F. WITTER:

Dear Sir: — I have received your circular and have endeavored to comply with your request. We have not been able to get a Health Board in this city, by reason of the *mayor* refusing to appoint.

Our water supply is furnished mainly from wells from 16 to 45 feet deep: A few get water directly from the river. Wells are curbed as fast as sunk, by reason of going through sand and gravel. Water soft but variable as to degree.

Wells recently sunk give the best water, while the supply in old wells becomes deteriorated on account of decaying curbing. I was

surprised to find so many wells in which the water is no longer fit for use.

There is only one well in the city which has been bricked up and yet all should be. We have never subjected the water to chemical analysis.

The supply varies with the rain fall from 4 to 6 feet in the course of a year. Typhoid fever has but slender hold in this city, nor have any cases of sickness come to my knowledge directly traceable to the water, although I think it must enter as a factor more and more. In a few instances I know of privies within 50 feet of wells, but the general distance is 100 to 200 feet. Our cemetery is outside the city limits, nearly 1¼ miles from the center, and on the same level or planteau; the inclination being toward the river, the cemetery can hardly have any effect whatever upon our water.

Yours very truly, W. H. SEARLES.

E.

SPARTA, Wis., Oct. 2, 1877.

G. F. WITTER, M. D.:

Dear Sir: — You request me to furnish the Board of Health with "as full and accurate information as possible upon the water used for drinking and similar purposes" in this village, and have given a list of questions, to which I make answer as follows:

1. Sparta.

4. A rich sandy loam.

5. We have a number of driven wells, 16 Artesian wells, but the greater part of our water supply is obtained from common wells curbed with pine boards.

6. We have no system of water supply.

7. We have no system of sewerage or drainage other than the almost perfect one given us by nature in the streams which pass through our limits.

8. Average depth of dug and driven wells, 20 feet.

9. Water is soft.

10. Rain water not used for drinking to any extent.

11. No system of filtering or purification in use here.

12. Average distance about 60 feet.

13. Least distance observed by me between well and privy is 40 feet.

15. We have two cemeteries; the one most used at present is on the high ground on the northern limit of the corporation, and is in close proximity to a populous part of the village; the other is on high sandy ground a long distance from any dwellings.

It is to be observed that the rock crops out above the surface near our cemetery while just below it, at "Judge Stub's well," the rock is only 15 feet below the surface, and at the "North Park well" it is only twelve feet below the surface. Dug wells are usually sunk, in this part of the town, a few feet in the rock, to get a constant supply of water. Does the surface water ever penetrate

through Potsdam sandstone? Is it possible for the surface water in the cemetery to find its way down to the rock (which is only a few feet below the surface), and then be shed in the direction of the dip of the rock, southward, into dug well? [It is decidedly possible.]

16. Iron tubing in driven and artesian wells.

17. The water of the North Park and court house artesian wells has been analyzed as follows:

	Grains.
Carbonate iron	14.33501
Carbonate magnesia	4.03101
Carbonate lime	.40202
Carbonate strontia	.01402
Carbonate baryta	.00600
Carbonate manganese	.00072
Carbonate soda	.21030
Carbonate lithia	.02400
Carbonate ammonia	.00210
Sulphate soda	2.21430
Sulphate potassa	.64130
Sulphate lime	.18020
Chloride calcium	.60502
Chloride sodium	.14301
Phosphate soda	.06400
Phosphate alumina	.06080
Iodide sodium	.00014
Silica	.28000
Hydric sulphide	.00340

20. There are no open springs supplying water for domestic purposes.

21. The water supply of this district has not been contaminated to my knowledge so as to become offensive in any way, except in the case of rotten wooden curbing which I think is often a cause of contamination especially after heavy rains: the fungi that accumulate on the curbing are then washed down into the well, and I have often seen water in such cases thick with decaying organic matter. After a few days the water becomes clear again. This I believe to be a serious evil.

23. I know of no case.

24. Severe drouths decrease the supply in our dug and driven wells but do not affect the artesian.

All of which is respectfully submitted.

R. S. WELLS, D. D. S.,

F.

WAUPACA, Aug. 8, 1877.

1. City of Waupaca.
2. Waupaca.
3. Sandy.
4. Sandy loam.
5. From wells dug about 28 feet deep, and curbed from the top

downward with pine boards. The water is found in abundance and very pure in a coarse gravel at the above depth.

7. No sewerage; the sandy soil absorbs everything.

9. Hard in some of the wells and soft in others. Those that are hard contain but little lime together with some vegetable matter blown in from the top and deposited from the sides. The wells are about four feet square, and catch flying leaves and other vegetable substances blown by the wind.

10 and 11. No.

12. Two to three rods.

13. *Ten feet!* This is one just made and used by one of the stores.

14. No.

15. The grave yard is separated from the city by a strip of marsh that empties into a small lake, and is nearly a mile from the city.

16 and 17. No.

18. I think the water in this city and neighborhood is pure as any in the state. The quantity of organic matter from causes above stated must be very small. The quantity of water in most wells is very small, and is reproduced as often as drawn out. The depth rarely exceeds two feet, and the quantity rarely exceeds 60 gallons.

20, 21, 22, 23. No.

24. But very little; any excess of water is soon absorbed by the soil.

Yours, etc.,,

GEO. R. TAYLOR, M. D.

SECOND COMMUNICATION FROM DR. TAYLOR.

WAUPACA, September 22, 1877.

Dr. G. F. WITTER, *Dear Sir:*—I have procured several samples of water from different parts of the city and submitted them to Heisch's test, referred to in your circular.

I find that they *all* exhibit large quantities of what I should regard as organic matter. The water has become very turbid, of a milky appearance, with a heavy deposit very much resembling that of an excess of acet. plumbi in water. The odor in several of the specimens is that of rain water that has been standing for some time in the open air.

One of the specimens (and that now used at the public school) plainly indicates, in my opinion, animal matter in decomposition — perhaps from mice or other small animals falling into the well.

Yours, etc., GEO. R. TAYLOR, M. D.

G.

PRAIRIE DU CHIEN, WIS., Sept. 6, 1877.

G. F. WITTER, M. D.:

Dear Sir: I have answered your questions as well as I can, not having time to make analyses or other minute investigation. Our

artesian well is probably one of the finest in the world. I append analysis of its water, made by G. Bode, of Milwaukee.

The ground upon which our town stands is a pure sand-bank on the Mississippi river — a gravelly sand to the depth of about 150 feet. The wells are mostly drive-wells, which are easily put down through this sand, and we obtain very excellent water. The drainage is simply the absorption into the sand.

1. Prairie du Chien.
2. Crawford.
3. Limestone underlaid by sand-rock.
4. Clay loam.
5. City, by wells; country, mainly by open springs.
8. From 30 to 50 feet, common and driven; gravelly sand.
9. Hard.
10. No.
11. From 30 to 50 feet.
13. Perhaps 20 feet.
14. No.
15. None that I know of.
16. Iron.
17. None that I know.
18. Very good.
20. In the country, yes.
21, 22, 23. No.

ANALYSIS OF WATER FROM ARTESIAN WELL.

	Grains.
Carbonate of lime	0.6222
Carbonate of magnesia	10.9739
Chloride sodium	90.2007
Chloride potassium	3.8064
Bromide sodium	0.1281
Sulphate soda	12.7978
Sulphate lime	25.3699
Carbonate iron	0.2808
Alumina	.0061
Silica	3.8430
Phosphate soda	trace.
Organic matter	trace.

Very truly, D. MASON.

H.

MANITOWOC, August 16, 1877.

1. Manitowoc.
2. Manitowoc.
3. The whole country is underlaid by a bed of limestone, varying in depth from 50 to 100 feet on the lake shore, to 0 or 50 feet above, in the form of ledges 12 to 20 miles from the lake shore.

This ledge is continuous with the limestone ledge which passes east of Lake Winnebago, N. and S. The upper stratum is pure sand on the shore of Lake Michigan, depth 20 to 50 feet, underlaid with stratum of red clay. At a distance varying from ½ to 1½ miles, the upper stratum is a sandy loam with similar substratum.

4. Soil very fertile.

5. Entirely from wells, with an occasional spring.

7. Drainage mostly surface drains and has no connection with water supply except by porosity of soil.

8. Average depth of wells in city about 20 feet. Common. Mostly through sand ; occasionally, gravel. At above depth we meet with rock; but mostly sand, with occasional layers of clay and gravel.

9. Hard. Cannot give exact amount of lime salts per gallon, but it is not more than is usually found in good drinking water.

10 and 11. No.

12. 10 to 50 feet.

14. Yes; have known some cases of fever that were directly traceable to drinking water. In one instance we had an epidemic of 12 or 15 cases of typhoid in space of two blocks, which was spread by filtration through the soil, and use of water from two or three wells in the neighborhood.

15. A long distance from our water supply and what drainage there is from the cemeteries is toward the river and lake.

16. No.

17. None except what I have caused to be made or made myself.

18. With exceptions following, I find the water unusually good.

19. Have tested fifty samples from wells in different localities, and intended to be fair specimens of drinking water. Of these, twenty-eight do not respond to the test. and are therefore supposed to be pure drinking waters. The remaining twenty-two show organic matter in varying proportion. Only five have so much as to render them, in my opinion, dangerous. and these five are but little better than ditch water. We have probably one thousand wells in the city, which, in the above proportion, would make one hundred probable foci of disease. These two artesian wells, both yielding valuable mineral waters; one that has been analyzed shows sulphate of magnesia, with other salts and a small proportion of iron in its composition. Our water supply, with a little care, would be pure and wholesome, but *criminal carelessness*, over which we have no control, and the lack of proper sewerage will, in time, contaminate a great part of it.

20, 21, 22, 23, No.

24. Prolonged rains cause a perceptible difference in the taste of our water, making it brackish, but only for a short time.

26. The only danger to our water supply arises from the present system of drainage, which is unsufficient, and the close proximity of stables; privies, etc., with no provision for preventing saturation of the soil. We have not a single sewer in the city, but we have but little stagnant water. In the older part of the city, some wells have been abandoned by reason of contamination. Our city lies

partly in a basin through which the river flows. This basin is surrounded by a ridge of sand twenty or thirty feet high. In the basin is the great danger; on the ridge, the water supply can be contaminated only in the course of years and by gross carelessness.

Milwaukee, Sep. 1879. J. F. PRITCHARD.

G. F. WITTER, M. D.:

I send herewith the result of an analysis of the lake water made lately by me.

The water was taken from the hydrant in my store, August 18, 1877, the pipes being then supplied from the reservoir after it had been thoroughly cleaned.

Total quantity of solid matter per U. S. gallon, 8.4971 grains.

	Grains.
Soda	0.1474
Lime	2.7832
Magnesia	1.1243
Oxide of iron	0.0430
Alumina	0.0184
Silica	0.5529
Sulph. acid	0.4055
Carbon. acid	3.2071
Chlorine	0.1720
Organic matter	0 0552

Combined as follows:

	Grains.
Chloride of sodium	0.3195
Sulphate of lime	0.6881
Bicarb. of lime	4.4606
Bicarb. of Magnesia	2.3593
Bicarb. of iron	0.0431
Alumina	0.0184
Silica	0.5529
Organic matter	0.0552

Yours respectfully,
GUSTAVUS BODE,
Analytical Chemist.

I.

BERLIN, Sept. 1877.

1. Berlin.
2. Green Lake.
3. Potsdam sandstone.
4. Sandy.
5. By wells and cisterns.
8. Wells, common average depth, 25 feet. Within one mile east, Magnesian limestone crops out; this has a slight dip eastwardly.
9. Hard; containing fully 30 grains of lime-salts per gallon.
10. Yes, to some extent; is received in cemented cisterns; a brick partition or diaphragm divides the cistern into two parts, and

acts as a filter, the water being admitted upon one side, and drawn from the other.

11. Can only give the general information that such water is not wholesome.

13. Thirty feet.

14. No.

15. Out of the way.

16, 17. No.

18. I believe that the lime-salts exist in too great quantity, and that the filtered rain water affords the more wholesome supply.

19. Have had Heisch's test applied to all the principal wells in the city, and all remain clear and transparent.

Respectfully,

N. M. DODSON.

WATER, AND THE WATER SUPPLY OF THE STATE.

BY PROF. THOMAS W. CHITTENDEN, of Grand Rapids.

An eminent English sanitary engineer (Mr. Eassie) gives it as his deliberate opinion, founded upon many years of observation and experiment, "That the presumption in respect to a well-water is invariably that it is bad; that it is in fact unsafe to use a well-water without having it first examined; that the results of investigation by our first chemists warn us emphatically against well-water" generally.

At the request of Dr. Witter, the writer has devoted some time to an extended series of analyses of the waters used for drinking and culinary purposes in the state of Wisconsin, and the results have been such as to show most conclusively that the above statement holds good for Wisconsin as well as for England, with but little modification. In conducting this work, it is scarcely necessary to say that for obtaining samples of water for examination, it was needful to rely on very many persons of all degrees of intelligence, but such careful directions were given to all who undertook the task, that it is believed that with one exception only, the water arrived in the examiner's laboratory free from any impurities other than those present in it at the source from which it was drawn. The directions were as follows; "Take, if possible, a new glass or earthenware bottle or jug, clean it as thoroughly as possibly, and rinse it repeatedly with the water which it is to contain, filling and emptying it at least five or six times before finally closing it up: then fill

it full, cork and seal aud send it to the chemist as soon as practicable." Samples bottled according to these directions were received from all, or nearly all of the principal valleys of the state, including those of the Fox, Wolf, Wisconsin, Yellow, Black, Trempealeau, and Chippewa rivers, as also from many private sources of supply; samples of the water used for drinking on the cranberry marshes of Wood county were also received, and the writer avails himself of this opportunity to return thanks to the many gentlemen who interested themselves in the work and forwarded specimens of water from their respective localities.

The idea prevails to a very great extent that well-water must necessarily be pure and wholesome for two reasons; first, because it is generally cool, clear and colorless, and secondly, because even though it be wholly derived from surface drainage, it must have parted with all impurities during its passage through the soil, which is generally held to be a perfect filter, both chemical and mechanical, upon an enormous scale. To show the fallacy of this idea we cannot do better than quote the following experiment from the admirable report of Dr. Selden, of Tomah, which forms appendix "A." of Dr. Witter's paper.

"From one gallon of water, taken from a public well which enjoyed the reputation of furnishing pure water, one pint was passed through filtering paper and twenty-five grains of pure cane sugar were added. After standing in an atmosphere of 70° Fah. in a glass-stoppered bottle for twelve hours, the water was very turbid and emitted strongly the characteristic odor of decomposing organic matter. A filter was then prepared of the subsoil surrounding the well, and packed more closely than it was before disturbed. Through this filter, water from the same well was passed until a pint was obtained, which was filtered through paper and subjected to the same test as the other. In the same time the same turbidity was noted and the same odor given off showing that no change took place in the water during its filtration through the soil. Even if the soil did naturally possess some merit as a filter, yet, in towns where imperfect policing is the rule, the soil must become saturated with the leachings of filth."

Further, let the following facts be remembered: That the well is dug, in the majority of cases, at such a distance from the house as will reduce the labor of obtaining water to the minimum; that the door yard in which the well is placed is usually the receptacle for all the sweepings from the house; that the barn yard is frequently

in close proximity to the door yard, and the character of the soil and the probable amount of its power as a filter may easily be guessed.

Moreover, a well, constructed as only too many wells in this state are constructed, *i. e.*, by digging to what is considered a sufficient depth, and lining the hole thus dug, with pine plank, is a receptacle for all the water which falls upon the surface of a circular area which has the well for its centre and a radius varying with the character of the soil, from 25 to 100 feet and even more, as well authenticated instances prove. As mentioned above, the position of the well is chosen with reference to the greatest convenience, being in many cases inside of the kitchen, scullery or wood shed. Slops of all kinds are thrown, very generally, upon the ground just outside of the kitchen or scullery door; the cleanly housewife mops her kitchen floor almost daily, and, as the writer can testify from personal observation in more than one instance, the well is so placed that a large portion of the water used in this purification finds its way directly back into the source from which it was drawn. And, finally, privy vaults and cesspools are generally mere holes in the earth, without curbing or lining of any kind whatever, are much shallower than the well, and at a distance from it, in very many cases, wholly insufficient to prevent the passage of their contents into it. If all these circumstances be considered, there will be no hesitation in affirming that the conclusions of the English sanitarian apply with even greater force in Wisconsin than in England.

Believing that an examination of water, like charity, might best begin at home, the writer began his work by making an examination of the water from the well of the house which he himself occupied, and which he had always considered rather better than that used by the most of his neighbors. A sample of the water treated by Heisch's test (detailed in the extract given above from Dr. Selden's communication) gave in the course of 24 hours unmistakable evidence of the presence of putrescible organic matter in solution, and an examination of the well, which immediately followed as a matter of course, revealed an abominable state of affairs, which, up to that time, had remained unsuspected. The depth of the well was about 12 feet; it had been curbed with pine boards, and, at the time the inspection was made, the curbing had decayed to such an extent that any of the boards composing it could be crumbled to

pieces between the fingers. The well, which was under an outbuilding used as a summer kitchen, had been covered with boards to prevent the sweepings, etc., from the floor above it falling into it, and upon this covering lay a mass of filth evidently the accumulation of several years. It is scarcely needful to say that water drawn from a source with such surroundings could by no possible chance be fit either for drinking or for culinary purposes.

The next examination made was of the water used by a family some member of which was generally more or less unwell. The owner of the well from which this specimen was taken had dug somewhat deeper than common, and claimed that he had struck an unusually large vein of very pure water; that no surface drainage contaminated his supply. On being pumped from the well, a large quantity of floculent matter was to be seen suspended in the water, and upon the application of Heisch's test, after filtration, putrefactive fermentation commenced in less than twelve hours. In this instance, it is probable that the putrescible matter was derived from the washings of the kitchen, laundry slops, etc., the well being placed close to the back door, and its covering being built up level with the kitchen floor, forming in fact a part of the back stoop over which all the water used in the mopping of the kitchen floor passed, and upon which, in summer at least, the weekly washing was done.

The first of the wells above-mentioned contained 14 grains of organic matter in solution per gallon, and the second 16 grains per gallon. The first was invariably filtered previous to use; nothing is known of the second in this respect, but the presumption is that it was used for all domestic purposes in the condition in which it was pumped from the well. The first contained a variable amount of suspended impurities; the sample of the second which was examined showed 23 grains per gallon of the suspended flocculent material mentioned, of which no examination was made; it was, however, evidently organic in origin.

Another sample from a driven well in the neighborhood of these two showed very little organic impurity of any sort; it had a slightly offensive taste, which was found to be due to a minute quantity of decayed vegetal matter; it contained traces of lime and magnesia, together with sulphates of soda and potassa.

A curious illustration of the manner in which a water originally

remarkably good and pure may become so contaminated as to be unfit for use, was given in the examination of a sample of water from a spring which supplied several families. Heisch's test showed the presence of putrescible matter, and further examination showed that nitrites and phosphates were also present in considerable quantity. From these facts, very grave suspicions arose as to the source of contamination, there being a disused cemetery in the immediate vicinity. Examination proved, however, that the slop of the strata of clay from between which the spring flowed was in such a direction as to render it very probable that any drainage from the cemetery could find its way into the spring, and further inquiry brought to light the fact that some, if not all, of the junior members of the families concerned were in the habit of using the spring-head as a convenient place for the storage of minnows, frogs, etc., intended for live fish-bait. A further cause of contamination existed in the fact that water found its way into the spring from a portion of a road which had been filled in with slabs, etc., in the crevices of which great numbers of beetles and other similar insects found a congenial home. Upon the spring being thoroughly cleaned out, a cemented lining substituted for a wooden one, and proper arrangements made to divert the drainage from the road into more suitable channels, a second examination of the water was made, and it proved to be, as had been the boast of those using it, one of the best waters in the city, all, in short, that could reasonably be expected or desired.

Far different was the condition of the water from a number of springs flowing from a low bluff, lying to the north and east of the same locality, upon the edge of which the old cemetery referred to above is located. The slope of the clay, underlying the drift which forms the bluff in question, is such that a large part of the water forming these springs must, of necessity, pass through the cemetery; it is heavily charged with nitrites, phosphates and chlorides, all of which point too plainly to an animal origin to admit of much doubt that the water is simply a "strong infusion of death." It is not known to the writer whether the water from these springs is used to any great extent for domestic purposes; the time at his disposal, moreover, was not long enough to admit of any thorough or extended investigation of the character of the water used in the district which they probably supply; a question of considerable

sanitary interest, however, is, whether diseases pointing to an impure water-supply prevail to any considerable extent in the district in question.

A very common error, in this section of the state at least is, that of considering water, colored by decaying vegetal matter and possessing almost any disagreeable taste, as a chalybeate, having all the tonic and other medicinal properties of waters of that character. A tolerably large section of this city is supplied with water which, flowing through a marshy tract, has become impregnated with vegetal matter, which imparts to it a brownish tint that, taken in connection with a somewhat nauseous flavor, is generally thought to give indisputable proof of the presence of iron. Analysis shows, however, that while a trace of iron is really present, the quantity is wholly insufficient to affect appreciably either the color or taste of the water, far less to impart the very decided tint and flavor which characterizes it. As a matter of fact, very few of the samples of water examined contained iron in sufficient quantity to give, even after considerable concentration, the characteristic reaction of that metal with potassic ferrocyanide.

Among the specimens examined were two from two hotels, one the Rablin House, in this city, the other labeled simply "hotel water," having nothing to indicate the name of the house or its locality. A greater contrast could hardly be imagined than that existing between these two sources of supply. The first was of exceptional purity, showing traces only of soda and potassa, and almost entire freedom from any organic matter. The second contained lime, magnesia, soda, potassa, chlorine, phosphoric, nitrous and sulphuric acids, giving strong reason to suspect contamination by decaying organic matter of animal origin. Another sample from a private well showed the presence of a large amount of nitrites and phosphates, and from a rough diagram which was drawn by the gentleman who obtained the sample in question, it is inferred that the same state of things exists throughout the locality from which it was obtained. According to this diagram the well "lies near the foot of a hill, one side of which is rock, the other and that nearer to the well being composed of sand; upon the sandy side is situated a cemetery," its distance from the well not being mentioned. A memorandum descriptive of the well and its surroundings from which we quote, says: "The well is fifty feet deep, all the way

through sand, and the soil for a large distance around is sand." Now, there is at least one case on record, narrated by Dr. A. Hagler, of Basle, Switzerland, we think in vol. XI of the German Archives of Clinical Medicine, which proves beyond all question that water may pass through more than a mile in thickness of porous soil without being freed from organic matter in solution. This case was briefly as follows: Three cases of typhoid fever occurred in an isolated farm house situated on one side of a mountain ridge, upon the opposite side of which stands the village of Lausen. A brook runs past the farm house, which stream received the excreta of the three patients, and in it their bed and body linen was washed.

The brook served to irrigate certain meadows near the farm house, and the water from these meadows filtered through the soil, as was shown by a crucial experiment, devised and executed by Dr. Hägler, and mingled with the water of a spring which supplied nearly all the inhabitants of Lausen with water, the only exceptions being those of six families who used water drawn from wells on their own premises. No fever occurred in any one of these six families, while scarcely one of all the rest escaped. One hundred and forty-four cases in all were treated, including those of children who contracted the disorder at Lausen, where they were spending their vacation, and who sickened after their return to school.

Cases like this are full of warning and instruction for all who are willing to profit by the lessons they convey. From the facts discovered by the analysis of the water from the well described above, and from the account given of the relative situations of the cemetery, and of the character of the soil lying between it and the well there is serious reason for apprehending danger to all who use water derived from wells in that locality.

And just here it may be said that while water tested by Heisch's test, which shows any marked milkiness or turbidity, or which gives off any disagreeable odor within forty-eight hours, may be safely pronounced unfit for domestic use, it by no means follows that all waters which remain clear and transparent when subjected to treatment for that length of time are free from all impurities which are dangerous to life and health. That test, valuable as it is, for the detection of sewage and similar matter in water, gives no information whatever in regard to nitrogenous compounds which have undergone oxidation more or less complete. The presence of

nitrates in water gives ground for suspicion in regard to its fitness for drinking, for it indicates the presence, in some portion of the soil through which such water has passed, of a very large amount of animal, or at least nitrogenous matter.

Still more objectionable is the presence of nitrates, and these were present, in the case referred to above in large quantity. These salts indicate an originally incomplete oxidation of nitrogenous matter, a reduction of oxides from a higher degree to a lower, or, as has been recently discovered, the presence of bacteria and their action on alkaline nitrates. If the presence of nitrates be due to the first of these causes, the soil is insufficiently aerated, and consequently its oxidizing powers are overtaxed. In the second case the inference is that some reducing agent is present, and while this agent may be in itself perfectly inert or harmless as regards the animal economy, on the other hand it may be some putrefying organic matter, and in all such cases it is the part of wisdom to assume the worst, and to avoid the use of such water for domestic purposes. Lastly, the appearance of bacteria is so closely connected with the processes of putrefaction and decay that there can be no doubt whatever of the propriety of rejecting water in which there is reason to suspect their presence. Further, the presence in both nitrites and nitrates in water indicates not only the presence originally of nitrogenous matter in the soil through which such water has passed, but if their quantity be large it indicates an overtaxing of the chemical powers of the soil, or, to say the least, that these powers are already tasked to their utmost extent, and that consequently any addition to the amount of nitrogenous matter already present will remain to be partly dissolved by the water which filters through it, and carried into wells or other sources of supply, to be drawn thence and to do the work of producing disease and death. It ought, moreover, to be generally known that nitrates are all soluble in water, the alkaline nitrates especially so, and that they impart to water a saline taste and a degree of coolness which are considered by many peculiarly pleasant and refreshing, so that the very qualities which ought to give warning of danger are held to be powerful recommendations.

In addition to the many samples of water obtained from wells and similar sources of private supply, a few samples were procured from the cranberry marshes of Wood county. These were gener-

ally good in character, none of them containing more than 3 grains per gallon of organic matter or anything harmful. One was chalybeate in character, holding 8.7 grains per gallon of carbonate of iron in solution.

The question will doubtless be asked, "What are we to do—whence are we to obtain supplies of water for drinking and domestic purposes, if the water of our wells is as bad as you have represented it?" In answer, we reply that the state of Wisconsin is blessed with an abundant supply of as pure and good water as is possessed by any territory of equal extent in the United States, and probably in the world. The waters of the Wisconsin, Black, Yellow, Wolf, Fox, Chippewa, and probably of all the rivers of the state are equal to the boasted Croton of New York, and in some instances far superior to it. In cases where no stream is available as a source of supply, greater care in digging wells, with an avoidance of the use of wood for curbing, and the exercise of common sense in locating privies and cesspools, will probably prove effective in improving the quality of the water. The excellent suggestion of Dr. Selden may also be of use in a large section of the state.

If it came within the scope of this article so to do, much might be said in relation to the construction of privy-vaults, the merits of earth-closets in respect to the water supply, the best methods of well-construction, etc., etc., as bearing upon the questien of public health. Neither time nor space, however, admit of the full discussion of these subjects, even if they fell into the writer's province. It must suffice if we have succeeded in calling attention to some of the dangers which threaten us, and in arousing abler minds to a contemplation of them in all their magnitude.

ON THE BREEDING AND MANAGEMENT OF HORSES.

BY REV. WM. H. H. MURRAY, OF MASSACHUSETTS.

Of the *management* of the horse, I have not the time, neither have I the inclination to-day to speak; every man has his own idea, and every man who owns a horse thinks his own idea is better than his neighbor's, touching the question of his management. I have

found no greater divergence of opinion in reference to horse matters, than just this question. How should a colt be managed? In reference to his education, in reference to the discipline of his powers, in reference to his diet, in reference even to the surroundings of his stables, and how he should be managed when driven in those great contests of speed which decide the quality in him, I find few men to agree. So we will lay that aside. I have thought that, in reference to the matter of breeding, there might be some young men here, and if not here, there would be young men in the country before whom this report, when published, — as I understand it will be — will be laid, who would be interested in knowing what a young man who has been actively engaged in breeding, and who has made his studies touching the literature of the horse tend in that direction, had settled upon in respect to two or three of the dozen points involved in the general problem.

I would say, then, in the first place, that there is but one way to approach this problem of breeding the horse. It is the way in which we should approach the discussion of propagating any form of life that has been made of God, and is intimately connected with human happiness and the welfare of society. The greatest coarseness that can be manifested by a human being is the coarseness manifested in the presence of a woman, and especially in the presence of a woman who is a mother. A man who can derive any element of joke, any material for squibs, or the least substance for irreverential remark, as he looks into the face of the mother as she holds her child in her lap, or on her bosom, has stamped himself so base, so ignoble, and so utterly rude, that he has ruled himself out of the presence of respectable and cleanly thinking men.

Whoever can approach the problem of propagating life so that it may fulfill the high, and I may say, the serene uses that the Creator intended it to fulfill; whoever can look even upon the young lamb in the farm-yard, and not see in its existence one of the divinest mysteries in the universe; whoever can look into a nest of little robins, and see the care of the old birds for their young, and not feel that he is touching the margin of the greatest mystery we have to explore, is a marvel of course insensibility, — and going up to the higher forms of life, until we come next to the highest perhaps, the propagation of the horse, — for I place higher than the propagation of the horse, the propagation of the dog, — when he sees

what God intended in his creation, sees what he was designed to be when God created him — for you know that all animal forms existed first in some mood of God; before even they had structure, they existed in his benevolent designs; they had an eternity of conception as it were, in him, and they truly have come out of him, as out of his own substance, — whoever then, comes up to a problem like this: How can we reproduce the horse, in its original type, and does not feel grave and sober; feel that he has touched one of the gravest matters of studentship, he is, — I will not say what he is, I will say what he is not — he is not a sensitive and reverential student of divine causes and effects.

Now, young man, if I have arrived at any truth, if I have arrived at any correct understanding of this matter of breeding the horse, I am quite sure that I owe it, more largely than to any other one thing, to the fact that I took it up reverentially. "A brutish man knoweth not God," said the old Psalmist. He neither knows him in his essential nature, as he is unexpressed as spirit, nor does he know him as he is expressed in organism and structure. There is a certain fineness of fibre required in the mind to understand these things, which lie so closely to the edge and verge of Deity. If I have arrived at any truth in this matter, I say, I believe I owe it more to the fact that I took the first knowledge that I discovered out of the Bible, and with it was associated in my mind all the traditional reverence, if you please, in which I had been trained touching the Word of God. I remember well how long I floundered about in the mire of discussion and antagonism, and difference of opinion on the part of wise men as they would be called, in reference to this matter, and I remember well, how one evening, in looking upon the pages of the open Bible, I struck the bottom fact which underlies, as I conceive, the whole subject; and it was in that plain, ordinary sentence, which all of you know, but which few of you, perhaps, have ever felt in its full significance, that, "every seed should bring forth after its kind." I said, "find the highest type to perform the parental act, and you can repeat the typical creation. Find two parents that represent the original idea in any organism or structure, and I can repeat the original idea." Find the typical rose of all the world, and you can repeat the first rose that ever was made. Find the representative daisy, and you can repeat the original daisy form. Find the original perfection of horse structure,

horse temperment, horse form, and you have got back face to face with the original idea that was in God's mind before ever he stamped it into the physical structure of the noble animal.

I will pass over the history of the beeding and management of the horse, one of the most unique and wonderful which the literature of the world records, pausing simply to say we are only discovering and learning over again the lost wisdom of the world. The Egyptians, for instance, three thousand years ago, bred five or six different styles of horses, in order to meet the demands of their festivals and royal entertainments. The highest form of beauty, — the royal form of beauty in horses, as many of you know, was the horse which had such high action in front, that his knees, when brought up in stepping, nearly touched his lower lip as he marched with his nose curbed in. The royal chariot horses of Egypt had this superabounding high knee action in front, as we admire it in the parade horse of to-day. They not only admired it, but reduced it into one of the facts of their breeding. In other words, the royal horse of the old Egyptians — the horse which drew the king in his chariot, when his captives followed in chains at the rear — that horse was as it were, spring-halted in front; and they bred him so for over a thousand years, a distinct breed, a stock that never intermitted its peculiar royal and kingly characteristics. The gradations of rank, from the Egyptian king down to the soldier in the common cavalry might have been measured, by one gazing upon their triumphant processions, by looking at the height of the knees of the horse when brought up, as he was passed in the long review.

I will pass over all these suggestive reminiscences of literature which would make a pleasant evening's entertainment, if we were seated together around a genial fire, and I could dwell upon them; but I must come directly to the heart of this question, and the heart of it, from the commercial point of view, is, that breeding is a failure. I maintain that breeding, in America is a failure, commercially considered. I take it that any business whose workings as to results are so little ascertained, that you cannot figure out your result until you come to it, and then, in five cases out of ten, find the result just what you did not wish, and what you were not striving to have. I say, a business that is no better known than that, not only is, but must be, a failure. A business that is known in its methods, and in its results, is the only business that has in it the chance of

success. Weighed in this scale, breeding in this country is a failure. There is not a breeder that I know of to-day who can tell me what he is going to have in the colt that will be foaled on his farm next May. Tell me surely, tell me as you can tell me what interest you will receive on the United States bonds you may have — so much, ordered by law. But natural results are as strictly under natural laws, as commercial or financial results are under the command of statute. And if we could only ascertain the law out of which comes the force that makes the result, we should know just how to repeat the result every time. The trouble with all of us is, we are superficial students. We are objective students, we look at the colt as an object. We do not look at the colt as a creation, and analyze the causes which underlie that creation. How did he get his color? How did he come by his temperament? Whence did he receive that peculiar conformation of structure? Was it from his immediate parents, or from his remote parents, or is there the original type in that colt, — a new creation, as it were, independent of his parentage. For God, in order to preserve the finest specimens of every race or tribe, occasionally repeats the original type of it.

You have all, no doubt, known children that were so much more brilliant than either father or mother that you could not say they came out of either father or mother. You have known sons so much more talented and able than father or mother, that they could not be called the children of either father or mother. God intervened for his own wise purposes, and made a new creation in that boy. And, the result was a poet, or musician, or orator; a being made of so much finer stuff than ever could be reassured out of the parentage that preceded, that thoughtful men say, God went back to the beginning of the world for that man. Well, men are puzzled in meeting a great horse bred from a dam and sire of no peculiar note; they undertake to account for that wonderful creature, as if he was the result of his sire and his dam. I look at it differently. I give that sire no credit at all, because it is such an exceptional case that it is ruled outside of the law of descent. We cannot afford to trust to it by way of reasoning from it. A result that is so exceptional as to be unsupported by any law. You cannot make the basis of any business; or rule of any studentship. You bring me a fine horse, of so much greater value than sire or dam,

that you cannot account for that horse on the ground of parentage. And I do not try to account for him in that way. I do not give the sire or dam any credit for him whatever. I take it as one of those mysteries I cannot fathom. I can mention the names of half a dozen Americans, known in literature and state craft, whose names are familiar to you, whose fathers and mothers, grandfathers and grandmothers, could not, if I may so speak, produce them. They were, as I hold, new creations, magnificent original types of men and women.

Well, from such causes, breeding of horse stock is a failure, because it cannot predict what the result of breeding will be. Let us look for a moment to discover, if we can, the cause of this result. My idea is that it is, briefly put, *ignorance.* I think at the core of almost all failures, you will find ignorance as the cause. I think at the core of this failure that we are making in breeding, you will find lack of knowledge as the real cause. For instance, how rarely you find any practical studentship brought to this matter of breeding! How can you expect an ordinary farmer, whon ever thought a moment on this matter, who never read a book upon this subject, who never looked upon it even as a matter which he had need to study, nay, how can you take a man who has never studied anything, who never thought about anything, as students think upon matters, and by such men the majority of our colts are being bred, — how, I say, can you take such a man, and expect that he will make a success in breeeding, when breeding means the finest and most painstaking studentship that we have to engage in today? That interrogation answers itself.

So we pass on to the next point, that, in addition to ignorance, lack of means has acted as a cause of failure. Breeding requires money. What right have you to rule this great industry out of the companionship of kindred industries? What right have you to make, as the essential of all success in every other branch of industry, *capital*, and not make *capital* essential to all success in breeding? If a man goes into the dry goods business, to make a success of it, he must have capital, must he not? If he goes into the onion-raising business, he must have capital, must he not? If he goes into the grocery business, he must have capital, must he not? But here are men, taking up this business of breeding, with no capital whatever. A dam that is worth fifty dollars, perhaps, and if you

are a moral man, you would not dare to sell her at that price, bred to a horse that is not worth fifty cents, with the hope of getting a "Dexter or a Goldsmith Maid!" Just such wild dreams as that, I know from correspondence I am receiving, are being entertained by young men.

Now the question is often asked me. "Which makes the colt, the dam or the sire?" The Arabs have a maxim, that the "foal follows the sire." It is fashionable, I see, to laughat Arabs. We caught the fashion through theegotism of the English thoroughbred breeders, who dislike to own that their favorites originally sprung from, or could be potentially bettered by, an infusion of Arabian blood, to any extent. It is easy to laugh at the Arabs, to say that their horses are not equal to the modern English thoroughbred, and all that sort of nonsense, which you see now floating through horse literature; but friends, I find on the old Egyptian tablets, that are three thousand years of age, the image of the horse that is now called the Kocklani in Arabia, the princeliest of breeds there; the same horse, I say, that you see in Arabia, to-day, you fin dengraved on Egyptian sculptures more than three thousand years ago; which means, that for thirty-two hundred years, the laws of breeding have not only been known, but kept; not only were discovered, but have been actually taught and obeyed to the letter. Now, then, a people, whether literate or illiterate, must be wise in horse lore that can trace back along a line of three thousand years of breeding, so exact that astrangely colored hair has never come into the hide of one of their horses; so that a different shaped nostril, a different curvature of the eyebrow, has never yet been known in that princely breed. When you go among a tribe of men who can look back thirty centuries and not find a distinction in the color of a hair, or in the arch shape of the eyebrows, I tell you, you may sit down at the feet of those men, as the wisest teachers in the breeding of the horse the world knows. Therefore, when I find that Arab proverb, "The foal follows the sire" and find that my foals do not always follow the sire, I say I must look deeper into this matter. Those men knew a thousand times more than I do; the knowledge out of which that maxim came is not for me to question; it is for me to account for it, and, I go to work to account for it. My opinion is, I may change it to-morrow; I would not give a cent for a man who would not change his opinion on horse matters as

easily as he turns over in bed at night, but, to-day, I am inclined to swing back to the Arabian principle of breeding, that the foal always follows the sire.

To account for it, in the first place, the Arabs always select their dams with great care. Now it may be, that the word "best," as applied to their dams, you do not apply to yours. That is, the dam that you would consider the best, may not be the best in the eye of the Arab breeder. What is the best dam in the eye of the Arab breeder? May it not be the one that will allow its foal to bear the stamp of the horse? I think so. I have two dams on my farm that could not be sold by a religious man for over three hundred dollars, in a matter of trade, and yet three thousand dollars could not buy either of them. Why? Three colts have come out of each, and every colt has looked precisely like its sire; has put its feet, when eating its oats, precisely like its sire; has smelt of the water, and muzzled round it before drinking, precisely like its sire; has done everything like its sire. The dam simply carried it, as a mother holds her baby in her lap, and never marked it at all. Now, may not the old Arabs have such facts in mind? May they not, when they laid down the maxim, "The foal always follows the sire," have had this in mind, that there should be no dam bred to a sire that would interrupt the sire in propagating himself.

I know a man that has a mare that has foaled two colts. He bought her for $87. And yet she is invaluable. Why? Because each of the colts that came from her are not only like the sire in a general sense, but they are the sire in miniature. In interior habits of the stable, in the way they move about in the stall, the way they toss their heads, and the way they feed and drink, they are the sire over again.

You may take all my fashionable, high-bred mares out of my stable, if you will leave in their places such mares as that, for you have eliminated for me in doing it, half the difficulty out of the problem of breeding; namely, the difficulty which the temperament, structure and habits of dams bring to the breeder. For instance, I could select an animal that is perfect, — one I know is perfect, — one that can transmit himself, if he is not bothered and interrupted in doing it, by the dam. I know I can, I say, select such a stallion in New York, in New England, and in six or eight stables in the middle states; and if I can find a dam that will not

trouble that sire in the offspring, I can repeat the sire in every colt. The Arabs may have selected their dams in that way.

Now, then, will you see the possibility of this old Arab maxim being true in our practice? First, select a dam that will simply carry the foal, feeding it with its blood and milk, but not affecting it at all, and then select a horse that has, first, the general excellence you want, then the special excellence, and then the power to transmit both general and special excellence, and would not the maxim be true, that "the foal follows the sire?"

Vicious ones should never be bred to. Men raise sinners enough; we do not need to imitate them in raising equine imps. It is a crime to breed an ugly dam either to an ugly horse, or a good-natured horse. No mare that bites, leers or kicks can be bred in my stables. It is not *business* to do it. I am not actuated by any higher motive than the old Yankee wooden-nutmeg sense that is born in us down in Connecticut. It is not *business* to do it; for I know that the colt would kill somebody in the attempt to break him, and the sire would get a reputation for being ugly, when the real cause is in the dam, and the result would be, that "viciousness" would be written in popular characters over my stable.

Observe, also, that the foal partakes of the physical and nervous condition of the sire and the dam, not as they are by nature, but as they are at the time when the foal is conceived. These are rudimental principles; but, gentlemen, they lie at the base of success in breeding. I doubt whether our arbitrary fashion of managing the sire and dam at the time of conception is not one of the prime causes of our failure in breeding, when you are talking about success in the really high and fine sense. I notice that the principles of selection, of favortism and affinity, God has not left out of the horse structure; I notice that there are some dams that do not take kindly to some sires; and it is a rule, a rule reverentially obeyed in my head groom's management, that unless nature plainly, by sympathy, affinity and expression, points to the result, the result shall never be obtained by us. I must allude to this in passing, because it is one of those things that, in our minds, account for so much that is mysterious and inexplicable in any other way: it accounts for so much in the propagation of the human species, in the perpetuation of disordered minds, tendencies and appetites, wants and craving, that can be accounted for in no

other manner. He whose name is Love never intended that there should be any propagation outside of it. Wherever you find an organization fine enough to follow affinity, there you find organization that must be jealously and sacredly guarded down at the very root and germ of its propagating connection. The man who thinks of this thing rudely, coarsely, who looks at a horse as merely a brute, merely an animal, devoid of sense, devoid of a fine nerve structure, devoid of fine habits, can never be, in my judgment, a candid student of this subject. An excited nervous condition should be avoided at this delicate period.

A horse should never be treated as a hog is. I can go into stable after stable, and find every horse as fat as if God had not made him for activity but sluggishness. He made him strung with strong, lively, fibrous muscles, not to be covered with layer upon layer of adipose tissue. One of the great sins of breeding has been the overfeeding of the stock horse, from which cause many have died. My judgment is that "Fearnaught" died because he had been kept like a swine, not like a horse. My judgment is that "Taggart's Abdallah" has been in danger of death for three or four years, because, in order to make a horse that did not weigh a thousand pounds tip ten hundred and fifty, Mr. Taggart has kept him hog fat. I instance these, not invidious comparisons, because, where the rule is the same with all, there can be no invidious comparison. I impeach the rule and fashion from bottom to top.

There are two extremes of condition in which you should never breed, where the horse has little exercise, and is kept fat, and where the horse is drawn fine for some great nervous feat. Either condition is fatal to breeding. The reason "Ethan Allen" got so many weak-kneed, nervous colts, was because he was kept in a nervous condition by constant trials of speed.

The two horses that, by a combination of their qualities, would have given us the perfect horse, in my opinion, were old "George M. Patchen" and "Ethan Allen." In those two horses, you had about all an American could desire in a horse. In one you had size, in the other you had beauty. In both you had speed; in both, a splendid temperament. In one, plenty of bone structure; in the other, the finest bone structure. The intercrossing of their respective descendants would have given us, as I think, pretty nearly the perfect horse. Both were wasted, both were absolutely spilled,

as you spill a barrel of liquid when you pull out the tap and let it run out on the cellar floor. No conservatism was exercised, no guard was put around them. "Justin Morgan" was killed, was wasted, just as "George M. Patchen" and "Ethan Allen" were wasted,—the three horses that stand as stock horses ahead of all the horses America has ever known.

Here are the essentials in a stock horse: First, *size*. A stock horse should be sizable, about 15.2 in height, and 1,050 in weight. I would, as a rule, never breed from a horse that did not weigh 1,000 pounds, or that did not stand 15.2. There are exceptions, of course. There are many horses that are excellent stock horses that do not stand 15.2. One of the best stock horses I have in my stable stands about an inch and a half under that; yet, by proper crossing, I can make a great success at the first cross, but it requires proper crossing to remedy his defect. Let another man manage him; let a man, for instance, buy him, pay a high figure for him, and try to get that money back as quick as he can; take dams of all sizes and all temperaments, and the result would inevitably be failure, as it has been under like conditions with more than half the stock horses of New England. "Tom Jefferson" is under size; "Ethan Allen" is under size: that is the one great defect of his life as a stock horse; "Lambert" is under size. These horses, if properly managed, would have been extraordinary stock horses; but under *no* management, and held by their owners only to make the most money out of them, instead of bettering, they have rather injured, the average stock of the country. "Lambert," one of the great New England horses, in many respects,—a horse that will almost invariably transmit his outward form and gait, and both are perfect,—is absolutely being wasted, so far as the perfection of breeding goes, by the excessive use made of him, and by the lack of discrimination in the dams chosen for him. The same, to some extent, was true of "Fearnaught;" the same is true of "Taggart's Abdallah;" the same is true of "Tom Jefferson." As stock horses they stand nowhere, compared with where they might have stood, if there had been some other genius besides the money-making genius presiding over their stables.

I briefly enumerate the points to consider. The first great point to be considered, is, *pedigree;* second, *size;* third, color; fourth, health; fifth, temperament; sixth, speed. The order in which I

breed in my stable, is, first, *beauty*. The American temperament is a beauty loving temperament. The American eye, more and more, is getting to be an eye that delights in size, in clearness of outlines, in the fullness of those points that make symmetry and beauty. There is, probably, outside of Italy, no country on the globe where, considering the roughness of our surroundings, at the start, the artistic element has been more profoundly developed, than it is among us. A beautiful horse will always find a buyer. Therefore, breed for beauty.

I say to you, that, in my judgment, talking as a breeder with money in view, no horse that is bred should be bred purely for speed. Taken as a whole, breeding for speed does not pay. Twenty years ago a horse might have had a head like a tub, a gait like a camel, and yet could be sold at a large price, because he had *go* to him. He might be vicious, a camel-leopard in style, and a mule in gait; yet, if he would *go*, that was all the American asked. We have left that period behind us. It is the period through which all youth pass—the period of push and go, hurry and hurrah,—and all nations, like boys, pass through it. But, by and by, there comes to the boy a time when he begins to look at the fineness of things, and delights in them because they are fine, until, at last, he comes to rejoice in beauty for its own sake; and we in America have come to that time when the fineness of things appears charming to us, when the beauty of loveliness is being apprehended and carved. The first thing, therefore, for which I breed, is *beauty*. I can always get five hundred dollars for a colt that has a beautiful color, a beautiful neck, beautiful limbs, and a beautiful carriage. The second thing I breed for is *docility*. The third thing is *speed*. *Beauty*, first; *docility*, next; *speed*, last. If I can get the first two in a large degree, and the third in a fair degree, I know I can make a sale; and I know I can get my money back, and get it back early, too, which is a great point with a breeder. If I have a speedy colt, on the other hand, I have to keep him until he is developed, and then I have to put him into a gambler's hands, perhaps, to get my money back. I must wait two, three, or five years; and one of the secrets of making money in breeding, as in other business, is in getting rid of things. Some of you have found that out, I guess!

In regard to this matter of crossing, many ask: "Is thorough-

bred running stock necessary for a cross, in order to get beauty and docility?" Well, friends, there is a popular error touching this matter of beauty in thoroughbred running stock. Thoroughbreds are not all beautiful. Take "Messenger." He was a great, 16½-hand, round-shouldered, big-necked, coarse-headed, thick-legged horse. That was your imported "Messenger!" His son, "Mambrino" was a thick-necked, strong-legged horse. His son "Abdallah" had a head as big as a small flour barrel; was a dirty roan as to color, with a rat's tail, which he stuck straight out! That was "Abdallah." The tremendous ugliness of some of our "Abdallah" and "Hambletonian" stock is accounted for by the fact that they have come through "Abdallah," "Mambrino," and imported "Messenger." The idea that the English thoroughbred and the American thoroughbred have always small limbs, small feet, a fine head, and small, arched neck, clean-cut jowls, and a coat like satin, is a fallacy. While these things are the law, there are noted exceptions. I have stood and looked at thirty brood mares, in the veins of many of which not a taint of low blood ran, and I give you my opinion, as an eye-witness of their merits, and rejoicing in their merits, that I could have gone into Vermont, twenty years ago, and selected, easily, twenty daughters of the old *Green Mountain Morgan* horse, that, at any agricultural fair in the country, where horsemen were the judges, would have taken the palm for beauty from any twenty out of that collection of thirty mares. Many of them were quite coarse-looking; some of them had hair on the fetlocks, much to my astonishment—so much so, that I questioned the breeding, until it was clearly proved; many had rather heavy jowls. There were many things about form and motion that did not affect one pleasantly, as I stood and ranged my eye over them, for the ideal horse as to beauty. I do not think we need go to the thoroughbred running stock for beauty, if we will be careful of our selections among our own breeders. "Tom Jefferson," "Lambert." "Taggart's Abdallah," are as handsome horses as I have ever seen in the thoroughbred family. I am not saying anything about the imagined beauty that the artist loves—that beauty that you have hung in pictures upon your walls, but never see anywhere else,—but the beauty of shapeliness of limb and fairness of look in the stable and in public,—the beauty of the actual, not the ideal, horse. The sheen of the coat, for

instance, is supposed to be peculiar to thoroughbreds. It is not so. The horses I have just mentioned have a gloss as fine, a tinting as brilliant, and a glow as deep, when led into the sunshine from their stables, as any thoroughbred I have ever seen; and I do not hesitate to say, that, for beauty, we have as handsome horses in all respects, save one, as are to be found on the face of the earth. I said, with one exception. There is one thing our horses lack. It is that style and kingliness of curvature, that sort of curled look and appearance which a horse can put on in public, which is associated only with a horse that stands 15.3 in height. Most of our handsome horses are too small to be imposing in their beauty. You must have a horse stand 15.3 if you are to get the finest expression of horse beauty, in my judgment; you must have him measure about such a length from his ears to the sweep of his tail; you must have him stand in the pasture with a certain look of height, breadth, and length, in order to have him perfectly fill your eye. To obtain some of these minor points, if you please to call them so, we should do well to cross with the racing thoroughbred. And for docility and gentleness of behavior until the moment of action comes, we have nothing that equals a first-class thoroughbred of the running family. Take "Joe Daniels," for instance. A child can lead him up and down before the judges' stand. He seems to be conscious of a latent power that he can exert at any moment, and does not choose to exercise until the proper time comes. I have seen a thoroughbred led out, with no defiance in his eye, no glory in his appearance, none of that fire and thunder which we associate with fine breeding and a first-class horse; but when the saddle was put upon him, the rider mounted, and the exercise had warmed him so that the moisture began to start, then see how the veins begin to swell; how the jockey begins to feel the play of the muscles under the saddle as the latent power begins to reveal itself; see how the nostrils begin to show their lining of fiery red, and then—how that horse begins to go! And the farther he goes, the faster he goes, and the harder he pulls.

I have ridden the magnificent creature to which I have referred under the saddle. She would take the first four miles as every respectable man ought to take a horse the first four miles, easily, merely jogging; but when she had reached that point, fixed by good judgment and her own good sense, I could feel her muscles begin

to work under me, and she would begin to move up on the bit and settle herself to her gait, and the faster she went, the better she felt. I could feel the swell of the great muscles under the saddle as she gathered nervously for her leaps; her neck would stretch out and become lowered more to the line of her body; her nostrils open and expand at every jump; her ears would come back closer and closer to her neck, like those of a cat when vexed, and then how she would spin! But when she had spun her spin out, she would amble back to her stall so gently, that were it not for the unquiet mouth and the lingering fire in the eye, you would not suspect that she had such lightning in her.

I will only speak upon one other point. The question has been asked me, and I will answer it. "What makes a horse trot?" Well, it is not the whip, that is one thing settled;—and it is not your driving, friend, either,—that makes your horse trot, that is settled. I wish there could a fashion come up among us men who drive trotters, of driving without reins, until we know more than we do, or until we will admit that we do not know much. A horse cannot talk, and it is very difficult to understand the nature of any being that can not express its meaning in speech to you. Should you come across a species of human beings that had never uttered a word, and you wanted to master the secrets of their being, how would you begin to master them? What is just the right pull to make on a horse's mouth to save him when he breaks? When is the proper instant to move that bit in his mouth? What is the right way to handle a horse to get him through the air a second faster to the mile? You cannot, all of you, find out these secrets, friends; a few gifted ones who have the prophetic instinct that can see into the horse nature, like Charley Green, Dan Mace, Budd Doble and the Elder Woodruff—in many respects better than either, in my judgment,—a few men like those instinctively sense it; but we ignorant and bungling chaps better let it alone. That is my judgment. My maxim in driving, young man, is, let the horse alone. I presume I do not take the reins in both hands once in three months, so far as need of strength goes, when I am driving on the road. Of course there are some horses that we must *make* trot, if they ever trot at all; I, for one, do not desire to have anything to do with that sort of horses. But give me a horse that is a natural trotter, and I am sure he will never go except in a trot, unless by

reason of some pain in his foot or somewhere else, that may cause him to break. In that case, the best way is to let him alone. I am driving a five-year-old colt that is fast. If he breaks, I let him run. After he has been running six or eight rods, I hint to him that it is just as fashionable for him to strike his trot, and if he does not take that hint in a little while, I give him another. But don't yank him or jerk him, "pull him back," "settle him down," "square him," as they say, and all those other excellent phrases that do not mean anything. The colt means to trot, and I know it; and if for some unaccountable cause he brakes, I know the habit naturally implanted in him will get him back to his trot just as quick as he can. A horse cannot run awhile and catch himself suddenly without hurting himself, so he will take another jump or two. When he has jumped two or three times, I give a little touch to the reins, suggesting to him that he may as well trot. He generally knows what I mean; but if he don't, I tell him again, and pretty soon I find him going along with his tail as straight as a spirit level. I never on such a horse use a check-rein, never put on martingales; but let him go, head up and tail streaming. These are the rudders intended to keep the horse true in his gait, and you have no right to deprive him of his steering apparatus. So, gentlemen, the rule is, that the horse, if he is a sensible, level-headed horse, knows a great deal more than you do about trotting, and you should let him have his own way. That is my best advice, briefly put, in regard to driving.

IMPROVEMENT OF THE MOUTH OF THE MISSISSIPPI RIVER.

BY JOHN NADER, C. E.

The improvement of the mouth of the Mississippi, the free and unobstructed outlet of a great national highway equal in extent to that which forms the subject of this paper, can certainly not be over-estimated. A number of important producing States depend mainly upon this highway to dispose of their productions, and also to obtain through the same those imports which are necessary for manufactures, arts, and comforts of life. The river, very properly

denominated the father of rivers, flows in a north and south line through a fertile tract of country, partaking of varieties of climate and embracing the extremes of latitude of the United States. Its tributaries are numerous, and some are of considerable magnitude; its productions embrace the extremes, its commerce concerns the world at large, and the national character of this great highway demands free and unobstructed passage for the largest ships sailing the ocean.

Before entering upon any plan of improvement, we will first examine the physical and hydrological conditions of the river in question.

The Mississippi River is one of the great working-rivers of the world, and compares with the "Nile," the "Po," the "Rhone," the "Danube," and others. By working-rivers, we understand those rivers which deposit large quantities of alluvium in deltas at their outlets to the ocean or seas.

The working of rivers is due only to natural forces, and in order to remedy any resulting difficulties, it is necessary to amend these forces, but in order to master the forces of nature and to use them to our advantage, the first condition is, that we should well understand them.

In examining a map of portions of the Mississippi valley, we can conclude, by observing the form of sloughs, bayous and annular lakes, that the river which occupies a very inconsiderable portion of the valley, has at some time occupied in turn nearly every portion of the same. The matter is very plain when we observe the present working of the river; an abrasion takes place on one side, while a corresponding accretion takes place on the other, and in this manner a constant lateral motion takes place which may continue in one direction for an indefinite period, until from some cause or other the motion is changed.

It is not difficult to comprehend the movement of an island down stream, or the shifting of the point of bifurcation. The upper end of the island is worn away by the current, while at the same time the lower end grows by deposits which take place in the still water. The movement of bends, on the other hand, partakes of an entirely different nature; these must be destroyed before they can reform. The peninsula like portion of land projecting into the bend is abraded on both the upper and lower side, until it is

finally cut off, the old river bed is abandoned and a new one is formed; the regimen of the river thus disturbed, at once seeks to readjust itself, and hence the fearful inroads consequent upon a natural or artificial cut-off. The causes are plain, the absolute slope, and consequently the velocity is increased, while at the same time the reciprocity of curves is broken, and a new bend must result. The remedy in this case is plainly the preservation of the natural bends.

My object in dwelling upon the foregoing, although foreign to the subject, was simply to illustrate the source of the material requisite to form the delta. The material which is carried along by the action of the current, will be found to differ very materially along the course of the stream, on the upper portions it is composed of sand and gravel, this will be found reduced by attrition as we descend the river, until it is finally reduced to impalpable mud; decomposed vegetation is added by the draining of the forests, and of this composition the delta is formed. I can give no better illustration of the delta than the following from a translation of a work by "Reclus." He says:

"These narrow embankments of mud, brought down into the open sea by the fresh water, present a striking spectacle. In several places these banks are only a few yards thick, and during storms the waves of the sea curl over the narrow belt of shore, and mingle with the river. The soil of the bank becomes perfectly spongy; it is not firm enough to allow even willows to take root, and the only vegetation is a species of tall reed, the fibrous roots of which give a little cohesion to the ooze, and prevent its being dissolved and washed away by the succession of tides. Farther down the reeds disappear, and the banks of mud form, are washed away and form again, wandering, so to speak, between the river and the sea, at the will of the winds and tide. On the left bank of the southwest passage, which is used for the largest ships, the plank built huts of a small pilots village have been fixed as delicately as possible. These constructions are so light, and the ground that carries them is so unstable, that they have been compelled to anchor them like ships, fearing that a hurricane might blow them away; still, the force of the wind often makes them drag on their anchors. Below, the banks of the Mississippi are reduced to a mere belt of reddish mud, cut through at intervals by wide cross streams; still farther down

even this narrow belt comes to an end, and the banks of the river are indicated by nothing but islets, which rise at increasing distances from one another, like the crests of submarine dunes. Soon the summits of these islets assume the appearance of a thin, yellow palm floating on the surface of the water. Then all is mud; the land is so inundated with water that it resembles the sea, and the sea is so saturated with mud that it resembles the land. Finally, all trace of the banks disappears, and the thick water spreads freely over the ocean. After getting clear of the bar, the sheet of water which was the Mississippi preserves, during floods, the yellowish color by which it can be distinguished for about twenty miles, but it loses in depth all that it gains in extent, and, gradually depositing the earthy matter which it holds in suspension, becomes ultimately mingled with the sea."

This beautiful illustration gives one at once an idea of the difficulties of navigating the Delta, which in storms and dark weather becomes uncertain and dangerous even with the assistance of expert pilots. Now, in connection with the above, if we consider the insufficient depth of the channel, our problem at once becomes manifest. Before however entering upon the solution of the problem, we will examine the working of rivers, and the means applied to remove the resulting obstruction in the deltas and mouths of rivers.

The amount of alluvion brought down and deposited in the gulf annually is estimated equal to a mass one mile square and 268 feet high. The "Hoangho," which probably carries more alluvium than any river in the old world, has formed a delta which extends over a space of over 90,000 square miles, and constitutes one of the most important provinces of China. It is estimated that the alluvion of this river would in the course of sixty days, form an island a mile square and over 100 feet in depth. According to Rennell, the Ganges conveys from five to six cubic yards per second, or from forty to fifty thousand cubic yards per day. The Nile, scarcely comparing with rivers of an inferior class, advances but slowly, yet its delta measures nearly 200 miles on its front and increases over seventy acres in a year.

The "Po" is considered one of the most remarkable working-rivers in the world, although a constant subsidence is taking place; the river is nevertheless continually encroaching upon the Adriatic, its deposits being estimated at over 15 million cubic yards every year.

The Rhone deposits an estimated mass of 22 million cubic yards every year.

I have here given a fair idea of the enormous amount of work done by rivers, in order to show what we have to deal with.

Considering the enormous masses which form the obstructions which we wish to remedy, it may be well to examine the manner in which they are disposed of by nature, and how these obstructions are formed. I will here return directly to the river in question—the Mississippi.

It will be observed that two parallel banks, confining the river, stretch out into the gulf over 60 miles; these finally become irregular, and the stream is divided into numerous branches and outlets. It is asserted that the Delta proper commences only at the head of the *passes*. I would, however, consider the entire projection as belonging to the same. The first formation was on the shallow coast of the gulf, removed from the destructive force of the ocean waves; the river here asserted its rights and pushed boldly on, every freshet increasing and fortifying the narrow causeways forming its banks, which the waves would, in my estimation, only tend to solidfy by impact and by incorporating denser substances eroded from the gulf-shores.

The west side of these advancing banks is by some considered part of the gulf shore, whereas it appears to me to be an accretion, formed by the littoral current, such as would occur in the case of a jette. In fact it appears that at one time the Delta was being forced to the east, as may be observed at Bird Island, where the motion must at some time have been decidedly east. As soon, however, as the delta had advanced far enough to stop the erasion of the shores, the accretion ceased, and the shoals produced by the previous easterly motion gave a tendency to a contrary motion. During freshets the alluvion is precipitated on the banks which thereby continue to rise and to assume a more substantial consistence.

In building a dyke, or causeway of earth, the same is self-sustaining to a considerable height; even in shallow water the same can be formed, but when the saturated portion becomes considerable, it finally loses the cohesion necessary to support the superincumbent weight and partakes of a lateral motion, or in other words, spreads out, until the submerged portion attains sufficient resistance to produce an equilibrium.

The alluvion of the delta after reaching deep water, and not being fortified by any material denser, than its own impalpable mud, must necessarily spread out until the lateral resistance would prevent motion. The river also would become wider, and lose in depth what gains in extent. Now, considering the foregoing facts, it is not at all suprising that the delta of the Mississippi encroaches on the gulf and presents the difficulties with which we are already familliar.

The estimated discharge of alluvion of the South Pass is about 22,000,000 cubic yards per annum, and the advance of the delta is put at 100 feet.

As the delta advances, ist progress will decrease in proportion as the depth of the gulf increases; the difficulties of navigation would increase in the same ratio in this wide-spread bed of alluvion. In order to estimate the result of this progressive motion, we must consider that the discharge of a stream is the product of two quantities, viz,, the cross-section and main velocity, (Q=F. Vo) and that the latter depends principally upon the absolute slope;

$$\left(h=\frac{v^2}{2g}\right)$$

hence the lengthing of the river would diminish the slope, and sincé the natural supply must of necessity be discharged, the slope must of necessity adjust itself for the performance of the work. It is for this reason that we find that the Mississippi, which at first most naturally flowed in the lowest portion of the valley, is now at places over fifteen feet above the adjacent flood plains. On the improvement of the line, the entire river has been lowered as much as six feet in places by increasing the slope by means of cut-offs, and large tracts of land have been reclaimed which had become entirely worthless.

On the majority of "working-rivers" we find very little difference in the ultimate result, unless they are interfered with by artificial contrivances, or that the natural forces find a new field of operations. After what has been observed, I will endeavor to review what has been done up to the present time to remedy the difficulties arising from the detritus deposited at the mouths of rivers.

The first and most natural conception, was to endeavor to im-

prove the natural outlets of the rivers, but this plan has been attended with varied results, and in some cases the very action of nature suggested the contrary.

In the case of the Vistula, every attempt to improve the mouth failed; a new outlet was formed and the old channel was converted into a canal which gives the necessary water to Dantzic. At the mouth of the Danube the Jetties gave success, but they were applied to the "Soulina Pass," a comparatively new branch of the river, far removed from the actual delta. The Jetties were carried out into the sea to a point where a current passes from north to south in the Black Sea; this current receives and carries all the alluvium brought down by the river, and prevents the formation of a bar. The channel has been deepened from nine feet, to sixteen and one-half feet by this means, since the works were constructed. It is very properly presumed that the encroachment of the whole delta will have the effect of crowding the current farther into the sea, and finally a bar will form as heretofore.

The improvement of the mouth of the "Adour" was accomplished by means of Jetties, but this river differs very materially from what we consider "working-rivers." The difficulty in this case was, that the obstructions cast up by the Atlantic forced the river in a direction parallel to the shore until its banks were no longer able to contain it; at such times the river would break out and form a new mouth. The mouth below "Bayonne" was improved precisely upon the plan of our lake shore harbors. Paralled dykes are carried out to a depth where the action of the waves cease to disturb the bottom, which is in about eighteen feet, the channel is cleared by dredging and the natural current of the river maintains the same, the detritus moved down by the river is carried off by the littoral current into deep water. The question as to how long these artificial structures will serve their purpose, is a matter not yet determined. Operations were carried on for many years at the mouth of the Rhone by dykes and jetties, which plan had finally to be abandoned. It was hoped that by closing the lateral outlets, and by confining the channel between contracted banks that a sufficient depth might be obtained, but the works were not carried out to a sufficient depth, and the mass of alluvium carried down, left the outlet in about the same condition as it was before the improvement. Finally, a canal was constructed to

the "Gulf de Fos," so called from a former canal constructed by Marius. This canal (St. Louis) is entirely sufficient for the requirements of commerce. In connection with this canal there is a very extensive basin to serve the purpose of trans-shipment to the steamers navigting the shallow portions of the river.

It appears that a system of jetties is the plan that has most generally been resorted to by engineers for the improvement of the mouths of rivers. In some cases they have been attended with partial success, and in others the enormous expense involved did not warrant the completion of the experiment.

An attempt was made about 1857 to improve the Southwest Pass of the Mississippi, but a tempest swept away a jetty of over a mile in length.

In reviewing the subject, we may safely conclude that the jetty system would give but temporary relief in working rivers, although the plan has succeeded admirably in the majority of our inland harbors where the same was applied.

Returning directly to our own subject, we find the Mississippi one of the most active working-rivers in the world. The South Pass increases at the rate of one hundred feet annually, and the other principal passes even more.

From the manner in which it is brought before the public we know that it is obstructed to a great degree and requires a remedy. For years the government has been engaged, and with considerable success, in improving the Delta. The method applied has been a peculiar kind of dredging. Boats of considerable power were provided with a movable propeller, which could be lowered to the required depth. The boat was run down stream into the bar, the excavator was agitated, and the alluvion was given to the current. This process most naturally required constant repetition, but on the whole was not of sufficient capacity to satisfy commerce. I am reliably informed that the depth of water maintained in the Southwest Pass at present varies from fourteen to eighteen feet, rarely, however, less than sixteen feet. But that, on account of this lack of sufficient water, many of the larger sailing vessels and steamboats have been withdrawn from the trade, and my informant says: "I believe that one German line has been discontinued on account of the difficulties, dangers, and delays at the mouth of the Mississippi."

Now, when we consider the foregoing, together with the fact that for the past twelve months the port of New Orleans reports a total export in cotton, tobacco, grain in bulk, sugar, and sundries of $100,000,000, and total imports, foreign and coastwise, of $60,000,000, notwithstanding the many drawbacks, we no longer wonder that the nation calls for improvements.

Now the question arises; as to the kind and extent of improvement to satisfy the requirements of commerce. Although the Government, with an annual expenditure of about $100,000, has failed to maintain a reliable 18-feet channel, while commerce demands at least 24 feet, still the problem is one that must and can be solved. There are however other difficulties of a local nature which I would wish to exhibit. Captain C. H. Howell, of the corps of engineers, makes the following statement in his report for the fiscal year ending June 30, 1873:

"Even the popular prejudice against dredging has been overcome, and the people of New Orleans most interested to-day acknowledge the good done. So far, so well; but there is a powerful monopoly, known as the Tow-boat Association, domiciled in New Orleans, controlling its commerce, opposed to the improvement of the channels across the bars at the mouth of the Mississippi, and having in its power at any time to render valuless any improvement attempted. This association has, time and again, willfully and maliciously retarded my work, and damaged and destroyed its fruits."

This monopoly really forced the dredges from the Southwest Pass to Pass a l'Outre, in April of 1873, according to the engineer's report. Science may overcome the natural difficulties, but those just mentioned can only be overcome by prompt and positive legislation.

From what we know of this matter, it appears that the nation is prepared to do the work; the only question has been as to the plan which would, with the greatest certainty of success, and at a warrantable cost, satisfy the wants of commerce, and which could be maintained with a reasonable expense.

A board of engineers was appointed in compliance with an act of Congress of June, 1874, to examine and report a plan with estimates for obtaining and maintaining sufficient depth of water to the Mississippi for purposes of commerce; the plan to be either a canal, or the improvement of one or more natural outlets.

The board has completed its labors and has reported in favor of the Jetty-system, according to the idea of Captain Eads (of St. Louis bridge fame), with this difference, that they recommend the South instead of the Southwest Pass. In this connection I agree with the committee, as the South Pass is several miles the shortest, and debouches into deeper water than the others, although some work will be required at the head of the passes to make a sufficient depth to the entry of the pass. The committee discussed several canal plans, the Fort St. Philip plan receiving the preference, but on account of the greater cost was rejected, and the improvement of the south pass by means of Jetties and dredging was finally recommended.

The estimated cost of construction and maintenance of this plan is $7,942,110, and the estimate for the Southwest Pass is $16,053,124, and that of the Ft. St. Philip Canal $11,514,200. Now as to the relative merits of the different plans without regard to cost of construction or maintenance, the improvement of the South Pass would open the Delta in the middle and vessels going either way would not be obliged to make a detour, while at the same time it is the shortest and most direct route to the river; on the other hand, Capt. Eads may have counted on the more stable bottom of the Southwest Pass to support the Jetties. In either case it would require a large annual expenditure to lengthen the Jetties as the delta advanced, and to dredge out bars.

If we should now consider the Jetty-system to succeed, the danger of entering is still not removed. It will be necessary, in a storm, to find an entrance to a gap of only 300 yards among mud-lumps and mud-banks, none of which are more than three feet above still water, and although the channel may be buoyed and marked and lighted, still more than ordinary skill would be required, while at the same time, the entry would be subjected to the severest storms and waves of the ocean.

As reported, one member of the board concurred only in so far as the selection of the south pass for the *trial* of the Jetty-system if that be adopted, as the chances of success of the improvement of the natural outlets do not in his judgment justify recommendation; and since the canal plan offers reasonable chances of success, he gives this his preference.

New Orleans being the second city for value of her exports and

sixth in the value of her imports in the United States and promises fair to improve with sufficient navigation, it is important that the plan offering the greatest chances of success should by all means be the one to be adopted.

From the quotation which I have used to give a general idea of the appearance and consistence of the delta, and by examining a map of the same, the difficulties to be encountered are very apparent. Placed, I might say, in an open sea, a hundred feet deep of mud, of insufficient consistence to sustain itself, ever seeking an equilibrium, some sinking, some rising, moving, oozing, never at rest; volumes at times lashed into foam by the fury of the ocean waves.

Considering the unstable foundation upon which we would have to construct, and the fact, that the Jetty-plan has been attended with success in only a few and special cases, it is but proper that we should adopt some other and more certain method to obtain the end in view.

The plan known as the Fort St. Philip Canal, has always appeared to me to be most reliable method of opening the Mississippi. The river at this point is deep and safe; the banks, although not more than a few feet above the level of the river, have assumed sufficient stability to admit of constructions; the whole length between extremes of excavation will be about six miles; the river at this point never rises more than seven feet above the level of the gulf, and is seldom lower than the same. The gulf-end is sheltered by the arms of the delta, and by a number of islands, and will give a safe outlet of 26 feet, which is sufficient to admit the largest class of sea-going vessels. Several locations of canals have been advanced, but all seem to be incumbered with the same objections excepting the Ft. St. Philip Canal.

One plan has been to leave the Pass a l'Outre six miles inside of its bar and reach deep water to the north; another, of leaving the Southeast Pass about six miles above its bar and make deep water towards the east. Both these plans have this disadvantage; although the slope is inconsiderable, yet without locks, there is a possibility of the canals becoming a branch of the Delta; on the other hand, it may be that the stability of the banks is insufficient to support the construction of locks, or resist the pressure during freshets.

Another plan has been considered, which is the closing of the head of the South Pass by means of a dam, and entering the Pass through a channel from the Southwest Pass. In this case the difficulty would be the keeping open of the mouth of the pass by dredging away the bar which would be thrown up by the ocean waves. It appears to me, that the plan of the Fort St. Philip Canal is the most reliable plan of producing uninterrupted navigation to the Mississippi, and the only plan which promises positive success. This canal would be in the extreme six and one-half miles long and should be 300 feet wide at the bottom, with sloping banks of not less than two horizontal to one perpendicular. The lift to be overcome would never exceed seven feet; the locks should be of the greatest capacity, say 500 feet long and 80 feet wide, so as to enable the largest class of vessels to enter without difficulty, or to pass a fleet of small vessels at the same time. I would recommend at least two locks, in order not to impede navigation in the least degree; at the same time if one lock should in any manner be impaired, commerce would not be impeded.

I have not the slightest doubt that such a canal could be constructed at a cost not to exceed that estimated for the improvement of the South Pass, say $8,000,000 in round numbers, with a certainty of success which no other plan promises. An annual expenditure of $25,000 or $30,000 may be required to maintain the work, still this is no comparison to the $100,000 or $300,000 required to extend the jetties per annum, provided that science and determination should exist in sufficient abundance to produce the same on the ground which would have to be occupied, and of sufficient stability to escape the fate of the jetties of 1857.

ON THE REVOLUTIONARY MOVEMENT AMONG WOMEN.

BY JOHN W. HOYT, A. M., M. D., LL. D.
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I. The work of civilization is the work of individualization. The problem of the ages in the interest of mankind is the problem of the soul at work in its own consciousness. Man's service to man

in attempt to harmonize universal need is not greater, nor is it other than this—the attempt of the individual to find himself his proper place. The accomplishment of this by the few is that which makes any advancement possible, and it is the accomplishment of it by all that must merge the mission in the fulfillment of civilization.

But the unit man is able to open the eyes of his fellow men to this greatening of power and privilege only as he is able to help them to a like experience of it. Soon it is found that thought-level and class-level coincide—that one cannot at once get beyond the charter or the decree, and that progress is chronicled by caste and special end.

This parcelling out the rights of the individual has had the effect to make advances slow and partial; for in the same breath that makes the declaration, "thus far will we come!" there is heard the limitation, "we and no others!"

There are two thoughts that run along so parallel to any retrospect made of the progress of the race, that they seem a part of all other thought upon the subject. They are distinctly these: that whatever has been gained has been wrung from those withholding as long as it was possible to do so, and that these gains have been so generally in the interest of man, that woman has remained outside of any considerable advantage. And yet, after all these generations of steady advancement for man, the burden-bearer of the world, how little is he advanced, at the best of his aspirations and means! The marvel that he has not been goaded to a fuller conquest of all barring the way to his rights of manhood and possible achievement stands face to face with that of woman, now moving in her own interest to the most complete and far-reaching revolution the world has yet seen.

That man, with his constitutional aggressiveness, his aptness for organization, the clear field with nothing but himself to oppose, should up to this hour have missed so much, is not more surprising than that woman, unaggressive by nature, unsuited to organization and with universal history, precedent, and prevailing philosophy against her, should have undertaken at one move, the sum of all revolutions. And yet there it stands, the most conspicuous fact of the times touching either a moral or a political future for society.

A demand for rights of one kind and another — in the home, in

the schools, in the occupations and professions, with a more equal control of property, and, lastly, use of the ballot, as covering all these — has characterized this movement from the beginning. The wholeness of this demand makes the requisite reconstruction easy. Could anything be more simple? The half of society claiming to speak for the whole population, and hitherto exercising that prerogative, have but to draw a pen across a few proscribing words in statute and constitution, and there is freedom for the whole people to be and do, each according to capacity and power. To the thoughtful and just man, it is strange that in the countries most enlightened, especially in our own, the very essence of whose institutions is freedom without partiality, this sublimest act of emancipation that history can ever record should be so long delayed. For what can be more profoundly moving to the justice and sympathy of the universal mind than the spectacle of one-half of the great people, through sheer force of muscle and ruder force of brain, withholding from the other its dearly-purchased and most sacred immunities?

All things considered, the success of the movement, at last begun, is next to the fact of it noticeable. It has acquired a respectable, not to say remarkable, frontage in literature, on the rostrum, and in the halls of legislation. For thirty years, from pulpit, press, and platform, in club and in social circle, it has had the benefit and hindrance of approval, protest, and discussion; enlisting the dignity of conversation, the brilliancy of wit, the contempt of sarcasm, the repartee of humor, and all the vicissitudes of a question so much at home among the people as to be equally everybody's and nobody's business. And yet, should the history of this movement be attempted, the details would be found unsatisfactory, its methods unattractive, and its results vaguely defined.

II. Of the causes moving to this unrest and protest among women, the difficulty of finding suitable and remunerative employment is conspicuous. Here, as in the beginning of human effort, the question for woman is first one of shelter and sustenance, and without the world before her, as it has ever been before man; for the great highways of occupation are either positively or practically closed to feminine industry; and in those open to women, it is the almost universal rule that they are met with less wages for the same work.

The best argument for this inequality of compensation is based upon the usual responsibility of man for the family maintenance. This leads to the question, How, then, when a woman receives from one-fourth to one-half of that paid a man for the same service, is she to maintain a family left to her care? It seems very unsatisfactory to be told that "such persons are exceptions to the rule of generally provided-for married women, and the case must be met in some other way than that of labor and compensation for it;" or that, "women left without natural protectors, must take upon themselves the pursuits of men in order to live at all," and that, "for these aberrations from general law special arrangements must be made." So far from staying this revolt, women are not even pausing to press the old question, "Gentlemen, what is this other way, and when are those special arrangements to take effect?" but are moving upon results with the apparent purpose of making their own arrangements.

There is not a more pitiful proposition in the list of social impracticabilities than that of a mother turning to the occupations of men, and asking bread and education for her children. So far as I am aware, the consideration of this struggle for existence among dependent women has not advanced much beyond the admission that it is a case to be considered. And I would here suggest, as a step toward something known, if not done, in this regard, that through this organization for the advancement of knowledge and social amelioration the Government be asked at the taking of the next census, to inquire how many women there are in the United States dependent upon themselves for support; and how many, in addition to their own support, are charged with the maintenance of children, aged parents or family relations dependent upon their labor, with the occupations followed and the means accruing therefrom. This, with the number, sex, and age of children and other statistics relating to the family, and a statement of such partial means as have been left by deceased or are furnished by incompetent natural providers, would throw much light upon related questions, while bringing this one of conpensation for labor with a new significance before the social philospher who answers the inquiry, "Ought not the compensation of one person to be equal to that of another for the same work?" by asking, "Ought not families to be supported?"

The question before us is not a divided one, but inseparable by virtue of a higher law no political economy can permanently resist. That "the laborer is worthy of his hire," stands denied by Christian, as by Pagan communities, to the multiplication of poor-houses and jails under sound of the Sabbath bells of all Christendom. This is no mere figure of speech; the logic of statistics proving that in the so-called most Christian nation upon which the sun shines, the pauper list, because of unremunerated employment, is greater than that of any other country in the world. And what is pauperism? Pauperism is the result of uncompensated labor; and labor uncompensated is that the wages of which do not furnish the means of keeping in repair the instruments of it. Science and experience show that man, as a laborer, must receive wages in advance of keeping himself in repair, or the instrument he leaves to take his place must be a deteriorated one. This, because, while he labors he also becomes the father of children. This deferioration, going on with each generatiou, at last reaches the point where pauperism becomes a settled condition rather than an occasional and temporary result.

This monstrous evil, this unconvicted crime, of labor without adequate wages, it is plain to be seen, falls most heavily upon the laboring woman who, least of all, is responsible for it. The interests of industry and the instincts of virtue unite in the condemnation of such barbarism.

This question of family maintenance rests upon an arrangement far below the righteous or unrighteous usages of society. In the nature of things, the duty of maintenance belongs to that parent, be it father or mother, best fitted for the fulfillment of it. Shall the little one of any household in the Kingdom of Christ go less suitably fed, clothed and educated because the burden of this providing falls upon the mother, whose more brooding care and greater tenderness more fully symbolize those of the All-Father for the child Humanity? Not always. Nor need the majority-man, upon whose shoulders this burden usually falls, fail of courage because of this concession. He will find the problem most easily solved by the rule of equal compensation. Women do not go into the occupations or men, competing for wages, save from necessity; remaining there the shortest possible time, and finding themselves, when there, at disadvantage of natural and acquired

unfitness. Nevertheless, it is true that women, thus thrust out of their own into new and distasteful occupations, often accomplish as much and as good work as men trained to its pursuit. This putting of themselves so completely into their work, to secure this result, must be exhausting beyond that of masculine services of the same sort. For this reason, and for other very good reasons, when women do go into the occupations of men for wages, they ought to have at least as much, since in respect of need they have the same—that of having others to support—and, in addition, this: the care of the household, in cooking, sewing, nursing, and the general responsibility of administering the affairs of the home. This is so much extra burden laid upon the average laboring woman beyond that performed by the average laboring man.

But the great reason, covering all classes and all conditions of each class is this—*that women are not able to labor so continuously as men.* The disabilities that cut a man off from compensation for labor he is not able to perform are possible and occasional; while those thus hindering a woman are inevitable and periodical. And this, most certainly, at that period of life when family maintenance, if left to her, would, from the youth of her children, be the heaviest. That physiology which stands with its protest at the ballot-box may well take the initiative of protection for woman against this iniquity of more work for the same wages. For a woman to do as much, and as good work as a man, at any continuous employment, involves the using of her life-forces at the rate of self-destruction. And for society to compel, or even permit, this is to legalize by stronger than statutory provision the abrogation of that law of self-preservation, and that duty of equal protection, for the enforcement of which society was formed.

Another and most prolific source of discontent is the want of appreciation which everywhere meets women in the performance of the ordinary and ever-recurring duties of domestic life.

This want of appreciation is apparently grounded, not so much upon a depreciation of woman, herself, as of her occupation. It is as wide-spread as domestic life, and a source of bitterness among all classes not exemted from personal care in affairs of the house by exceptional exaltation of rank. It is found equally among the intelligent and the illiterate — a prevailing low estimate of home duties. Strange as it may seem, this estimate steadily lowers as

the intelligence and pursuits of class advance; finding its ultimate in the disdain of gentlemen of the best circles.

The fact that women do not complain of this very much, or that, to many, it is not distinctly formulated in thought, is all the more to the argument of its being a great wrong and working serious injury. Indeed, next to the fact itself, that it finds so little expression is the worst of it. It is a skeleton with a shadow for every homely joy, dragging the body of its death, through the weary round of woman's life.

The depreciation of whatever industry, art, or gift belongs to the furtherance of purely domestic ends, such as thrift, organization, and device in the household, has gone so steadily on since the days of King Lemuel, that, taking it up as a cause of revolution among women is, as if in obedience to the command, "Open thy mouth for the dumb, in the cause of all such as are appointed to destruction."

I am not unaware of the speculative nature of the theory that measures the decay of woman's interest in home by that of man's estimate of business, but I appeal to both to say whether as the world enlarges to the one, the home is not belittled to the other. The house increases in dimensions, for there must be room for the conveniences of art and a retinue for the service of means. But the home atmosphere is dying out. In the language of one whose celestial philosophy often touches practical life, "it is not known any more what it is, or even that it is." What is there in the well-furnished modern home? Everything to make it comfortable but comfort. Man, with his energy and skill, brings everything there but an appreciation of what woman does to convert material into beauty and use. Ignoring that the home contains in microcosm every element of power with which he wrested from the world the right to call it his own, with additional force of finesse and spirituality of which he has little conception, he seats himself so in the midst as to leave her pretty much out. How to organize the forces, that there may be order without restraint; to harmonize the restlessness of the child with the rest of the adult; to adjust the duties and privileges of servants, the entertainment of friends, the cortesies of society, the calls of religion and charity, maintaining through all her own individuality, and things, if possible, more precious, — the saving from themselves of dearer ones by the con-

servation of all the powers through which the thoughtful woman knows how to build with stones that need no smiting, — she knows through what an incarnation of soul and sense these have come. He does not. So far from this, he really thinks they have cost him so much money. Are not these the receipts?

There is nothing more common than for the wife to discover that her husband wonders what has become of her time. The masculine judgment that money and hired service are sufficient to the results a woman knows have commanded, not her time and freshness only, but as high an order of talent as was ever employed in money-making or in State administration, is driving the wife of price beyond rubies out of the home and out of the world.

There is no mistaking either the fact or the effect of this. In regard to the highest of these home duties, the care and training of children, notwithstanding the theoretical value placed thereon, they fall into the rut of a uniformly low estimate of what is properly considered a woman's work. Evidence of this is found in the fact of no provision made for the development of any practical efficiency for their performance in the home, and in the placing of children under charge of the most incompetent and poorly paid teachers in the schools.

Not until the best institutions that can be established make ready the devoutly impressed and richly furnished young women to become mothers, will women believe there is any honest conviction behind the complimentary speech with which this branch of home service is taken out of the category of contempt. From the gridiron and clothes line to the best possible administration of the home, it is against this grinding sense of undervaluation of her employments that woman makes her way through life.

Of education, as a cause of the present revolutionary movement, it is more difficult to speak. I refer now to that wrong and inadequate education, of which girls get so much that women find themselves practically without any. It commences early and continues long, in that indirect tutelage found in the home, in institutions, laws, literature and society, and which, between repression and stimulation, becomes an almost systematic procedure for baffling nature and substituting the standards of art. And what do we see? Hearty, happy little girls? We see very little, any more, of that phase of female loveliness. Preferences and tendencies are no

longer tolerated unless of clear becomingness, according to estimates as changing as the unreliable qualities they foster. To atone for this ever present repression in regard to food, frolic and devices of taste, an enervation of indulgence sets in, with corresponding results to body and mind.

The law of nature, which is development and not hindrance, is thus stimulated to over-activity among boys by the constant assault upon its application to the girls of the household. Thus the hard and aggressive nature of boys becomes harder and more aggressive than nature intended, resulting in injury to the female organism. Reference is had to that sort of injury upon which the discovered relations of physiology and psychology begin to throw some light, and which is due to the more complete wholeness of woman's structural development at any given time, and at the earliest time, making the endurance of repression or the excess of stimulation more hurtful to the childhood of girls than of boys.

The pernicious doctrine that women are made for sacrifice, with the stimulus of making this sacrifice wholly acceptable, has been the root and front of all falsity in relations between the sexes. It begins in the family, teaching to the least of them that brothers are to become whatever they can make themselves through their gifts and opportunities, and that sisters are to become what is neither in the way of nor unacceptable to their brothers. This subordination of one sex to the other teaches inferiority and breeds the pride of some sort of rivalry. The field of this is soon found, there being much help to it; and the aim is fixed to be a pleasure to the brother, as he is a power to her. If this were all, little harm would come of it; since, at its height of art and purpose, it is the gift of God — *this art of a woman wholly pleasing a man.* But the end being presented, with no incentive beyond it, the aim soon touches its depth of demoralization, through the notion that methods are of less consequence than results, and forgetting the purpose of appearing to be what she is not.

There is little room to doubt that this is a legitimate result of early indirect training; and a fountain of that insincerity which is so dark a shadow on female character. The affectation, instead of the cultivation of gracious quality in the plastic years of childhood, often remains but an affectation, to the wormwood and gall of other lives and latest years. It is because of exceptional nurturing of

truth and womanly quality, that society is saved from the full penalty of the teaching that women are bound to please; and, pleasing, it matters but little how. Grave as this charge seems, it is as true as when made a quarter of a century ago by that illustrious friend of man, Horace Mann, that, "Through all time, women have been assiduously taught that the garniture of the body was more precious than the vesture of the spirit; and in no age nor portion of an age, in no country nor segment of a country, has woman ever been elevated for her reflex power of elevating others."

Under the conditions, it is not surprising that woman should seize upon material ornamentation as accessory to the purpose of making the most of herself; or that, as the sense of her moral responsibility is lowered, she would rely more and more upon these allies of personal attractiveness. The surprise is, that with any moral sense left, she should not repudiate the putting of things beautiful and appropriate, as aiding the expression of intrinsic beauty and worth, in the place of these. Nevertheless, this is done, and to such an extent that, just as the connection between taste and morals disappears in modern feminine apparel, it reappears in the spectacle of a very low standard of personal appreciation, expressing itself in the deformities of fashion. It is not merely the empty head of the votary of conventional extremes that measures the folly and wickedness of training up childhood to such maidenhood; it is in the exhibition of moral unfitness superinduced upon womanhood itself, and finding its moral expression in her attire, where the womanly art of decoration becomes artifice.

As life advances, the position and language of institutions reaffirm to women the humiliating proposition of her youth. At the threshold of all higher power and privilege, she is met with the denial of right, or the denial of capacity. There is not an institution, of the highest grade of its kind, in the world where a woman can go for instruction, upon an equality with man; and in those approximating this rank, where she finds admission, it is also to find the atmosphere and hindrance of his supercilious toleration,

In the language of the law, she finds herself ranking first in the list of natural and convicted incapables — "women, children, criminals, idiots and slaves." Moses placed her in the category of substance — property — and there she remains. Not long since I saw

in an American newspaper an advertisement of the escape of a wife who had been left as security for the payment of money, with notice of penalties for harboring her. The property and the husband are one, and not the husband and wife; for does not their relation terminate upon the death of either, while the husband and his horse go on together beyond the solemn event?

In regard to the ownership of children, not the slave-mother alone, but Cæsar's wife may miss the infant from her side and Cæsar make no answer. Moses inaugurated this also, and time has meddled but little with the policy.

In literature it is the same, and yet worse of the kind. The voice of institutious and of law can be somewhat escaped, invading the home but occasionally, But literature, which is a woman's refuge, with its treasures of new and old, its enchanting fabrications in story and verse, and its record of all that has been done, and hoped and failed, — it is here that woman finds herself in the full habiliment of her subordination. It is not the bold avowal of her inferiority and the scorn of her sphere, of which there is no lack; it is not the meaningless paraded recognition of her charms and gifts, as the decorator and subserver of his leisure, nor yet the vows and homage accorded her as ministering angel of the house and purifier of society; it is that inexpressible tone and spirit pervading the whole, as she turns its pages, announcing everywhere to women the measure of her esteem among men. Out of literature proper she is eased down into society — where the virus of all takes most fatal effect — by the newspaper press. There is nothing more offensive, and nothing more damaging to the moral sense of the average reader, of either sex, than the manner in which woman is distorted and bemeaned by the newspaper craft. Women, the scandal of the double-leaded column, the gist of every well-told tale, the butt of the best joke, the glint of sarcasm, the ridicule of domestic discontent and diabolism, and the unknown quantity of all innuendo and suspicion. And woman not at her best, or half best of admitted worth, but at her worst of disadvantage.

In society, the attitude and the speech of man to women is most decorous; for it is here, in the preseuce of her physical charms, that the fascinations of her intellectual and spiritual beauty unite in appeal from the decrees of his calculating intellect. And yet it is here that woman brings the largest of an unreserved sacrifice — her time, labor, means, capability, her health, herself.

As a last cause distinctively considered, we have the direct education furnished in schools for girls. And it may be that here will be found the chief cause of the attempt of women to revolutionize public sentiment in their interest, since the language of positive education is the plainest possible statement to women of the inferiority of her duties and of herself.

The rule of less compensation for labor may come in part from a mistaken judgment as to the number of dependent women; the depreciation of home duties from an imperfect knowledge of domestic economy; and much of indirect teaching may be the half unconscious growth of a belief that, things being as they are, it is best to make the most of conditions found. Even the injustice of her legal status may be glossed over by the assumption that the responsibilities of equality would overbalance its additional security. Such conclusions are compatible with a rather fair estimate of women taken out of the intricacies of relations which it is difficult to estimate. But that direct education, which is neither for public nor professional service, comes to woman with a denial of the right to it or capacity for it. If one could lay upon the page, or place before the eye, a picture representing the hemispheres of time occupied by men and women respectively, and touch them with light and shade, according to the measure of education that has been furnished each, the eye might help the mind in gaining a conceptionof the extent to which woman has been denied a knowledge of herself and of the world in which she lives. But art has not the gift, as eloquence has been in vain, to arouse man to the wrong of denying to woman an equal share in whatever education can give as a preparation for life. Because there is a difference between the present and the practice of earliest times, it is not to be lost sight of that the difference in the opportunities afforded young men and women respectively, has not been diminished in proportion to general educational advancement; so that it remains, to the dishonor of all time and countries. Using again the language of Horace Mann, "In estimating the number of heroic souls who have languished out their lives in dungeon cells, or fallen beneath the axe of the oppressor, we count by hundreds and by thousands; in summing up the multitudes whom conquerers have subjugated and enslaved, we count by nations and races of men; but, in enumerating the women whom man has visited with injustice and persistent wrong in the rights of education, we express ourselves by a

unit, but that unit is the world. And this, notwithstanding that human reason seeks in vain for a reason why there should be this difference of education and no education between the sexes."

It is incredible that women have not been taking note of these things through much time of both experience and retrospect; and that they are not more moved to protest and revolution to-day, in the flush of modern enlightment, than when abiding in the thicker darkness of the past. Nor is it wonderful that this revolution, having its root and furtherance in the English-speaking countries, where progress has done the most for men, should find just here, where their education is most advanced, most bitter cause of complaint.

III. Of the aims and methods, there is but time for the most general mention.

The aim is to take woman out of the condition of subordination to one of equality with man. As an aim it is all that it could be — a whole, a wise, and a just one.

Of the methods, it must be said, they have often been mistaken ones, hindering the cause. But they are explained as being the only ones furnished as models — the means used by man in furtherance of similar objects.

IV. The supposed results being the hydra-headed confusion and desolation of the social scheme, it is well to look a little carefully at what they would probably be. And, first, they must appear in woman herself more than in man. The mere fact of equality before the law would vitalize her intellectual being, through an added sense of power, not likely to awaken at once a corresponding sense of responsibility. This has been the history of all class advancement, and especially when advancing upon privileges long withheld, and it cannot be doubted that the entire body of women, I mean all classes of them, would be thus affected — first by the privileges, rather than by the duties, of the new position. Nor could this fail to bring about great social injury, involving the neglect of children and homes, domestic industries and charities, differences between husbands and wives, and disaster to private and public business. As the direct result of the independence of woman, this would be bad enough; but it would undoubtedly be followed by the darker shades of increased licentiousness among both women and men. Political power, and political power alone, as furnishing the

means of protecting himself against the inflictions which may come of it, has been the bulwark of man's prerogative and practice of vice. It has done more and worse than this; it has compelled, whenever his interests were subserved thereby, a participation by woman in his vice, while meting out direst penalties for the same, when it did not so subserve his purposes.

The revulsion from all this, with co-ordinate power and privilege, will most assuredly work to the debasement of female character, checked only by her natural superiority of instinctive virtue, and by the increased security against temptation found in her enlarged material independence. The tendency to this growth of vice among men would also find restraint in their increased respect for women, *because* of their independence, and in the elevation of sentiment inspired by them through better culture and the consequent ability to turn the excess of masculine passion into virtuous and useful channels.

Another powerful, and, it may be, more immediate check to either the ordinary or increased licentiousness of men would be the alarm seizing upon all but the most depraved circles of society, at the spectacle of woman becoming the instrument of so appalling a measure of retributive justice. Nor can it be doubted that this spectacle would become a measure of extraordinary enlightenment to him concerning the whole nature of the sexual passion and of the non-sexual character of morality *in extenso*.

An increase of divorce legitimate to this state of things would ere long be corrected by enabling women to enter upon marriage more considerately than now; while marriage itself would be steadily gaining in dignity and security, as the elevation and responsibility of enfranchised women began to take effect upon the general quality of men, as well.

This movement, would, however, beyond all question, show itself to have been a great and just movement in the result of better educated women. Through the independence of equality in education, better women; and after that a better race of men, better rearing, better society, better government, and a nobler civilization.

That women desire an equality with men to the end of entrance upon public life, or of competing with them in the affairs of business, is as far as possible from the truth. There is much apprehen-

sion as to the subversion of social order, while insisting upon obedience to the law of nature in the parcelling out of duties and relations between men and women; and yet the entire proceeding of the civil structure of man in this regard is as if nature had furnished no law not in need of the sanction of his enforcement. But if there is one law of the intellectual constitution of sex more clearly defined than another, it is this: That man is intended for massing himself with his fellows in organization, and woman for abiding in the unity of self-hood. Man for openly aggressive, and woman for silent, power is the *law* of power; each after its fitness and its destiny. Since the world was, man has appeared best in activity, woman in repose. Instance the testimony of all marble and canvas, as well as of literatute, and observe it in the daily round where the self-blinded eyes of men begin to see this open secret of the social disorder.

Women do not crave a public career, nor would they remain long in public life if its paths were fully open to them. They do not seek the ballot to this end. Even the majority of the leaders of this movement desire nothing so much as the protection a domestic sphere and home-life theory promise them. As before the Magi of the old, a woman stands to-day before the law maker of this new time, questioned as to what most pleases woman. And thus has she always stood, answering in the language of the myth, "To be loved, to be studied by her husband, and to be mistress of the house."

The difference between the women of that and this time is in the manner of the response. The Persian representative of her sex stood in the twilight of the world, asking for a veil behind which to hide from even the gods, who held in their keeping such precious gifts, her sacred joy in anticipation of their bestowal; while the representative-movement woman of to-day stands on platform and in press in the emphasis of her determination to have something better than the *promise* of these good things.

To be loved, to be studied, and to be mistress of the home where strength and honor are her clothing, this has always been and always will be the joy and crown of woman. By the laws of her physical and spiritual being, as well as by intellectual preferences, she is wedded to her motherhood. But she never has been, and never can be, true to it under the imposition of conditions dependent upon the will of man.

Ideal freedom, which is the birthright of every human soul, is more necessary and more possible to woman than to man, if any comparison can be made. Alone with herself, in the unity of that mysterious bond which binds a finite to an infinite being, woman becomes a power for baffling evil and furthering good. But under the ban and surveillance of her master, she is not able to realize, much less to find, her place.

V. The final cause of this movement is that of all real progress, and in the nature of things, it cannot fail. That women will accept less than the obliteration of the last jot and tittle of man's ungraciousness to her is not possible, as it is not possible for a law to be and not to be at the same moment. Ways and means are nothing, as condition and precedent are nothing. Through folly and through wisdom, through strength and through weakness, moves on the perfect plan to perfect ends.

BACCALAUREATE SERMOM.

BY JOHN BASCOM,
President of the Wisconsin State University in the Assembly Chamber, June 16th, 1878.

THE COMMON SCHOOL.

MATT. 11: 5. "The blind receive their sight, and the lame walk, the lepers are cleansed, and the deaf hear, the dead are raised up, and the poor have the gospel preached unto them."

These words compose the message which our Savior sent to John the Baptist in answer to his inquiry, Art thou he that should come, or do we look for another? They are most interesting as a clear expression by Christ of his idea of the proper and sufficient proof of a divine messenger. It is both by works and words, beneficent works and blessed words, coming forth together and sustaining each other, that the argument is to be maintained. In this case the works are of the most supreme order, for the messenger is the Divine One; but they are none the less works which lie directly in the line of nature. Nature is simply helped in her weakness and restored to her strength. The blind *see*, the lame *walk*, the lepers are *cleansed*, the deaf *hear*, the dead *live*. The work is all redemptive, the putting on their feet again of men damaged, disabled

or dead in the strife of life. They walk once more, they see and hear, they come again into the glad possession of the sunlight, they live before God and with their fellow men. The supernatural, great as it is, here bends perfectly to the natural, and these beneficiaries of Christ are put back into life such as it had once been to them, — yet not altogether such, for they now have a gospel preached to them. The burdens have not been thrown away, but they are greatly strengthened to bear them.

Every man who does this, who gives new life and new conditions of life, one by whom figurative or literally the blind see, the deaf hear, and the lame walk, is God's messenger. The method of doing it, whether by means alone or by miracles also, belongs not to the substance of the message, but to its form, and changes with the changing conditions of human experience.

But the crowning proof Christ offers is, the poor have the gospel preached to them. These external gifts and helps only make way for internal light, and pass the penitent on to a regenerative gospel, a pure and peaceful vision of the soul. And this vision is brought pre-eminently to the poor, to the poor who are jostled in the thoroughfares of commerce, and carried to the wall in every social conflict; to the poor who, in a philosophy of evolution, are the unleavened lump of dullness to be cast out, and who in the paths of religion even, are ever and anon slipping under the feet of the priestly procession.

There is a disposition among good men and indifferent men to accept the facts of the world on their present basis under one set of principles, and let them pass, and to construct the facts of heaven on another basis, under higher principles, and press on to them. In accordance with this teaching, the poor are left very much to shift for themselves, to endure hard conditions and sweat under heavy burdens, encouraged, if encouraged at all by the promise of a better state of things hereafter. The world is surrendered to selfishness, and its inmates to the schooling of self-interest; Heaven alone is reserved for the reign of good-will. The philosopher satisfies himself with this conclusion, because we blunder so often in our charities; and the Christian, because he has not enough of the life of love wherewith to work the law of love. There is in this contentment a subtle and pervasive lie in whatever way we regard it. The good man who satisfies himself with the poverty of the

poor, thereby impoverishes his own spirit in the very graces of sympathy and good-will which are the wealth of heaven; and the poor man who, with his mouth full of the cant of the time, is waiting for death to enrich him, is missing the very entrance of the path of life.

The poor are interesting to the wise mind and warm heart not as remaining poor.—nothing belongs to mere poverty but hard discipline fitted to drive us one and all out of it, but as calling for that aid which shall make them rich, shall give them the conditions of life. The poor can only be permanently raised from their poverty, a poverty of internal even more than of external resources, by effort and aid. The effort is eternally theirs, and the aid eternally ours. To stretch out the hand of aid to the hand of effort is the divine commission in the world. This it is which makes one a messenger of God, the preacher of a gospel to the poor.

Is it not then a consuming lie in reference to all our own virtues, in reference to Heaven and Earth alike, to relegate the poor, pitied or unpitied, to their poverty? Is it not a most deceptive lie for the poor to sink back into ignorance and indolence and wait for death to readjust relations, as if infelicities here were a claim for felicities hereafter? It is life not death that saves the human soul. It is time to break down the border-wall between the present and the future life, the conditions here and the conditions yonder, the laws present and the laws to come; it is time to remember that the Kingdom of Heaven sweeps through and over all periods and places, and that we are to make ourselves, in impulse and act, of it this very instant. His garment of grace was the imperial purple, the spiritual power in which Christ was clothed. He brought a gospel to the poor, that is to all men. The paths of Heaven with their sweet flowers were under his own feet, and he was busy in leading men *at once* into them. To awaken and enlarge the lives of men henceforth and forever, this was the work of Christ; herein he was disclosed as the Son of God.

This also is our work. If we open not every door, the doors nearest us, of wealth, knowledge, truth, virtue, for every man, and first for the poorest as for those who most need our aid, how shall we ourselves enter Heaven, rich in beneficence, rich in the wisdom that ministers to beneficence, heirs of the grace of God! It is, then, the crowning distinction of every messenger sent of God, every com-

munity constructed of God, that they have an instant and urgent gospel for the poor; that they are full of desire and full of power to sweeten and enlarge human life. The disposition and the skill are both present.

There is one door, a homely one; one often battered and many times broken; one that, in the majority of cases, discloses beyond it no very desirable vista, nor a vista seen to lead anywhere in particular, which we should do something to-day, and every day, to place firmly on its hinges, to beautify and set wide open as an entrance to knowledge for the rich and the poor of our land; it is the door of the district school or common school.

Good people always contract cant, and suffer insensibly from hypocrisy. The best of bread will mold. The educational cant of our republic is the common school. This is our peculiar hypocrisy; our popular idol, in whose praises we shout ourselves hoarse, while in our heart of hearts begrudging the dimes and dollars that go to its support. This is the fetich that is to preserve our liberties, when no rational man, looking at its construction and the range of its powers, can tell how it is to do it. This is the institution which is to make us unlike all who have gone before us, or are on the earth with us; a nation who understands the laws of society and cheerfully observes them. We express this our social creed in a variety of pleasant phrases, but they are one and all pervaded by that easy conventional faith that belongs to cant. We are unwilling to open anew the topic and test the adequacy of our means — the existing district school — to the end proposed, the public safety and the prosperity of free institutions. A thoughtful man must feel a sense of the ludicrous mingled with his sorrow when invited to look at the country school as it exists among us and told that this is our penacea, this the entrance to our social millennium. Surely there is some mistake here as in those churches which are thought of as weather-doors to the gates of Heaven.

Yet the common school may be, if properly constructed and properly supported by other institutions, in a large measure what it is thought to be, the nurse of national life; the point at which the life that it imparts itself to the life that is to be. It is then most harmful to our national strength to put in these, its very sources, words for things and appearances for facts; to allow the fountain to fill up and defile itself till the living waters are quite lost.

Our inquires will be, how shall primary public instruction be shaped in order to be a gospel to the poor, a full folio? And what are the reasons why it is partially failing, or is liable to fail, of its true function in the state? The common school should be inviting in position; neat and orderly without; within, wholesome to body and mind, and furnished with a discipline and instruction corrective and stimulative to the thoughts and feelings of every child. I need not say how often neglect and indifference are the most legible lesson without and within the public school; nor how quickly the child catches the spirit of contempt and abuse. Some school-houses in themselves and their surroundings educate a school in violence and vulgarity more than any medium teacher can educate them in virtue. The respect of parents for the public school should be written on every portion of the grounds and buildings. Nor can poverty be pleaded at this point, for care is far cheaper than carlessness.

While the appurtenances of the school should be quickening to all orderly and enlightened impulses, its kindly and energetic discipline should be a moral tonic. Every good school is a moral training, every bad school an immoral one. It is not the children who settle the moral tone of a school, but the purposes pursued in it, the spirit and the method of the work. No discipline is more moral than that of faithful, enthusiastic work; and no work is more wholesome than a beneficent, social training of our powers. This is a child's normal spiritual life. A school need not go out of its way to be morally invigorating; it can not help being so, if it is a school with a thorough purpose, a conjoint life, and a lively regimen. The head and the heart are there, and they throb with affectionate and constructive force. Says HUXLEY of the growing public schools of England: "The intelligence, patience and good temper of the teachers which are now at the disposal of the veriest waifs and wastrels of society are things which a few years since did not belong even to costly middle-class schools."

The essential thing in the common school is that it shall give pertinent knowledge with due rapidity. But what constitutes pertinent knowledge and due rapidity? It has been laid down rather decisively that "the true theory of a common school programme is that every step should be the best possible preparation for stepping out rather than for stepping up." But is there any such contrast as is

here implied between stepping out and stepping up? The path which carries one up in knowledge is the path from which it is profitable to diverge into the world at any point, the farther on the better. This statement calls for a few simple qualifications, and that is all. There are a very few studies, like book-keeping, that are half mechanical, a mere preparation for work; the vast majority of studies are quickening to the intellectual nature, and owe their chief value to that fact. In these studies, stepping out and stepping up are identical in the method called for. The tree is simply growing on all sides and also upward toward the light.

There is one other qualification. Some studies, like languages, impose a great deal of comparative drudgery on the child in acquiring their rudiments, and reward him later for his labor. The time, therefore, at one's disposal, must be considered before these branches are entered on.

With these exceptions, the ability to go up advantageously is the ability to go out advantageously. The ability to do either is the ability to acquire knowledge, to make all things aid in furthering our activity in this direction. In each case the primary condition of success is to awaken the mind, and give it bent and power. The first purpose of instruction, whether it be the instruction of schools or of the world, is to evoke an appetite for truth; and nourish it in one or more ways. Whether, therefore, the pupil tarries in training a half dozen or a dozen years, the object is the same, to help him over the comparitively mechanical conditions of knowledge into the realm of knowledge itself. The instruction which makes the mind a living thing, that only is education. For both purposes and all purposes, we tarry too long and in too dead a way in the district school on the formal conditions, the shucks and shells of knowledge, when we should hasten forward to knowledge itself. Thus we spell through a spelling book of words, when we know and can know little nor nothing of their meaning and use, little or nothing of the literature of which they are the dead and dismembered terms. We multiply the rules of language and construe speech in a thousand ingenious ways, instead of making it at once a highway into the heart of a new territory. This is to put drill in the place of war, to march up and down the hills of difficulty, backwards and forwards through the dusty routine of knowledge, with much weariness and little inspiring progress. In all our schools, and in none

more than in the district schools, we need to ask afresh for the shortest roads to real knowledge, and to acquire the forms of knowledge in getting at its substance. A great deal of so called thoroughness is blowing a feeble spark till we have blown it out. That child is best fitted to leave the common school, whether for those paths of knowledge which run out into the world, or those which wander on farther in the quiet places of study, who has begun to get hold in its own thoughts of things, persons and events, and to move an interested party among them.

It is evident then, that public school instructions should be made as quickly nutritious as possible, and put the child in possession of geographical, historical, scientific, personal facts, more particularly those which touch our daily life, and make it thoughtful and significant. There ought to be laid on the country schools none of those restrictions which are applicable only to carefully graded city schools. Many branches may be pursued, and the higher help the lower. Since the district school is assisted by no outside relations, it should be hindered by none. It should be open to all the possibilities of the present hour, the present pupils, the present teacher. That district school is the best which chokes the child least with the dry dust of knowledge, germinates and plants the most seeds of thought, and by the aid of the town library, swings the door wide for further growth.

But the district school, to subserve its purpose, must not merely be a quickening school, it must be a common school where the rich and the poor meet together. It must be good enough for the rich and is only thereby good enough for the poor. Who can tell whether this or that child shall prosper, or both be alike good! The youth of all nationaities, all faiths, all classes, must be fused together by the warm sympathies of childhood, drawn out in a common intellectual life. Only so can we escape a populace, a proletariat. A district school that is the barley loaf baked in the public oven for the poor, God avert the folly that thinks that this will make citizens and not paupers! Such institutions are not more than enough to answer the purposes of hypocrisy and keep the disease well smothered in about the heart. Convulsion follows convulsion at the South. Why? Because its States are not commonwealths, its children are not plants rooted in the same soil and growing up into the same light.

Our district schools at the North advance hesitatingly, with much labor. Why? First, because we are not willing to put money into them, not money enough even to save what we do put into them. Our schools are too cheap. A little more cost might, in many instances, double and triple returns. It is this purblind penuriousness with which we often deal with the public school that makes it just to characterize our laudations of the system as the cant of liberty. At no point does the cry of taxes, hard-earned taxes, more surely tell than at this point. Hard-earned taxes! Is the money any harder earned than that spent at the saloon on the next corner? Is it not hard-earned because earned in ignorance? And, as hard-earned, is it not to be spent wisely? We forget that other taxes leave our labors unlightened, but that this tax enters into our very households, and turns for us one dollar into ten, into a hundred, in meeting that first duty and chief delight of home, the education of our children. Analyze our taxes, as the taxes of this city, and how often will we find that we are paying on some debt whose parents were ignorance and fraud, as much as for our schools. In our city schools, where there is extravagance in buildings, it does not follow that there is wise and uniform liberality in administration. That an economy which impoverishes our schools is as unnecessary as it is irrational, is seen in the habits of our people, their personal indulgences; in the money we put into houses of correction, prisons, asylums, all more or less directly the entail of ignorance; and in the cost of strikes, vicious legislation and domestic war, farther results of popular debasement.

We are abundantly able to give our schools a thorough support, and so supported, they will steadily reduce in many directions our burdens of taxation. It is cheaper, as all experience shows, to educate a man than to maintain him as a lunatic, feed him as a pauper, imprison him as a criminal, or shoot him in insurrection. If there is any connection fixed in human society, it is this general relation between intelligence and good citizenship.

The ignorance of the people is played upon every day. Some politician leads them into needless and fraudulent expenditures, and then regains his poopularity by crying out against the cost of the schools in which the people are educated. No matter what red flag is waved before the populace, they rush like a mad bull after it, because of ignorance.

At what price are we seeking, in this State and in other States to educate our children. For three, six, possibly nine dollars per annum. What price is any wise parent willing to pay for the education of his children? Twenty, fifty, one hundred times that sum. The estimate which good men put on the training of their own children as contrasted with those of the commonwealth, is forty to one. We need, then, more liberality; we need more life-blood poured into the right arm of our strength, if we are to get a secure hold on the possibilities of the hour.

The teacher is the head and the heart of the school, and he can be neither completely, without being both measurably. We should put none but the best men and women in charge of the children, and so in charge of the State, and of the future. We should say with pride of a man, "He is bright enough and good enough to be a teacher." In the gallery of my childhood, most of whose portraits have quite faded out and their very names been lost, one winning face remains, that of an instructor. That face was among the earliest and most intelligible signals that the spiritual world hung out to me, as life was opening on its mysteries, and light was streaming in at the casements of youth.

The second reason why the district school is not the controlling power it ought to be, is, that as a people, we have little real interest in it. We maintain ir as a tradition, and shuffle along with it as a custom. We suffer with patience an occasional enthusiast on the subject, but we, the people, have very little fresh thought or earnest feeling about it. Interest is of more moment than money; nothing can be made wealthy by the hand which is not also made wealthy by the heart. There is no direction in which a wise philanthropy can better and more safely expend itself than on public instruction.

The communism of our time is not all an error. *It means something.* It means that wealth and poverty must stand on more equal terms than hitherto, that the resources of the nation are for the nation, and that no stable community can be built upon merely commercial law. The true communism is that of intelligence, of opportunities. If we reject this, we shall be worried and wasted by its devilish counterpart, the restless, night-stalking ghost of murdered sympathy. It is strange, very strange, that our churches take more interest in public instruction. Some of them attack the common

schools, some of them are indifferent to them, and none seem to regard them as a supreme point at which life is to be poured into the community. Our churches seem to think it their chief office to care for themselves — as if self-seeking were any better in them than in the individual — and not to construct a kingdom of heaven, a true commonwealth of Christ. The real umbilical artery by which the parent power of righteousness is to pour its life-blood into the state, always embryonic through its children, is this very avenue of public instruction. Not to know this is to have no message, no gospel for the poor. The commonweal, the commonwealth are mere words to us as yet; the injunction, "Love thy neighbor as thyself," as far off from our thoughts as the polar star — yet it is the polar star, and lies in the very axis of revolution in the spiritual world.

We hardly distinguish, as yet, the politician from the statesman, yet the one is a creature and the other a creation. The statesman infuses his strength into the state; the politician, leach-like sucks his strength from the state. The statesman watches the state with a loving, constructive eye; the politician, fox-like, watches it with a cunning, pilfering eye. The statesman works in the light, and by the light, and for the light; the politician, in the darkness, and by the darkness, and for the darkness; and it is the obscure night, brooding over the popular mind, that makes his career possible.

A third difficulty in our common school system is, the want of sufficient organization. Our city schools are often quite superior, owing chiefly to organization. It is a cardinal truth, in all intellectual and spiritual growths, that life works downward, not upward, comes from above and not from below. To leave feeble districts to themselves is to condemn them to imbecility and decay. The regenerative power is not in them. They must be helped and pressed upward with unflagging zeal. The town is the smallest admissible unit in a school system; the first step in organization, and its first strength. Towns themselves require to be taken firmly under the guidance of the state, and the state, by laws and taxes, should provide for education in all parts of it. We might as well separate the head from the body, as to divide the larger cities from the remote townships. It is a denial of the fundamental dependencies of the common life; it is arresting organization at the very point at which it is most helpful. Instruction in the country dis-

tricts is often ten times more costly, measured in the per centage of taxation, and ten times less efficient than in the city schools. The city cannot say to the country, "I have no need of thee," and the life of the state be saved. There is a composite profiting and a composite responsibility that we cannot forget. The wealth of the country is the wealth of the city, and the prosperity of one is the prosperity of both. We can indeed rob the field in seed time, but what will be the harvest?

Equally must there be an organization of higher with primary instruction. The district school must open a door, but to what? To all that lies beyond. The paths of progress must be made so continuous, that many shall pursue them, and turn from them at all stages. It is this diffusion, this continuity of knowledge in the community that prepare the way for all forms of educational influence, the pulpit, the press, the platform. Many of our people now know just enough to be conveniently cheated. The good and the bad rush into the street together, and cry Stop thief! Stop thief! Half-taught citizens join the shout, and the chances are, that after a hard run, the upright man finds himself hustled, while the rascal eads the mob.

The district schools that are not the fibrous roots of a system, that are not under the fostering care of the entire community, have small corrective power. We can be a body politic only as the warm currents of life go streaming into every member.

The last deficiency in public school instruction is the want of wise administration. Towns may lack the wisdom and good will to do this administrative work well, and cities, when ignorance or selfishness are in power, may pull down in a few weeks what has seen years in building. The State should be searched through all its limits for its very best and broadest men to be placed on its educational boards. If we insist, as we ought, on intelligence and integrity and strength, these desirable men are not easily found, and certainly are not always found.

The public interests in no portion of their administration call for more wise, liberal and disinterested men than do our educational nstitutions — men who were born men, and who have been growing into manhood ever since. When we look at the willful mischief hourly wrought, and hourly liable to be wrought on our schools, it is a truth as plain as it is painful, that we suffer irreparable loss from the want of a just and generous administration.

Says the *Nation* — a paper characterized by a high degree of that intelligence which is possible with only partial candor — commenting on the fitness of a National University: "Our State Universities, so called, are not successful in the highest and best sense of the word. Some of them are the mere playthings of politicians, and, as a general rule, the more ignorant a politician is the more he has to say about the University." We shall hardly be willing to accept this as a full statement, certainly not as a final statement of the truth, yet it is the admonitory flag hung out where the small-pox is. The demand in our higher institutions and, in their measure, in the lower ones as well, is for a free interior administration with a full exterior responsibility; that skilled labor shall have the rights of skilled labor; that those shall be over this labor who are wise enough to use it under its own law. If we desire men of talent as teachers, we must give scope to their talents; if we desire those whose heads can be tied up in a sack, then we should seek for the foolish ostrich. Strong men will go where strong men are respected. No high-minded man will allow the very heart of his labor to be taken out of it.

The integrity of one's work is in a large degree the integrity of one's life, and must be defended at all risks. Enslave the labor and you enslave the man that performs it. An open field is the first demand of independent manhood. The teacher must win this, if he is to have his own respect and the respect of others. Instruction is a great trust, a grand activity, but only on condition that it is treated in a large way. It is preeminently a calling in which the freedom of the spirit redeems everything or loses everything, in which we sink by hard conditions to servile drudgery, or, by the buoyancy of our own spirit, rise to moral mastery. Yet it is this mastery of our own thought within itself, and the affiliated master which belongs to its free, enthusiastic development in its own province, that can alone give us power to instruct, to build up an inner manhood and life. Freedom, then, is the native force of our tutorial function, and must be had as its first condition of health.

A school system that gathers up the wealth and the good-will, the constructive thought and executive wisdom of a people, will be great in itself, great in the conditions it carries with it, and magnificently great in its command of the future.

If we have the heroic elements and the faith elements that prop-

erly belong to our time, we shall achieve such a result in this Northern Mississippi Valley. In the incipiency of our work, we have shown two great features the world has not before so seen, — complete public instruction and co-education. It behooves us, then, not to waste one thought or lose one energy in discussion, but with a new birth of power in the world's progress, to consecrate all to righteousness.

Members of the Graduating Class : — This discourse has been primarily directed to you. You have shared to the full the benefits of public instruction, and are some of you in turn to carry this instruction to others. I have met you with peculiar pleasure in the recitation-room, and this I believe to have been the experience of your other instructors. You have also had the advantage of extended lectures in didactics, and are correspondingly ready for your work. Wherever you are found, and in whatever calling, I trust it will practically be in the public service, paying without discount, in these days of repudiation, your indebtedness to the state. We shall hope to meet you in many relations, and find you in them all faithful to the trust that has been committed to you.

Let us carry with us no narrowness and no bitterness. Let us recognize the fact that private schools and colleges are wholly within the liberty of the citizen, and that they may be at times among the best expressions of his power. While, however, we hold the faith, that our divided population, in these western states, can be most immediately and efficiently united and led forward by public instruction, let us give the principle no divided allegiance. There is too much to be done to set about it in different ways.

Our work, because of its very breadth and variety, is aspersed. We disregard the aspersion. There are two tests of good instruction : the number it reaches, and the ground it leads them over. We regard the first as by far the most essential in connection with the public welfare ; but fairly judged we fail in neither, and we shall grow in both. We have a gospel which we are carrying to the poor, but it is none the less a gospel. First breadth, and so heighth, is our line of progress, and we are not to be diverted from it by criticism which is interested only in a more narrow work.

We are called with a grand calling. No more fertile furrows ever waited for sowing, no heavier laden fields ever waved before the sickle. Better and greater men than we will come after us, yet

they will be born of our strength and fed of our wisdom. We shall have their love and reverence according as we have wrought in these directions of growth. If any of you have the purple cloak, I trust, with a courtier's instinct, you will spread it at once in the paths of Truth. Her reward will be great and generous, like that of England's queen.

The world is in the freshness of youth, and moves forward to manhood. Let us catch the sense of divine power in all things about us, take to ourselves the fortunes of our time, and along the path of generous activity, enter into our inheritance — heirs of God and joint-heirs with Jesus Christ, proclaimed the Son of God by virtue of a Gospel preached to the poor.

THE USES OF REFUSE — LET THE TRAMPS BE MARCHING ON.

By PROF J. D. BUTLER.

Twenty years ago, the homestead bill was advocated as a panacea for pauperism. It was said, "Uncle Sam is rich enough to give us all a farm, and the free-holder will not be a vagabond." The land thus longed for was freely given, and it was still less frequently kept. Give all tramps homesteads to-day. Not half of them will till their acres at all. A great majority will at once sell them for a song — and spend the petty avails so as to intensify their own vice and misery. There is no doing a favor to those who will not take it. Perhaps Shakspeare had some fellow feeling for tramps. At all events, he would have looken on them kindly, for he said: "There is some soul of goodness in things evil, would men observingly distill it out." Such distillation would never be accused of crookedness. St. Pierre, a century ago, published a project for rendering French dukes and other nobles useful. Had his ironical hints been heeded, many revolutionary horrors that followed hard after would have been nipped in the bud. The French sage would have turned to account the froth and foam of society. The dregs and lees of it are what we now need to utilize. Any expedient, which may by possibility result in so desirable a consummation, deserves attention.

How, then, would I stay the tramp plague? My answer is, put every able-bodied tramp into the regular army. Send the tramp legion west to the tune of "Tramp, tramp, tramp, the boys are marching." This nostrum is novel, and, so far as I know, has not been before proposed in America. How would it work?

First, it would save the army. The expense of recruiting, now so great, would dwindle to almost nothing. The cost of the army being reduced, that institution would be less assailed by retrenching demagogues. It is often said that the army has long owed its salvation to the Indian, who has kept it from outliving its usefulness. As the grand receptacle of congregated tramps, the army would show itself useful in a new sphere, and would secure a new lease of popularity.

Secondly, tramps utilized in the way I have proposed would destroy the Indian. Satan would cast out Satan. The stronger battalions carry the day. At every point we can put into the field tramps outnumbering the savages. A match for Indians in laziness, gluttony, lying, stealing, and cruelty, and five times as numerous, how can the tramps fail to be victorious? The whole life of the tramp — his night prowlings and cunning surprises — have trained him, as by a liberal education, for Indian warfare. His foible in civilized society will become his forte beyond its pale. However this may be, his conflict with the noble red man will be viewed with far more of equanimity and interest by outsiders than even the fights of Turks and Russians. We should enjoy it as in Gough's story the woman did the fighting between her husband and the bear.

Thirdly, tramps, thrust into the regular army, would work out their own salvation. Not all of them would, but those would who are worth saving or who can by possibility be saved. It is under water that people learn to swim, and when thrown into it, if ever, tramps will learn. Under the yoke of necessity, they will develop faculties now unknown to themselves. Their experience will be analagous to that of certain Arabs, who, forced to work on a cold day by British officers, discovered, with glad surprise, what they had never dreamed of before, that they could get warm by working. Alexander the Great made the most of his cowards by equipping them with half suits of armor, which covered them only in front. As long as they faced the foe they were protected; but as

soon as they turned it was all over with them. Military discipline will be such a sort of half armor to tramps; a palladium while they go right, but a punisher the moment they go wrong. Indeed, it will, to a great extent, insure their going right, in a military sense or for military purposes. Nestor found a use for refuse, putting the worst fighters in the centre of his phalanx, where they were both led on by the van and driven on by the rear guard. Martial rigor has more than once transformed a bummer in a brave, even as the sculptor's hammer beats the stone into a statue. Place, then, the tramp host where there is not only scope for their energies, but where they will be forced to do their utmost, year in and year out, and that every day, regular as the sun.

What panacea so promising as this for desperate vagabonds? Will you give them alms? Pay them to do nothing and they will do it. Shall we feed them! Their's is an appetite which grows by what it feeds on. Shall we imprison them? Their legions are too vast to be crowded into jails, any more than Satan's host could find room in pandemonium before they shrunk and dwindled so that they, who had seemed in bigness to surpass earth's giant sons, were less than the smallest dwarfs. Besides, in jails there is no hope.

Moreover, in historic research, I find that the plan I propose, with a change of names and dates, has been tried, and has worked well. All, then, I ask, is to let history repeat itself. In 1541, when Cartier needed men to colonize Canada, he was authorized by King Francis I. to ship off thither, as his soldiers, all malefactors under sentence of death (petty offenses were then capital) in Paris, Toulouse, Bordeaux, Rouen, and Dijon. The original edicts have just been published by Harry Harries, who was searching for them all through the late siege, and who adds that the "most Christian" French king was inspired with them by the Catholic kings of Spain, who, on June 22, 1497, gave Columbus permission "to lead out into the islands he had late discovered (under martial law, of course,) such criminals as, on condition of having half their punishment remitted, would consent to follow him." Besides, whatever pride of ancestry there may be among puritans, cavaliers, and patroons, it is certain that a considerable element among the settlers all along our own Atlantic slope was akin to modern tramps. Our antiquarians are in danger of tracing their genealogi-

cal line up to one of quite another sort. John Bull will never cease to remind us that as soon as he gave us independence, he founded Botany bay. But both Australia and the United States have risen to respectability. We need not then despair even of tramps. Let the regular army regenerate them, and let them regenerate the regular army, and the Indians, too, — if they can. Utilize waste.

RAPID DISAPPEARANCE OF WISCONSIN WILD FLOWERS; A CONTRAST OF THE PRESENT TIME WITH THIRTY YEARS AGO.

BY THURE KUMLEIN.

For the last thirty-two years, I have resided in the vicinity of Lake Koshkonong, in Jefferson county, Wisconsin, and have during that time paid some attention to the Fauna and Flora of that locality, and have collected somewhat extensively in nearly all the branches of Natural History, particularly Ornithology and Botany.

When first I came here in 1843, a young and enthusiastic naturalist, fresh from the university at Upsala, Sweden, the great abundance of wild plants, most of them new to me, made a deep impression on my mind, but during these thirty-two years a large number of our plants have gradually become rare and some even completely eradicated.

When first I visited the place where I now live, the grass in the adjoining low-lands was five and six feet high, and now in the same locality, the ground is nearly bare, having only a thin sprinkling of June grass, Juncus tenuis and J. bufonius, Cyperus Castaneus, here and there a thistle or a patch of mullein and in the lowest with parts some Carices. As the land gradually became settled, each settler fencing in his field and his stock increased, some plants became less common, and some few rare ones disappeared; Lupinus perennis, among the first. But when all the lands was taken up by actual settlers, and each one fenced in all his land and used it as fields or pastures for as many cattle, horses, sheep, and hogs as could live on it without actual starvation, botanizing in this vicinity became comparatively poor.

In the oak openings, besides grasses of several species, there were an abundance of other plants of which I will mention only some Orchids from a small piece of opening-land near my residence: Pogonia pendula, Goodyeara pubescens, Corallorhiza odontorhiza, Aplectrum hyemale, Liparis lilifolia, Orchis spectabilis and Plalanthera bracteata, of these only one or two can be found in the same locality now.

In the thick timber along the Koshkonong Creek, there is now but one lot of about 40 acres where the plants can yet be found nearly as abundant as formerly. There can yet be had Phlox divaricata, Laphami, Allium tricoccum, Erythronium albidum, Dentaria laciniata, Asarum canadense and many other interesting plants. A Tamarack marsh held out the longest; it was not visited by cattle till, for want of pasture elsewhere they were obliged to cross its miry borders. In this marsh, or on its borders, were formerly growing, Microstylis ophioglossoides, Liparis lœselii, Gymnadenia tridenta, Platanthera leucophœa, lacera and orbicalata, Arethusa bulbosa, Pogonia ophioglossoides, Calopogon pulchellus, Cypripedium pubescens, Parviflorum candidum and spectabile, Tofieldia glutinosa, Drosera linearis, Lobelia kalimi, Ophioglossum vulgatum, Schœnus albus, Schenchzeria palustris, Triglochin palustre, and many Carices among which Carex oligosporma. Now of all these and many other interesting plants formerly growing in this marsh or near it, some have become very rare and some are totally eradicated.

On a small prairie, too stony and gravelly for cultivation, there can yet be found Geum triflorum, Aster obtusifolius and ptarmicoides, Lithosperum hirtum and longiflorum, Castileja sessiiflora, Linum boothi, Gentiana puberula, Ranunculus rhomboideus, Hieracium longipipilum, Draba caroliniana, Arubis lyrata, Arenaria: stricta, Mich. and Diplopappus which on gravel hills grows only two to three inches high, with leaves very stiff and narrow, but the flower large, having somewhat the aspect of an Alpine plant. A list of the plants of this vicinity, giving the plants of to-day, would be a comparatively meager one and nearly useless, as their number is lessening every year, and a lists of the plants of thirty years ago would perhaps have no other than a small historical value.

These observations, though made in only this locality, do probapply to all the settled portions of the State.

ANCIENT CIVILIZATION OF AMERICA.

BY PROF. W. J. L. NICODEMUS, A. M., C. E.

The ancient works divide themselves into three great geographical divisions, viz., South America on the west coast between Chili, and the second degree of north latitude; Central America and Mexico, and the valleys of the Mississippi and Ohio.

The ruins of ancient Peru, which form the first division, are found chiefly on the elevated table-lands of the Andes, between Quito and Lake Titacaca, but they can be traced five hundred miles further south to Chili and throughout the region connecting these high plateaus with the Pacific coast. The entire district extends north and south about two thousand miles.

Before the Spanish conquest, the whole country was the seat of a populous and prosperous empire, rich in its industries and far advanced in civilization. It is now accepted that the Peruvian antiquities represent two distinct periods in their ancient history, one being much older than the other, one before and the other after the first Inca. Among the ruins which belong to the older civilization are those of Lake Titicaca, old Huanaco, Tiahuanaco, and Gran-Chimu, and probably the roads and aqueducts were originated by it. On Titicaca Island are the ruins of an edifice supposed to be a palace or temple. It was built of hewn stone, and had doors and windows, with posts, sills, and thresholds of stone. At Tiahuanaco, a few miles from Lake Titicaca are what are supposed to be the oldest ruins in Peru. They are described by Cieca de Leon, who accompanied Pizarro. He mentioned great edifices "that were in ruins, two stone idols resembling the human figure, and apparently made by skillful artificers." These idols were great statues, ten or twelve feet high. He describes large gateways with hinges, platforms, and porches, each made of a single stone, some of which were thirty feet long, fifteen high, and six thick. Along the whole length of some above the stone ran a cornice covered with sculptured figures. "The whole neighborhood," says Mr. Squier, "is strewn with immense blocks of stone, elaborately wrought, equaling, if not surpassing in size, any known to exist in Egypt or India."

At Cusco, about two degrees north of Lake Titicaca, are the

ruins of buildings that were occupied until the rule of the Incas was overthrown. The temple of the sun was surrounded by a great wall built of cut-stone. Near by this is the extensive ruins of the palace of the Incas. The objective points to notice about both these periods of ancient civilization are, the absence of inscription; little or no decoration; method of building peculiar; their constructions including cities, temples, palaces, other edifices of various kinds; fortresses, aqueducts (one, four hundred and fifty miles long), great roads (extending the whole length of the empire), and terraces on the sides of mountains, built of cut stone laid in mortar or cement, sometimes ornamented, but generally plain in style and always massive.

The Peruvians were highly skilled in agriculture and in some kinds of manufactures. They excelled in the arts of spinning, weaving and dyeing. They had great skill in working metals, especially gold and silver. They excelled in the manufacture of articles of pottery. They had some knowledge of engineering as evidenced by their roads and aqueducts. They had some idea of astronomy. They divided the year into twelve months; and are supposed to have had something in the form of a telescope for studying the heavens, as a silver figure of a man holding a tube to his eye, has been discovered in one of the old tombs.

MEXICO AND CENTRAL AMERICA.

We now come to our second geological division, Mexico and Central America. Here we trace four distinct eras of civilization, which we will mark by describing a ruin belonging to each era. In the order of antiquity comes Quirigua. It is situated on the right bank of the river Motagna, in the state of Guatemala. It covers a large area of ground. We have described a pyramidal structure with flights of steps, and monoliths larger and higher than those at Copan. Though the sculptures are in the same general style, they are in lower relief and hardly so rich in design. One of the obelisks is twenty feet high, five feet six inches wide, and two feet eight inches thick. The chief figures carved on it are a man and woman on the front and back, while the sides are covered with inscriptions similar to those at Copan. Other obelisks are higher than this. The ruins of Copan that mark the second era are situated in the extreme western end of Honduras. Owing to

the hostility of natives, these ruins have not been very carefully explored. A stone wall from sixty to ninety feet high is described as running along the river Copan six hundred and twenty-four feet, in some places fallen and in others entire which supported the rear side of the elevated foundation of a great edifice. It was made of blocks of cut stone six feet long, well laid in mortar or cement. The chief peculiarity of Copan was the number of sculptured inscribed pillars. In speaking of these, Mr. Squier says the ruins of Copan are distinguished by singular and elaborately carved monoliths, which seem to have been replaced at Pelenque by equally elaborate basso relievos, belonging, it would seem, to a later and more advanced period of art. Palacios, who described these ruins three hundred years ago, speaks of an enormous eagle carved in stone, which bore a square shield on its breast carved with undecipherable characters; of a stone giant; a stone cross; a plaza circular in form sorrounded by ranges of steps or seats, as many as eighty ranges remaining in some places. This plaza was paved with beautiful stones, all square and well worked.

The next era is represented by the ruins of Palenque situated in the northern part of the Mexican state of Chiapa. The largest known building is called the "Palace." It stands near the river Chacamas, on a terraced pyrmidal foundation, forty feet high and three hundred and ten feet long, by two hundred and sixty broad at the base. The edifice itself is two hundred and twenty-eight feet long, one hundred and eighty wide, and twenty-five feet high. It faces the east, and has fourteen doorways on each side, with eleven at the ends. It is built of hewn stone laid in mortar of the best quality. It has four interior courts, the largest being seventy by eighty feet in extent. They are surrounded by corridors, and the architectural work facing them is richly decorated. Within the building were many rooms. The piers around the courts are covered with figures in stucco, or plaster. There is evidence of painting being used for decoration, but the architectural effect of the stone-work and the beautifully executed sculptures, particularly strike attention. The walls and piers are covered with ornamentation. Mr. Stephens thinks that the sculptured human figures, fragments of which are found, must have approached in justness of proportion and symmetry, the Greek models.

The ruins of Uxmal represent the fourth and last era of the

ancient civilization of Mexico and Central America. This brings us down to the time of the Spanish conquest. At that time it had begun to be a ruin which was complete in 1673.

The most important edifice was named by the Spaniards "Casa del Gobernador." It is 320 feet long, and was built of hewn stone, laid in mortar or cement. The faces of the walls are smooth up to the cornice. There follows on all four sides, one solid mass of rich, complicated, and elaborately sculptured ornaments, forming a sort of arabesque.

Before leaving this geological division, mention should be made of the astronomical monument, described by Captain Dupaix. In the Mexican State of Oaxaca, near the village of Mecamecan, is an isolated granite rock, which was artificially formed into a kind of pyramid, with six hewn steps facing the east. The summit of this structure is a platform, well adapted to observation of the stars on every side. It is supposed that this very ancient monument was devoted to astronomical observations. On the south side of the rock are sculputred several hieroglyphical figures, having relation to astronomy. The most striking figure in the group is a man in profile, standing erect, and directing his view to the rising stars in the sky. He holds to his eye a tube or optical instrument. Below his feet is a frieze divided into six compartments, with as many celestial signs carved on its surface.

Our third geographical division, the valleys of the Mississippi and Ohio Rivers, includes the remains of the ancient people called the Mound-Builders. Their ruins are the most numerous in the south, extending from the Gulf of Mexico, to West Virginia, Ohio, Michigan, Wisconsin, Nebraska, and probably further west. They consist of mounds and inclosures. In these mounds have been found ornaments and implements made of copper, silver, obsidean, porphyry, and greenstone, finely wrought. Also, axes, single and double; adzes, chisels, drills, or gravers, lance-heads, knives, bracelets, pendants, beads, and the like, made of copper; articles of pottery, elegantly designed and finished; ornaments of bone, mica from the Alleghanies, and shells from the Gulf of Mexico. Porphyry is a very hard stone and could only have been worked with tools made of the hardest material. Obsidean is of volcanic origin and much used by the Peruvians and Mexicans for arms and cutting instruments. It is found in its natural state no nearer the Missis-

sippi Valley than the Mexican mountains of Cerro Gordo. The art of spinning and weaving was known to them as evidenced by the cloth found in the mounds.

Before any evidence of ancient mining was discovered in the Lake Superior copper region, pieces of copper with blotches of silver appearing to be welded to it but not alloyed with it, had been dug from mounds. As this condition is peculiar to the Lake Superior copper, it was supposed that the Mound-builders were acquainted with the art of mining. This was proven to be so in 1848. The modern mining works are mostly confined to that part of the copper region known as Keeweenaw Point. This is a projection of land extending into Lake Superior. It is about eighty miles in length, and at the point where it joins the main-land, about forty-five miles in width. All through this district, wherever modern miners have worked, remains of ancient mining works are abundant; and they are extensive on the adjacent island, known as Isle Royale.

The area covered by the ancient works is greater than that which includes the modern mines, as they are known to exist in the dense forests of other district where modern mining has not as yet extended. Their mining was chiefly surface work; that is, they worked the surface of the veins in open pits and trenches. The mounds differ greatly in size. At Grave Creek, West Virginia, there is one 70 feet high and 1,000 feet in circumference. One at Miamisburg, Ohio, 68 feet high and 852 feet in circumference. Another at Cahokia, Illinois, is 700 feet long, 500 wide, and 90 feet high. They range generally from 5 to 30 feet in height. It is supposed that the lower mounds were used for the same purposes as the mounds in Mexico and Central America, for the foundation of their principle buildings. But these buildings, having been built of wood, soon perished, leaving no trace behind them save this earthen base. The high mounds are pyramidal in shape and have level summits of considerable extent, which were reached by stairways on the outside as those at Miamisburg, Ohio, and Grave Creek, West Virginia, which resemble the great mounds at Chichen, Itza, and Mayapan, in Yucatan, the first 75 feet high and the last two each 60 feet high. These Yucatan mounds were evidently constructed for religious uses as upon the summits of the first two are the ruins of stone temples. On the third the edifice has disappeared, as in all probability

those upon the high mounds in this division, being built of the same material, wood.

In one of the mounds of the Ohio Valley there were found the timber-walls of two chambers and arched ceilings, with overlapping stones, precisely like those in Central America.

The Natchez Indians, on the lower Mississippi, had temples and sacred buildings, in which the "perpetual fire" was maintained. They were sun-worshipers, their chief claiming descent from the sun. Their traditions connected them with Mexico. By some they are classed as the Nahuatl, or Toltee race.

According to the Central American books, the Toltees came from "Huehue Tlapalan," a distant country in the northeast, long previous to the Christian era. Here they dwelt in a high state of civilization for a long period, were overthrown by the Aztecs, who in turn were conquered by the Spaniards.

All indications seem to warrant the conclusion that the mound-builders and the palace-builders, if we may be permitted to use this term of Mexico and Central America, belonged to the same race. They must have left the United States on or before the advent of the wild Indians. This emigration south may have been voluntary to seek a more congenial clime, or may have been forced by the savages from the north. Fragments would seem to have been incorporated with the Indians, as for instance the Mandan Indians, a supposed branch of the Dacotahs. They differed in many respects from the other Indians, being of lighter color and peculiar in manners and customs. We suppose the mould-builders came to the United States from the south, entering the country near the Gulf of Mexica, where they were the most populous, and then gradually throwing out colonies, extended their sway, with sparser population to the northward.

They were eminently an agricultural people. Maize is supposed to have been their chief grain. Having fulfilled their mission here, they returned to Mexico and Central America.

The time of their disappearance is estimated to be about two thousand years ago. The appearance of the wild Indians is located at or after this time. In him we find an original barbarian with no signs of ever being connected with civilization. Besides, his traditions connect him with the northwest, from which direction he is supposed to have entered North America.

A strong fact in support of this view is that there are several tribes, the nomadic Koraks and Chookchees, found in eastern Siberia, throughout the region that extends to Behring's Strait, who have a strong resemblance to the wild Indian, and may well represent the common parent stock.

A few words in regard to the points relied upon to establish the antiquity of the mound-builders.

1. As no mounds are built upon the lowest formed of the river-terraces, it is presumed the mounds were built prior to their formation. These rivers show four successive terraces, in their subsidence to their present channels. It is not possible to say what antiquity this would indicate, but at least a great one.

2. Sound and well preserved skeletons known to be two thousand years old, have been taken from burial places in England and other European countries, less favorable to their preservation than the burial places of the mound-builders. Hence, it is supposed that the decayed skeletons taken from the mounds are more than two thousand years old.

I. The great age of the mounds are shown by their relation to the forests which must have sprung up after the disappearance of this eminently agricultural people. In conclusion, I will merely add that my theories, some plausible and others very absurd, have been invented as to the origin of the ancient civilization of Central America, and Peru. Authorities differ as to whether these two are distinct and if not which is the oldest. The weight of authority inclines to the opinion that they were originated by the same people and that of Central America is the most ancient.

Mr. Baldwin, an eminent writer on Archæology, after reviewing the principal theories as to the origin of this ancient civilization, arrives at the conclusion that it was an original civilization. This is certainly a very safe theory and till more light is thrown upon this subject, seems to have as much to be said in its favor as any other hypothesis.

EXTENT OF THE WISCONSIN FISHERIES.

BY DR. P. R. HOY.

There are thirty-six locations on Lake Michigan, and two or three on Lake Superior, which are merely headquarters for the fishermen for a large extent of shore, in the vicinity of the Apostle Islands, and the shore immediately east of Duluth.

In these regions there are employed about 148 pound-nets, 48 bearing gill-net stocks, and 212 lighting gill-net stocks, valued at a low estimate, at $200,000.

To carry on fishing, there are proprietors and men, but a small proportion of the number of men on wages — about 800 men.

The production of the Wisconsin nets, it would be difficult for me to separate from the total Michigan, Wisconsin and Illinois fisheries; *Chicago sales of lake fish amount to over a half million of dollars*, of which, of course, a large quantity come from Wisconsin, as they recover into Milwaukee dealers, the whole of the Lake Superior catch, on the Wisconsin shores. Milwaukee inspection reports have reached about 17,500 half-barrels of lake-fish, worth $87,500. Other points in Wisconsin, placing salt-fish on the eastern market, would swell the amount to about $40,000 more. The interest of the fisheries, probably brings into the State every year about $350,000. These estimates are made with the figures in my possession of statistics of the lake receipts of fish, for 1872, including the handling of fish in the markets, which has never been compiled before.

The evidences are very apparent, and universally acknowledged by fishermen, that the food fishes of the lakes are decreasing to an alarming extent.

The purpose of the United States Commission was first to investigate the decrease, its causes, and the remedies to be applied to arrest the decrease, and restore the fishes to their former numbers; in other words, to increase the product of the fisheries of the United States.

From careful investigation, it is evident that the first and principal means is artificial propagation, with judicious protective laws as an auxiliary.

The State commissions have given special attention to propaga-

tion, with the most encouraging results. The shad, in the Connecticut River, where they had been nearly exterminated, are now more plentiful than in the period of 70 previous years. Last season there was a large increase in the Hudson River, the result of the successful work of Seth Green, three years ago. In Canada, Samuel Wilmot, the government breeder, has restored the salmon in large numbers. Experiments have been made by three prominent fish culturists in the propagation of the white-fish, and their efforts are now crowned with complete success. Mr. N. W. Clark, of Clarkston, has carried three-quarters of a million of eggs beyond the stage of danger, and Seth Green has a large quantity hatched and is distributing them to inland lakes in large numbers. Seth Green has been equally successful with lake trout.

The advantage of artificial culture is in the fact, that almost the entire number of eggs are hatched, while in a state of nature, but a very small proportion are hatched. This is especially true in the lakes, where there are so many species of fish who make the ova of fishes their food, and where the continual stormy weather, at certain seasons, carries the sediment from the clay banks, outward, and deposits it on the spawning beds.

A bill has passed in the State of Michigan, providing for a fish commission and making an appropriation for the expenses of their work.

The State of Michigan has enacted that:

"It shall be the duty of the governor, to appoint three commissioners of fisheries, whose terms of office shall be, respectively, two, four, and six years, and their successors appointed, two years thereafter."

(As I cannot follow the detail of the bill, from memory, I will give the character of the different sections.)

The duties of the commissions were provided for in the second section, *i. e.*, to propagate white fish, and such other food-fishes as the saw fit, providing for two breeding establishments, one in the eastern and one in the western portion of the State.

The third section provides that they should have the privilege of taking in any manner any fish they choose, for the purposes of propagation or scientific purposes.

Another section provides that the pay should be three dollars per day and necessary traveling expenses, for expenses actually in-

curred, and for time actually employed. The pay should be drawn on a properly sworn voucher, from the auditor of the State. A clause gives the governor authority for directing concurrent action with other States. It has been drawn as concisely as possible, and embraces nothing but the provision for commissioners work, as it was deemed best to let the bill stand on its own merits, and not involve protective legislation or anything else.

CATTLE-FEEDING.

BY PROF. E. W. STEWART, LAKE VIEW, N. Y.

The new method of exporting dressed beef to Europe, and the success that seems likely to attend this enterprise, give new interest to the subject of cattle-feeding wherever the circumstances are adapted to that industry.

Should one visit the interior cities and large towns of New York with a view of inspecting the character of the cattle raised in the state, expecting there to find a full representation, he would be greatly surprised to find that most of these cattle were raised from 300 to 1,000 miles outside its borders. He might thence infer that New York is not adapted to cattle-raising, or that it cannot compete with the cheaper and fresher soils of the West in the production of beef. It is true that the fresher and cheaper soils of the West have an advantage in requiring so much less capital and furnishing the grain for fattening at one-half the nominal price, but this advantage is merely temporary, and more specious than real. The fact that land and food are cheap comparatively in the West leads to wastefulness and loss in feeding, and these western advantages ought to be fully counterbalanced by a better system in the East.

The true cause of the deficiency of beef-production, as compared with consumption, in the interior towns of New York, may be found in the neglect to adopt a better system. That system of feeding which produces a steer of 1,400 to 1,600 pounds at 24 to 30 months will enable the New York farmer to compete most successfully in his home market with beef of western growth; but if it

takes four years to grow an animal of that weight, the cost will exceed the market-price of the product. It thus happens that those farmers who have not improved upon the old system of slow growth regard beef-production as unprofitable, and have substituted for it grain-raising or other marketable crop. The average farmer is so conservative of the ways in which he has been educated, that he seldom attempts to improve his processes, but when they become unprofitable, abandons the business as hopeless. If, in his opinion, some crop will bring more ready money on sale than can be made by stock-raising, he raises and sells the crop, without a serious thought as to the effect of this policy upon the future condition of the land. Early maturity — a system securing marketable maturity at 24 to 30 months, with a live weight of 1,200 to 1,600 pounds — will bring success to beef-production in New York.

England has greatly increased her meat-production during this century, and at the same time has doubled her wheat-yield per acre. Grain and stock raising must go together when it is proposed to keep up the fertility of the soil. Germany has increased her meat-production while devoting so large a proportion of her land to beet-sugar culture. Even the refuse of the beet, after sugar extraction, will feed more cattle than the same land devoted to grain-crops; so, likewise, the lands of New York, now devoted to indifferent grain-raising, with little stock, would produce more grain by doubling the stock.

PRESENT CONDITION OF CATTLE-FEEDING IN NEW YORK.

I cannot report much general advancement among cattle-feeders of New York beyond the system of twenty-five years ago; for, as already stated, most of those who found cattle-raising unprofitable abandoned it for other agricultural products, instead of attempting to improve the system. The general system may be summed up in this manner: The calves are allowed to suckle the dam six to ten days, and are then fed upon a mixture of new and skim milk for a short time, when they are reduced to skim-milk or whey alone, in cheese districts. The skim-milk, if given in sufficient quantity, will grow a fine calf in connection with grass; but it is usually given in such scanty measure, that the calf makes a very slow growth, and at ten or twelve weeks is often turned into an indifferent pasture. These ordinary skim-milk calves reach a weight of

250 or 300 pounds at six months, and 350 or 450 pounds at one year old. If fed upon whey alone, they will scarcely reach the former figure, even with grass, because whey is only one element of food (sugar), and the calves are so poorly nourished while young that they do not thrive when they come to rely upon grass. The second year the animals reach a live-weight of from 550 to 800 pounds, and at the end of the third year 850 to 1,100 pounds; averaging rather under than over 1,000 pounds at three years old. During the fourth year they are prepared for market by a little extra pasture together with ten to twenty bushels of corn, and reach a weight of 1,100 to 1,400 pounds at the end of the fourth year; the average is not over 1,250 pounds. This is an average daily gain of only eight-tenths of a pound per day. They are kept in a sort of a store condition until the last year, and it may well be supposed they do not then readily take on the fattening habit after being so long kept in an unthrifty state. This system is called by those who practice it "a healthy, natural growth." But the market is always dull for this "natural growth," and, consequently, these animals are sold for 20 per cent. less per pound than those that make a rapid growth and reach 1,400 to 1,600 pounds at two and a half years old. The ordinary market price of these four-year-old animals is about 5 cents per pound, live weight, or $62.50. This pays the feeder an average of only 4.42 cents per day for four years — certainly very little encouragement — and we can easily see why farmers abandon so hopeless a business. But, however discouraging this statement may be, it is as favorable an exhibit as can be truthfully given of the general system of cattle-feeding in New York.

FEEDING CATTLE RAISED BY OTHERS.

Another branch of our system consists in purchasing steers from two and one-half to three and one-half years old, and feeding these a single season. This class of feeders have studied the question of the cost of adding to the live weight of cattle more thoroughly than the farmer who raises them.

Here the first difficulty that confronts the feeder is the general unthrifty condition of these steers. They have, in a majority of cases, been kept in such a state of suspended growth as to lessen the normal capacity of the digestive system and the powers of

assimilation in the secretory vessels. It thus requires from one to two months before these animals enter upon a stage of thrifty growth, and this time and the food eaten are practically sacrificed, as compared with animals in a thrifty state.

Feeders of experience, therefore, seek animals whose organs are all in an active state, and capable of assimilating large quantities of food. Such animals may be made to gain rapidly in weight and quality. They prefer to buy even very thrifty two-year-olds in preference to older and heavier animals that have been grown by the slow method. Some years since, when almost every farmer grew a few steers for sale, those who had skill in feeding made a practice of buying a lot for fattening each year.

The now venerable John Johnston, near Geneva, N. Y., was a conspicuous instance of this mode of feeding. Being a Scotchman and conversant with good farming in his native land, he placed a much higher value upon the manure made from fattening cattle to enable him to raise larger crops than his neighbors. He was willing, therefore, to take the chances of success in this mode of feeding. Mr. Johnston began this system of feeding more than forty years ago, and he has stated lately that he often fed out 45 tons of oil-cake in a year. He had seen the good effects of this food in starting thrift in lean animals, and to his free use of oil-cake is to be attributed the greater success that attended his feeding of both cattle and sheep. Wheat was his principal crop, although he was successful in the yield of Indian corn on his rather heavy soil, sometimes reaching 75 to 80 bushels per acre. He regarded his land too valuable for grass, except in the rotation; consequently his fodder was principally straw and corn-stalks. In the hands of most feeders this refuse fodder would have led to failure in cattle-feeding, but the intelligent farmer will now see that a small quantity of oil-cake would supply all the missing constituents (muscle-forming and fat-producing elements) in straw and corn-fodder, and render this as well-balanced food as good meadow hay.

Corn has too much starch and too little nitrogenous matter to feed alone with straw. When Mr. Johnston put up a lot of three-year-old steers to feed he began with two pounds of oil-cake and three to five pounds of corn-meal, and this was increased gradually to four pounds of cake and eight to ten ponnds of corn-meal. He

also avoided the too common practice of feeding a single food, however good it may be in itself. He gave hay once a day, and sometimes bran and pea-meal as a change. He found, practically, that his steers did better to have a few hours each day in the yard and sunshine than when kept constantly in stable.

From numerous experiments, however, it is found to depend more upon the habits of the animals than upon the simple fact of confinement. Those steers that have been reared in a wild state, or never stabled, feel the confinement irksome, and must be broken to the stable gradualiy. This is why feeding western steers in New York is often unsuccessful when they are kept in stable several months. A sudden change of habit is nearly always hurtful. But steers that have been stabled from calfhood during cold weather will do better if kept wholly in stable for a period of several months while finishing them for the butcher.

Mr. Johnston found that he could put on from 1½ to 3 pounds per head per day, depending upon breed and thrift when put up to feed. Good grade short-horns would, occasionally, make something more than 3 pounds per day for 150 days; but this rate of gain was exceptional. His average might be considered as reaching 2⅛ pounds per day. He usually made a gain in price of about 2 cents per pound between the purchase-price in the fall and sale-price in spring. From this came his profit. He purchased some time in October and sold in March, if the price was favorable. If the steers weighed 1,000 pounds at the time of purchase, and the price was $4 per hundred, they cost $40 per head; and at the end of one hundred and fifty days would weigh 1,318 pounds, and would bring, at 6 cents per pound, $79.08, having gained in value $39.08, or nearly doubled. He fed of oil-cake an average of about 3½ pounds per day, or 525 pounds per head; of corn-meal, 8 pounds, or 1,200 pounds; of hay, 8 pounds, or 1,200 pounds. Counting these at rates of recent years would give: oil-cake, $9.18; corn-meal, $12; hay, $6; in all, $27.18. This would leave $11.90 to pay for his straw and labor. This is not intended as an accurate statement of his gains for any one year, but only as an approximate statement of his results. His cattle were often purchased much lower, and the oil-cake for $12 to $18 per ton, and other feed in proportion.

Mr. Johnston was an excellent judge of stock; knew what ani-

mals would feed well, how to feed them, and last, but not least, how to sell them. Besides, he proceeded upon the wise plan of making all the manure he could, no matter how small the margin of direct profit in feeding. He got his pay abundantly in the crops produced from the manure. He has paid less attention to warm stables in feeding than is generally considered requisite to the greatest economy; but this may be explained in the fact of his feeding cattle raised often without stables, and too great a change in the habit of animals is not conducive to rapid fattening. Mr. Johnston has been the best example of success in feeding cattle raised by others with only common care, and fed by him with only common appliances, but with much skill in the selection of food and its proper proportion in the ration. Another example of a different style of feeding may be useful.

In 1870 we visited Mr. Otis S. Lewis, of Orleans county, New York, who had for several years adopted the plan of buying about the 1st of December, in the Buffalo cattle-yards, thrifty bullocks from the West, averaging 1,200 to 1,300 pounds. He selected, as far as he could, cattle that had been handled, so that they might take kindly to a warm stable. These were put up and fed about one hundred days. The daily ration was made up of 5 pounds of clover-hay, 15 pounds of straw, 9 pounds of corn-meal, and one-half bushel of Swede turnips, pulped and mixed with the short-cut hay and straw, and then all thoroughly steamed together. Sometimes 4 pounds of wheat-middlings were substituted for so much of the corn-meal. This ration came out of the steam-box with a most savory and appetizing smell, and the cattle ate it with a great relish. He bought cattle in good condition, requiring only a short time to finish them for first-class beef. His lot of 25 head at this time cost 6 cents per pound and averaged 1,250 pounds per head. At the end of one hundred days they averaged 1,550 pounds per head, having gained 3 pounds per day. They sold at 7¾ cents, and brought an average price of $120.12; and, costing $75 per head, gave an increase of $45.12. He estimated the cost of food, besides straw, at $20 per head, and the actual cost of labor at $4, leaving $20.12 to pay for straw and profit. He was able to raise turnips at 7 cents per bushel, but estimated them worth for feeding 12 cents per bushel. In other years the cost and sale price were different, but the result nearly similar. These cattle were fed in a warm

stable, and not let out until sold. This ration seemed to have the same effect upon the cattle as the most succulent grass, and produced a gain almost equal to the most favorable pasturage at the best season. Mixing pulped turnips with the other food, and steaming diffused the odor through the whole mass. It is a great point in fattening to render the food so very palatable that the animal is tempted to eat to the limit of its digestion.

AN EXPERIMENT.

I will give an experiment of my own, many years ago in feeding a lot of forty head of small two-and-a-half and three-and-a-half year old steers. They had been raised by various parties in an adjoining county, and few of them had made a respectable growth for their age, but were all in a healthy state, and, as we thought, good selections to experiment upon and determine how long it takes to change the habit of unthrifty animals and put all the secretory vessels into active work, so that full rations may be digested and assimilated. An animal that has had scanty nutrition usually possesses a small capacity for digestion, and it is a slow process to change this stunted habit to one of thrift. The average weight of this lot was only 850 pounds, although some two-thirds of them were three and a half years old. They cost only $2 per hundred, or $17 per head. We put them in comfortable quarters on the 3d of December. After making all reasonable allowance for their condition, we thought the price would permit the trial of an experiment without loss, but we discovered in the end that the estimate was a very close one. We began by feeding a daily ration of 2 pounds oil-meal, 2 pounds bran, and 2 pounds corn-meal per head, mixed with 2 bushels of short-cut straw, and all well cooked together. This was given in two feeds, morning and evening, with about three pounds of hay at noon. This was found to be a full ration at first, and after cooking, came to them in a most savory condition. They soon took it with greediness. These steers that had previously enjoyed shelter began to show a marked improvement over the others in three weeks, but at the end of thirty days the lot, on weighing, were found to have gained only an average of 10 pounds in weight. The gain in weight does not, however, represent the whole of the real gain. A lean animal gradually loses a proportion of the water in the fluids of its system before it begins to increase in weight when fed upon grain.

This loss of sap is replaced with fatty matter. Lean flesh holds 50 per cent. more water than fat meat. So lean animals, when put up to feed upon grain, may be making good progress for a time without any increase in weight. But when animals are fed properly they are always in a condition to lay on fat in due proportion. Ten of these steers had gained in thirty days 25 pounds each, and ten had gained nothing in weight. The next thirty days the ration was increased 2 pounds of bran and 2 pounds of corn-meal per day. The increase in the ration was made to correspond with the increasing wants of the steers. This additional 4 pounds of grain could now be digested and assimilated. The next thirty days showed a marked improvement in most of the lot, but especially in those that had gained most in the first period. Ten had gained 1½ pounds per day, 20 had gained ¾ pounds per day, and 10 only ⅓ pound per day; an average of only 25 pounds per head. The ration for the next thirty days was increased by 2 pounds of corn-meal and 2 pounds to the noon ration of hay, and, besides, one gallon of cheap molasses was used in the water for wetting the straw, &c., for the steamed ration. This was but a small amount of sweet to be diffused through 90 bushels, but it added so decidedly to its flavor as to become at once apparent. The steers were now nearly all of them got into a thriving condition, and during this period of thirty days the gain was much more rapid. The best ten gained 2¼ pounds each per day; twenty gained 1¼ pounds, and ten only ¾ pound; an average of 41¼ pounds each for the lot. The first ninety days had only produced an average gain per head of 76¼ pounds.

To show the risk of loss in feeding such animals, we will see how the account stands at the end of ninety days:

DR.

40 head of steers, 34,000 pounds, at 2 cents	$680 00
Oil-meal, 7,200 pounds, at 1¾ cents	126 00
Bran, 12,000 pounds, at ¾ cents	90 00
Corn-meal, 14,400 pounds, at 1 cent	144 00
Hay, 13,200 pounds, at $\frac{6}{10}$ cents	79 20
30 gallons molasses, at 30 cents	9 00
	$1,111 50

CR.

By 40 steers, 37,050 pounds, at 3 cents	1,128 20
Apparent loss, besides labor	$16 00

Cattle and beef at this time were very low, and it will be perceived that the first ninety days had lost us all our apparent good bargain; but these animals were now better worth 3 cents per pound than 2 cents ninety days before. They were now, most of them, ready to make a thrifty gain with the same good food and care. The ration of the last thirty days was continued for the next sixty days. Everything now seemed favorable, and at the end of this period the leading ten head had gained 3 pounds live weight per day, twenty head had gained 2½ pounds each per day, and ten head two pounds per day. Here was an average gain of 2½ pounds per head, or 150 pounds in sixty days; a remarkable gain, considering their condition at the beginning. At this period twenty head, averaging 1,150 pounds, were sold at 4 cents per pound, or $920.

The account now stands:

40 head, 3,705 pounds, cost	$1,128 20
Expense of keep last 60 days	390 00
	$1,518 20
By 20 steers sold, 23,000 pounds, at 4 cents	$920 00
By 20 steers on hand, 20,050 pounds, 3¼ cents	651 62
	$1,571 62
Showing an apparent gain of	$53 42

The reader will have observed that this expense account does not reckon the 32 tons of straw feed, which at any price would absorb more than the apparent profit. But straw is seldom taken into the account, the manure made from it being considered an equivalent. The reader will also pardon the effort to show a little profit in this case, as it is evidently a desperate one, and requires strategy.

Another point that tells in its favor is the high price of grain, compared with the then low price of beef. But under these discouraging circumstances, suppose the class of cattle had been better, had been as good as these were after ninety days' feeding, and the price paid had been 50 per cent. higher, or 3 cents per pound, the reader will see that by feeding them ninety days, with a gain of 2½ pounds each per day, there would have been a substantial profit upon everything fed, leaving the manure for the labor. And I should be quite willing to take a contract to feed cattle in the most comfortable stable, furnish all the material, and take all the labor requsite

to the most approved method of feeding, asking in return payment only for the food furnished, finding the profit wholly in the manure.

A few years later I fed ten head of three-year-old steers for one hundred days, keeping an accurate account of the daily ration, their increase every thirty days, and for the whole period. They were largely of short-horn blood (sired by a seven-eighths blood bull), had been well raised, as that term is generally understood, and accustomed from calfhood to be handled and stabled. They averaged 1,210 pounds, and cost 4½ cents, or $54.45 per head. Being in a thrifty condition, and accustomed to good shelter, they took most kindly to their new quarters when put up November 20. Regarding this as a favorable lot of steers for rapid fattening, we gave the following combined ration, made by grinding together 10 bushels of corn, 560 pounds; 8 bushels of oats and pease grown together, 384 pounds; and 1 bushel of flax seed, 56 pounds; making 1,000 pounds. This is the proportion, and, when evenly mixed and ground fine, furnishes a fattening ration so complete that little improvement can be made upon it. At the time mentioned, this ration cost $1.10 per 100 pounds. The first two weeks 10 pounds of this was mixed with 2½ bushels of cut straw, and all well steamed together, as the daily ration of each steer, given in two feeds, morning and evening, with six pounds of long hay at noon. This proportion of flaxseed makes the ration just laxative enough for health, and its oil is also worth all it costs in laying on fat; the corn is very rich in starch, and the pease and oats in albuminoids; and the straw is so softened by the steaming, and so permeated with the flavor of the grain, as to give it a fine relish for the steers. In fact, this cooked ration with straw is eaten as eagerly as if mixed with hay. About 2 ounces of salt is added for each steer before steaming. At the commencement of the third week the grain ration was increased to 11 pounds. These steers seemed as contented in their new quarters as if they had been raised in them. This demonstrated the advantage of buying those animals for feeding that have been accustomed to the comforts of a good stable. At the end of the first thirty days these ten steers had gained an average of 75 pounds each, or 2½ pounds per day. Two steers that appeared more perfectly formed than any of the rest were weighed when first put up, and turned the scale on 2,500 pounds, and on being weighed now were found to have gained together 180 pounds, or 3

pounds each per day. The ration was increased 2 pounds for the next thirty days. Care was taken to feed only so much as was eaten with a relish, and 13 pounds of grain of this combination was found to be all that would be eaten clean by these steers of over 1,300 pounds' weight. At the end of the second thirty days the average gain was found to be 100 pounds, or 3⅓ pounds per day. The ration for the next and last period of thirty days was increased to 15 pounds of grain, and the gain for this period was also an average of 100 pounds per head. These steers were then sold at 6¼ cents per pound, and the account stood thus:

10 steers, 12,100 pounds, at 4½ cents	$544 50
11,560 pounds of grain, at $1.10	127 16
5,400 pounds of hay, at 60 cents	32 40
13,500 pounds of straw, at 40 cents	54 00
	$758 06
CR.	
By 10 steers, 14,850 pounds, at 6¼ cents	$929 12
Balance to pay labor and profit	$169 06

This is an unusually favorable case of feeding steers raised by others, but such a rate of gain can often be reached with steers of your own raising. In this ration, double the amount of oil meal may be substituted for the flaxseed and wheat-middlings, or bran for the oats and pease, with the quantity slightly increased; but oats, pease, and corn, with flaxseed or oil-meal, is a combination of food easily obtained in many parts of our country, and is a great improvement over that of corn alone. So good a result could not be expected with that amount of food without cooking the ration and feeding in a warm stable.

TRUE SYSTEM OF MEAT-PRODUCTION.

We have thus far discussed cattle-feeding in New York as it has been heretofore and is now principally conducted. The early system was based upon the fact that many parts of the state were adapted to grazing and not to grain-raising; and these early farmers were in the habit of raising a few animals each year and feeding them very sparely through the winter, but giving them a good range of pasture in summer, and at three and a half years old they sold them to other farmers to be finished upon grain feeding. But, as we have seen, these very slow growing animals did not feed profitably

upon grain, it requiring so long a time to get them into a fattening condition. This system is so extremely unprofitable to both sides that it has been largely abandoned; and now the question arises whether New York must abandon meat-production, or whether she may not adopt a better system and produce meat with a profit, besides bringing the more important result of keeping her soil in perpetual fertility. The solution of this problem is found in the system of

FULL FEEDING AND EARLY MATURITY.

In feeding animals, as in other things, time is a most essential element of success. Nature has more clearly pointed out to us the road to success in cattle-feeding. It is found in this law that the young animal takes the least amount of food to produce a pound of growth, and that, all other things being equal, each succeeding pound of growth or live weight up to maturity of the animal costs more than the preceding pound. This has been established by so many facts that it may be laid down as a law.

Two interesting experiments were conducted by Professor Miles at the Michigan agricultural college farm in 1866 and 1868. In the former year three, and in the latter six, pigs were fed upon milk. These pigs were from four to six weeks old at the beginning of the experiment.

It took an average amount of milk to produce a pound live weight as follows: first week, 6.76 pounds; second week, 7.75 pounds; third week, 12.28 pounds; fourth week, 10.42 pounds. The professor attributes the cause of its taking a greater amount of food the third week than the fourth, to a "derangement of the digestive organs during this week, as shown in a tendency to constipation," and he remarks that "the milk to produce a pound live weight constantly increases."

The experiment of 1868 was continued afterward for twenty weeks upon corn-meal. The time was divided into five periods of four weeks each. It required of corn-meal to make a pound live weight, first period, 3.81 pounds; second period, 4.05 pounds; third period, 4.22 pounds; fourth period, 5.24 pounds; fifth period, 5.98 pounds.

Another experiment with a large number of pigs had a similar result. It will be perceived that in the fifth period, when the pigs were twenty-eight weeks old, it took about 75 per cent. more food

to make a pound live weight than in the first period when they were eight to twelve weeks old.

The writer tried a similar experiment in 1874 with a miscellaneous lot of ten calves fed wholly upon skim-milk. The milk was all weighed daily and the calves each week. It required of milk for one pound gain: first week, 11.02 pounds; second week, 12.18 pounds; third week, 13.17 pounds; fourth week, 13.40 pounds; fifth week, 14.60 pounds; sixth week, 15.05 pounds; seventh week, 16.71 pounds; eighth week, 16.80 pounds; ninth week, 17.01 pounds; tenth week, 16.08 pounds; eleventh week, 16 pounds; twelfth week, 15.90 pounds. The decrease of milk to make one pound live weight, beginning the tenth week, was caused by the calves learning to eat grass. The calves were each weighed separately, as was the milk feed to each, and the gain was very unequal in different calves, as they were not a uniform lot; but the result stated is the average of the ten. We regarded this experiment with great interest, not only as showing the gradual increase of cost to put on live weight as the animal grows larger and older, but as showing the value of skim-milk in growing calves. It has a value, when properly fed, much above that usually attached to it. We would also mention the experiments of Mr. J. B. Lawes, of Rothamstead, England, which proved the precise point under consideration, that the cost of putting on live weight is in proportion to the age and size of the animal.

Mr. C. S. Marvin, of Oxford Depot, Orange county, New York, raised the steer called "Uncle Abe," and Hon. George Geddes states the following facts concerning his growth: At birth, October 19, 1864, weighed 134 pounds; at ninety days, 385 pounds, having gained 251 pounds, or 2.79 pounds per day. During this time he had the milk of his mother, and after ten days old a quart of meal and oats per day, the mother having all the meal she would eat. At six months old he weighed 670 pounds, having gained 285 pounds during the second period, or 3.16 pounds per day, its food having been gradually increased to two quarts of meal per day. At one year old weighed 1,036 pounds, having gained the second six months 360 pounds, or 2.03 pounds per day. At eighteen months weighed 1,354 pounds, gaining the third six months 318 pounds, or 1.76 pounds per day. At two years old weighed 1,616 pounds, having gained the fourth six months 262 pounds, or 1.45

pounds per day. At two and a half years old weighed 1,830 pounds, gaining 214 pounds, or 1.18 pounds per day. At three years old weighed 2,070 pounds, gaining 240 pounds, or 1.33 pounds per day. At three and a half years old weighed 2,270 pounds, gaining 200 pounds, or 1.11 pounds per day. At four years old weighed 2,360 pounds, and at the end of four years and four months weighed 2,530 pounds, having gained in the last ten months 260 pounds, a trifle more than in the first ninety days, the rate of increase falling to 86-100 of a pound per day. As the age increased the food was increased to meet the wants of the animal, and at two and a half years eight quarts of meal, with good roots, hay or grass, was given. It is easy for the reader to see that this steer might have been sold at a profit at any time up to two years old. At this latter period he would have brought in market as good beef $100, which would have given a profit, but would have brought a better profit at one year old, as he would have then sold for about $70. It will be noted also that it took two years, or till he was three years old, to double his weight at the end of the first year; or, in other words, it cost less than one-half as much to produce a given weight the first year as during the second and third years. This is the earliest complete case of actual weights given at periods of six months that we have seen; but since that several cases of actual weighings at short periods have been reported, among which the following is the most complete and instructive. It was first published in the Live-Stock Journal for May, 1873. It is the history of a pair of grade short-horn twins raised by Mr. William Wallace, of Grant Park, Kankakee county, Illinois:

"ELLSWORTH TWINS."

They were dropped April 2, 1870, and called the "Ellsworth Twins." Their food the first summer was sour milk, oil-meal and grass. This produced as fine a growth as whole milk. They weighed on the 2d of October, at six months, 1,340 pounds. Their growth is shown in the following weighings:

	Pounds.
January 3, 1871, they weighed, together	1,550
February 30, 1871, each weighed 865 pounds; together	1,730
April 2, 1871, one year old, together	1,960
July 2, 1871, weighed, together	2,330
August 24, 1871, each weighed 1,250 pounds; together	2,500
October 14, 1871, weighed, together	2,692
November 25, 1871, weighed, together	2,880

	Pounds.
January 2, 1872, weighed, together	2,950
January 31, 1872, weighed, together	5,062
February 15, 1872, weighed, together	3,125
February 28, 1872, each weighed 1,599 pounds; together	3,198
March 16, 1872, weighed, together	3,265
April 2, 1872, two years old, together	3,305
April 28, 1872, weighed, together	3,400
July 1, 1872, weighed, together	3,575
August 31, 1872, weighed, together	3,650
October 26, 1872, each weighed 1,950 pounds; together	3,900
December 6, 1872, weighed, together	4,145
February 5, 1873, each weighed 2,150 pounds; together	4,300
April 1, 1873, three years old, together	4,500

These steers were fed upon grass, hay and corn, in the open air, and never stabled. It will be observed that these twins reached a greater weight at two years and three years, with only sour milk and oil-meal the first six months, than the steer Uncle Abe, that had full rations of whole milk. This is a valuable example, showing that butter-dairy men may raise excellent calves and get all the profit from the cream. In this case we also see a very steady and comparatively uniform growth, yet a gradual decline in the ratio of grain per day from the beginning.

The error of exposure to the weather the first winter is very obvious. They gained the first six months (if we suppose them to have weighed 180 pounds when dropped) 1,160 pounds, while the second six months (winter) they gained only 620 pounds. Had they been kept warm, they would, undoubtedly, have gained 200 pounds more. Their gain the first year was 1,780 pounds; second year, 1,345 pounds; third year, 1,195 pounds, a constant decrease the older they grew. But the reader will note the omission of one of the most important facts in this case, and that is, the amount of feed given in all the different periods; this would have added greatly to its interest.

ANOTHER EXAMPLE.

As teaching by example is more effectual than by precept, another case of rapid growth, occurring the past year, is given. It relates to a grade short-horn calf and its mate, fed wholly upon skim-milk. The calf was dropped March 1, 1876. At four weeks old this calf weighed 160 pounds, and was purchased by C. H. Farnum, of Concord, N. H., for a mate to another one that weighed, at the same age, 205 pounds. His purpose was to raise these for oxen if they should grow alike in form and size. Their feed was exclusively

skim-milk, but it soon became apparent that the 160-pound calf was outweighing the other, and he abandoned the project of rearing them for oxen. At 8½ months old the one originally the largest, but now the smallest, was slaughtered. His girth was 5 feet 2 inches, and his dressed weight 522 pounds. This was a remarkable dressed weight, as its live weight must have been 800 pounds; but the other calf was so much better that it was determined to feed it, on experiment, till one year old. The last three months its feed was principally skim-milk and shorts, and his girth, at the end of the year, was 6 feet and 5 inches, and he so fat that his hips were hardly discernible. He was purchased by a butcher at 10 cents per pound for his dressed weight, and slaughtered on the 1st day of March, 1877, at just one year old. His live weight was 1,200 pounds and dressed weight 902 pounds. Meat, 748 pounds; hide and tallow, 154 pounds. Price paid, $90.20.

These cases clearly show that new milk is not indispensable in growing the best calves, and, further, that the system of giving up the whole milk of the dam to suckle the calf is wasteful and unnecessary.

THE PROFIT OF EARLY MATURITY.

Many more cases might be cited to show the practical effect of high feeding at an early age. It may be stated as an established fact that calves, according to breed, may, as an average, be grown to the weight of 800 to 1,000 pounds at one year, and from 1,200 to 1,500 pounds the second year. And it may be further added that the animal shall also have arrived at the same stage of maturity as is usual at three and a half to four years of age under the old system.

M. Renault, at a cattle fair in France, in 1846, found a bull, only two years old, that had all his permanent teeth, and all the points of development and maturity in perfection, and, on investigation, came to the conclusion that high breeding and feeding had produced this result as a natural consequence; that, the growth being accelerated by the improved alimentation, the ripening and maturing of all parts of the system had made equal progress. It is therefore an error to suppose that the animal is as immature as its age would indicate, judged by the old system.

It may be a mystery to some that an increased amount of food should be required the second year to produce a given gain weight.

But the reason may be regarded as twofold: first, that while the young animal is in its most active stage of growth, the waste of its system is much less, in proportion to weight, than when mature; and, second, its accumulated weight the second year, on which waste accrues, is more than double that of the first year. Take the case of the steer Uncle Abe. Its weight at birth was 134 pounds, and at the end of the first year 1,036 pounds; it gained, therefore, 902 pounds; half of this gain is 451 pounds, which, added to its birth-weight, gives 585 pounds as his average weight the first year. He gained 580 pounds the second year; half of this, 290 pounds, added to 1,036 pounds, his weight at the beginning of the second year, makes his average weight for that year 1,326 pounds; and in the same way his average weight for the third year is 1,843 pounds.

Now, it is evident that it must take more than double the food the second year to supply the waste of the system that was required the first year, and the third year 50 per cent. more than the second year. This, then, explains the reason of the increased cost of putting on live weight as the animal grows older and heavier. And if this be a law of nature, it certainly behooves the cattle-feeder to take note of it, and regulate his system in harmony with it. If, then, the cost of growing beef constantly increases with the age and weight of the animal, it must follow that economy requires that the animal should be sold at the earliest period of maturity suited to the requirements of the market. This period is indicated at two years; and well-grown animals intended for beef should not be kept beyond this period, except when an unfavorable market requires it.

COST OF A TWO-YEAR-OLD STEER.

Having been driven by carefully-tried experiments to the conclusion that profit can only be expected from full feeding under the system of early maturity, and that to carry out this system to the best advantage the animals should be raised and finished for the butcher upon the same farm, I propose, in conclusion, to examine the real margin for profit under this best system.

Let us take the average gain of good thrifty calves fed upon 20 pounds per day of skim-milk for the first ninety days, with an average of one-half pound of flaxseed and one pound of wheat-middlings or oat-meal after the first ten days, giving much less at first,

but increasing it to that amount; and the second three months, 10 pounds of milk, 1 pound of oil-meal, and 2 pounds of middlings per day, with pasture. The cost, then, of the first six months will be, for milk, 2,700 pounds, at ¼ cent, $6.75; 30 pounds flaxseed, 90 cents; 91 pounds oil-meal, $1.82; 272 pounds middlings, $2.04; 100 pounds hay during first ninety days, 50 cents; pasture three months, at 15 cents per week, $1.87; in all, $13.88. With this feed the calves should average 500 pounds' weight at six months.

The second six months it will require 10 pounds of hay per day, or 1,820 pounds, $9.10; 182 pounds of oil-meal, $3,64; three pounds per day of middlings, 546 pounds, at $15 per ton, $4.10, amounting to $16.84; and the gain should be 2½ pounds per day, or 410 pounds, averaging at one-year old 910 pounds, costing $30.72.

The second summer, pasture at 30 cents per week will cost $7.80; three pounds per day of middlings, or oats, $4.10; total, $11.90. The second winter he will require 15 pounds of hay per day, or 2,730 pounds, $13.65; 6 pounds of corn-meal, $10.42; 4 pounds bran per day, $5.46 — $16.38; total cost of second year $41.93. The steer will gain an average of 1½ pounds per day, or 547 pounds, weighing at two years old 1,457 pounds. This steer will cost at our figures, at two years old, $72.65, and such rapidly-matured steers will always bring, in this state at least, 6½ cents, or $94.70. This would leave a profit of $22.05. But it must be remembered that we have estimated for the most expensive food and for feeding wholly on hay as fodder. It must also be remembered that although $72.65 may be considered a great price for a two-year-old steer to cost, yet it is made up of the products of the farm all estimated, and that the steer will pay a handsome profit upon that, while the ordinary steer will cost two-thirds as much and not bring in market more than one-third the price. I have raised calves upon the food here estimated, and at a cost of only $25 for the first year, weighing 900 pounds, substituting straw for half of the hay.

Another formula for raising good calves and steers is as follows: The same amount of milk as before, giving, after first twenty days, one-half pound of oat-meal and one pound of bran per day till three months old, then during next three months one pound oats unground and two pounds of bran per day, with pasture. This would make

cost of first six months: milk, $6.75; oats, $1.27; bran, $2.28; pasture, $1.80: total, $12.10. The second six months' feed, 8 pounds of hay, with straw *ad libitum*, $7.28; one pound of oats and two pounds of bran per day, $6.37; total, $13.65; cost for the year, $25.75. The second year the cost would be: pasture, $7.80; 4 pounds bran per day, with pasture, $5.40; cost of six months: summer, $13.20. Winter feeding: 8 pounds hay, $7.28; 6 pounds corn-meal, $10.92; 4 pounds bran, $5.40; six winter months, $22.60; cost second year, $35.80. Total cost, two years, $61.55.

This formula has produced an average live weight, with us, of 825 pounds the first year and 1,350 the second year. This steer will bring 6 cents, or $81, and leave a profit of $19.45. I do not feed corn or corn-meal the first year, because the object should be to produce a large growth of frame and muscle, and not to lay on fat excessively. Besides, corn-meal is very apt to derange the digestive functions, producing a feverish state of system. It is, however, allowable to grind one bushel of corn with two bushels of oats, or one bushel of corn with one of peas; but if pea-meal is used for calves, it should be cooked, when it will be found an excellent food to grow a rangy calf. A variety of food will be found preferable to any single kind, and we have found oats, bran, and corn a combination promotive of both health and growth. I should advise, when obtainable, the use of a small quantity of oil-meal or flax-seed; even a half-pound daily will have an excellent influence in winter-feeding to keep the bowels in the proper condition where roots are not fed.

These estimates, it will be understood, are made to suit prices in New York and most of the eastern states, and of course are much too high for the west, and higher than the prices of cattle-food often are in New York; but they are intended to show that with all these points against the eastern states cattle may be raised at a profit. We have not estimated the money-value of the manure, which would increase the profit side of the account into fine proportions. The best English feeders think themselves well paid if they can be reimbursed for the cost of the food in the value of the animal, charging all the labor and profit to the manure.

Let those farmers who think these estimates produce steers of greater cost than they can afford, take the trouble to estimate in the same way, and as fairly as we have done, the cost of those

common, thin, scrimped animals which they do raise, and compare the cost with their value in market, and they will then see forcibly the point we have tried to illustrate. If they will figure the cost of these common steers at two years old, charging fair prices for what they actually eat, it cannot be brought under $35, and they will seldom bring in market over $25. This system of full feeding and early maturity offers the only feasible plan by which the lands of the middle and eastern states may be brought into a high state of fertility. With this system, like the lands of England, they may be caused to double their production in a quarter of a century.

It offers a plan by which all the crops of the farm may be fed to animals, and so go back to enrich the soil, receiving a full compensation for the value of the crops in the sale of beef. And as a good augury for the future, it is only the best animals that can be sold to supply this great opening market for our meats in England; and we trust this may be an effectual stimulus to farmers to strive and grow two animals where one has grown before, and that each animal may outweigh two of its predecessors.

FRESH-MEAT SHIPMENT TO EUROPE.

For many years there has been a search for new outlets to American meat products. Numbers in proportion to population have not been maintained, but size and quality have both been improved, especially in beeves, since the advent of the short-horn. Shipments of cured and pickled beef, as well as of hams, pork, and lard, have largely augmented in bulk and value; but growers and shippers have not been satisfied, craving the higher prices of prime fresh beef, or the saving of heavy transportation bills by the processes of concentration. Numerous patents have been granted for extract of beef or other cooked and canned products convenient for safe and cheap shipment. The results have not been altogether satisfactory, as the profits only warranted the use of cheap beeves in Texas. Enterprising shippers believed it possible to send abroad our best corn-fed beef, by the use of refrigerating processes, in our fastest steamships, and present it in the principal markets of Great Britain

in perfect soundness of condition, in competition on its own merits with English beef of famous repute.

Little more than a year ago a pioneer experiment was made in New York with such success as to command a constant extension of the business, until the weekly shipments have reached an average of fifteen hundred beeves, and Philadelphia and other cities have inaugurated similar enterprises.

The success of the experiment has caused a sensation in England among producers and consumers. The Liverpool *Daily News* says that the quality of American beef is in no way inferior to that of British production, and can be sold at 2*d*. to 3*d*. per pound lower retail rates. About 600 tons weekly are now shipped, mostly going to London, and taken by west-end clubs and other institutions. A portion is sent to Birmingham, where it has reduced the price of English beef 2*d*. per pound, and to other towns. In Manchester and Liverpool a combination of butchers has prevented its extensive consumption. The queen, the prince of Wales, the lord mayor, the governor of the Bank of England, and other persons of influence, have indorsed the quality of this meat, and the butchers themselves acknowledge it to be "good, sound meat." Its price is a further commendation, being 6*d*. per pound.

The *Agricultural Gazette*, of London, of January 29, 1877, has the following items of wholesale and retail prices:

On Wednesday last, the City of Richmond arrived at Liverpool with 808 quarters of American beef, consigned to Messrs. Archer & Malthouse, of the Central Meat Market, London; 650 quarters were sold in the large towns in the north of England, and 158 quarters in the London market. The prices realized for the whole, by the carcass, was 6½*d*. per pound.

The sale of American beef in Dublin on Saturday was very considerable. The butchers' shops in which it was sold in different parts of the city were regularly besieged by purchasers. The beef was sold at 8*d*. @ 10*d*. per pound. Next week several shops for the sale of beef will open in the city. A panic has almost been caused by the sale of the beef, which is pronounced better than home produce.

An English member of parliament, Mr. Barclay, has been discussing before his constituents the probability of disastrous results of competition of American with British meat production. He admits that it is of good quality, tells where it is produced, and recites the advantages possessed in the great plains and mountains, from Can-

ada to the Gulf of Mexico, for growing young cattle in preparation for feeding in more eastern localities. He deems the situation somewhat grave, but concludes that the ability, perseverance and frugality of British farmers may overcome an advantage of a penny a pound in price. He says:

I adhere to the opinion I expressed at Forfar, that if they were allowed full scope and liberty in dealing with the land and crops on it in such a manner as they should find most profitable, and if they, in addition, were fully secured for that capital which it is absolutely necessary must be invested in land to produce the best results, I have no doubt they would meet the competition from any quarter of the world.

Relative to the difference in price of British and American beef, he is thus reported:

Before proceeding further, he wished to correct what seemed to be a misapprehension in regard to the price which farmers in this country were getting for beef. As they were all aware, the farmer sold his animal alive at a price per cwt. of the carcass dead, and although he appeared to get a high price per pound for the beef, there had to be deducted from it, in comparing it with the price of American, the value of the hide, tallow, offal, etc. On looking to the price of meat in the London dead-meat market, he found that for the best beef it varied from 4*s*. 6*d*. to 5*s*. 2*d*. per stone of 8 pounds, the average being about 4*s*. 10*d*. per stone, or 7½*d*. per pound; but from that a half penny fell to be deducted for carriage to London, so that the price which a farmer actually got for his beef was little, if anything, over 6½*d*. per pound, or 1*d*. more per pound than the wholesale price of American. Of course, a difference of 1*d*. per pound is a very serious one. He would, therefore, recur to the point from which he started. Was the importer able to bring the beef to this country and sell it at that price with profit. And, if so, did it pay the producer, and would the supply be likely to continue or increase.

He found from figures that the cost of bringing across beef, including freight and other charges, was from £7 10*s*. to £8 per ton, so that, added to the price at New York, would bring the cost of the beef to 52*s*. 6*d*. or 53*s*. per cwt., which would leave the whole of the tallow, offal, etc., as a profit to the shipper; and he believed that would be considered a very handsome profit indeed, and sufficient to meet certain contingencies which, of course, had to be encountered in every trade. Apart from the figures he had given, the continuous increase of the trade, and the fact that one line of steamers after another was making accommodation for carrying on the trade, showed that they had confidence that it could be conducted at a profit, and was likely to continue.

The next important question was, Could the farmers in America produce beef so as to be able to sell it at the price he had indicated

in Chicago? Before directly going into that matter, he would point out the new state of things which, within the past few years, had begun to obtain in America. For many years, in Texas and other states in America, there had been an unlimited number of cattle, but the quality of them, with a few exceptions, was poor, and would not suit the English market, although it suited, to a very large extent the American public. In fact, there was not in that country a very large demand for the first quality of beef so long as the secondary kind could be obtained at almost nominal prices. But now this new state of matters obtained, that the farmer in the United States and in Canada could get what he considered a very good price for the higher quality of beef; and the difficulty which had arisen now was, where was he to find his supply of young cattle for fattening? He could get any quantity of Texan cattle, but they were not very fat. After remarking that the original settlers of America were generally men of limited capital, and that they naturally, therefore, turned to the cultivation of the cereals as the easiest way to get money out of the land, and that it would take time to develop the breeding of cattle, Mr. Barclay went on to say that in many of the older states the raising of stock had been developed to a certain extent, and that in Kentucky and Pennsylvania there were farms as well farmed and fenced as any in this country, and that in the former states there were some of the finest herds of shorthorns.

The London *Live Stock Journal* admits that importation of meat from America is "the chief topic of conversation at the farmstead, at the markets ordinary, and in all places where agriculturists do congregate, and is the new element introduced into the stock breeders' calculations;" also that the new year opens with "an appreciable disturbance of the meat market, and already the gloomy prophets of evil are predicting a time of increased pressure, when the English farmer's last resource shall be taken from him."

This trade is a very promising feature in the meat-distribution of this country. It may grow into a business of vast importance to our farmers. Its extension must depend upon the continuance of a difference between American and English prices sufficient to constitute a satisfactory margin for expenses and profits. One condition needing amendment is evidently the weight of our beeves. Were there a larger proportion of heavy, fully-fattened animals, the price realized would be increased above the advance in cost. Feeders have their share in this work, and must co-operate with shippers if they would develop a permanent and profitable industry. The competition will tend to advance home prices in proportion to the comparative magnitude of the shipments. Such

advance would tend to limit the growth of the trade, even to the destruction of the business, if the margin should be reduced below expense of shipment. A more scientific course of feeding, the exercise of skill and the practice of economy in all the methods of management and feeding, become, therefore, essential elements of growth and success in transatlantic shipment of American beef.

The history of the beginning of this new enterprise which is here presented, is the result of the investigation of Col. F. D. Curtis, of New York, an intelligent breeder of several varieties of farm stock and an enthusiastic promoter of true progress in American agriculture:

In October, 1875, Mr. Timothy C. Eastman began his first shipments of fresh beef from America to England. Mr. Eastman is the pioneer in this enterprise, which has now assumed such extensive proportions. His first shipment consisted of forty-five cattle and fifty sheep. In December following he continued the export, increasing the number of cattle to a hundred, and from that time to the present he has made weekly consignments of from one hundred to several hundreds, gradually increasing the trade until, during the close of 1876 and the beginning of 1877, his shipments were from six hundred to one thousand per week. The first week in February, 1877, he shipped ten hundred and twenty-two cattle and seven hundred sheep. Mr. Eastman ships by the Williams and Guion, the White Star, and Anchor lines of steamships. He has shipped about thirty thousand in all, and has opened a market in London, Liverpool, Manchester, Sheffield, Birmingham, Leeds, Newcastle, Glasgow, Edinburgh, Dundee, and other towns in England and Scotland. The meat is kept fresh by a process on which a patent was obtained by Mr. Bate, of which Mr. Eastman is the sole owner. The patent is for preserving meat fresh by inclosing it in an air-tight chamber and forcing among it a current of cold, dry air. Refrigerators, or air-tight chambers are constructed between decks, according to the capacity of the steamers or the demands of trade, the largest one being on the Wisconsin (Williams and Guion line), which is 40 feet wide, 100 feet long, and 7 feet high. These immense air-tight chambers are surrounded on all sides by three air-tight walls made of matched lumber, covered with air-tight paper, which is made so by being saturated with rosin. Between these surrounding walls there is an open space of

an inch and a half, making the walls as perfect non-conductors as possible.

An ice-house is constructed on one side or end of the refrigerator, as is most convenient, and is filled with ice. The ice-compartment is in proportion to the size of the refrigerator, and is lined with galvanized sheet-iron. Fifty tons of ice are required by the Bate process for saving 60 tons of meat. A cast-iron fan or blower is placed inside of the meat-chamber, connected by a belt to a small steam engine on the deck above. The fans vary in size, according to work required. The belt is inclosed in an air-tight box. Flues, or air-passages, 10 inches high and 16 inches wide, made of matched boards, extend from the fan along the bottom of the floor to the sides of the refrigerator, where they connect with upright tubes or pipes, of half the size, which stand against the outer wall, into which the air of the refrigerator is drawn by the suction of the fan, and driven into the middle of the ice-chamber through a large flue made of matched boards, where it circulates through the ice and is drawn down and passed back into the refrigerator through an open space about three inches wide left at the bottom of the ice. The fan makes about eight hundred revolutions per minute, and is kept going constantly. These fans are large or small, according to the capacity of the meat-chambers. In this way a constant circulation of cold air is kept up during the entire voyage. A thermometer, suspended in a tin pipe which reaches from the upper deck down into the refrigerator, indicates the temperature, which is kept as near 38° as possible. A cap is kept over the top of the pipe to prevent the escape of the cold air from the meat-chamber. A more rapid circulation of air, which can be made by increasing the speed of the fan, will lower the temperature. The steam to run the fan-engine is supplied from the steamer's boiler.

As soon as the meat is received and put into the refrigerator it is closed, not to be opened until the steamer is ready to discharge her cargo on the other side of the Atlantic. The quarters of beef are suspended on hooks and also laid on the floor. When hogs are shipped they also lie on the floor, and the meat, being packed closely, does not move about when the steamer rolls at sea. If the supply of ice should run too low, it can be added to from the stock kept on all steamers. Usually, however, more or less ice remains

in the ice-chamber, and is sold at the port of destination. The meat is generally loaded at night, on account of the cooler temperature and the less liability of delays in getting the trucks on to the docks alongside of the steamers.

Only the best and heaviest beeves are selected to be sent to Europe. To be the most profitable, they should weigh when dressed not less than 800 pounds, although lighter ones are sent on account of the scarcity of first-class animals.

Mr. Eastman prepares his meat for shipment at the slaughter-houses at West Fifty-ninth street, New York, and at the stock-yards of the New York Central and Hudson River Railroad, where large refrigerators have been constructed by him on the same principle as those on the steamers. The refrigerators, called at the slaughter-houses "chilling-rooms," are situated just in the rear of the platforms where the cattle are killed and dressed, and are so constructed that the sides of beef can be run into them on cars attached to the timbers overhead. The sides of beef are suspended to the cars, hanging by the gambrel-joint, and as soon as dressed are conveyed into the chilling-rooms and transferred to the hooks overhead. These rooms are kept shut except when opened to let in the meat, and then they are closed as soon as possible. In this way handling the meat is avoided, and the animal heat is expelled as soon as possible, which is considered very important in preparing meat for long shipments. The meat soon becomes hard and firm. Each quarter is inclosed in coarse canvas, before being removed from the chilling-rooms, to keep it clean and prevent wearing or rubbing in handling and while being transported. In no case is the meat allowed to freeze, but the aim is to keep it as near the same degree of temperature as possible.

The meat remains in the chilling-rooms until the steamer is ready to receive it, and then it is carefully conveyed on trucks with springs, so as to avoid mussing. Mr. Eastman has never lost a single quarter by spoiling, and says that his beef is in better order to ship to the interior markets after it lands and keeps better than beef fresh-killed on the spot. He says that he shipped several hundred quarters last summer when the thermometer stood at 100° and not a pound was tainted or spoiled. It was taken from the chilling-room at night and rapidly transferred into the refrigerators on the steamers, and on the other side of the Atlantic was sent for-

ward under a very trying temperature. He thinks that the cold atmosphere effectually closes the pores or sears the surface of the meat, so that it is not as susceptible to the effects of heat and taint as freshly-killed meat, while at the same time it looks as fresh and bright as the newly killed, and does not lose anything in flavor. This beef sells in the foreign markets at 7 to 8 pence per pound, and is pronounced just as good as the home fed, which sells at 10 to 12 pence per pound. The American beef is lighter, and this is really the greatest and possibly the only difference. If the American farmer will feed his cattle more, thereby bringing them to a higher condition, and making the beef better and more weighty, he may reasonably expect nearly, if not quite, the same price for his beef in the English market which the home-produced brings. But the light and thin beeves, which make up a large proportion of the supply sent to the sea-board, will not compete with the stall-fed short-horns and other improved breeds of the English and Scotch graziers.

The cost to Mr. Eastman is about $26 per head, in gold, for preparing, freight, and cost in transit, including commissions on the other side. The averaged price realized is about $90, gold. Mr. Eastman is now engaged in constructing three additional large refrigerators or chilling-rooms at West Fifth-ninth street, and will enlarge his operation accordingly. At the present time, on an average, fifteen hundred cattle per week are shipped from New York.

While Mr. Eastman may be properly considered the pioneer in this enterprise, being the first to establish a paying trade in fresh-meat exportations, the fact should be recorded that Mr. John J. Bate, of New York, made several experiments in this direction. He tells the story of this experimental operation as follows:

On the 11th of February, 1875, I shipped by the steamer Baltic, in refrigerator, twelve quarters of beef, twelve sheep, and six hogs. The managers of the White Star line thought so little of the enterprise that they refused me the use of steam to run the fan-blower. The meat reached Liverpool in good condition by the use of hand-power to operate the fan. On the 6th of June following I shipped on the steamer Wisconsin ten carcasses of beef, thirty sheep, and twelve hogs, the meat reaching Liverpool in good condition. On the 10th of August following I shipped on the steamer Britannic twenty carcasses of beef and one hundred and forty sheep in refrigerator. The meat arrived in Liverpool in good condition. Used steam. In October following Mr. T. C. Eastman made the next and all succeeding shipments.

Gillett & Sherman, another large shipping firm in New York, slaughter and prepare their beef at the New Jersey stock-yards, located at Harsimus Cove, in connection with the Pennsylvania Central and Erie Railroads. They are sending from one hundred to three hundred cattle per week, and ship on three steamers of the Inman line, two of the Cunard line, with one steamer on the National. This firm began in August, 1875, with a shipment of seventy-one cattle. They have sent about three thousand five hundred altogether, and estimate the cost of shipment and sale to be $23, gold, and the average sale per head to be $90, gold. Their largest refrigerator is in the City of Chester (Inman line), and will hold three hundred cattle. They send the best cattle they can buy, none less than seven hundred and fifty pounds' weight, if possible to get them. Their last shipment, February 1, averaged 850 pounds dressed weight. Their principal market is London.

Messrs. Gillett & Sherman ship under the patent of Dr. J. J. Cravens, which is a process for radiating cold air and preserving fresh meat. A refrigerator-chamber is constructed between decks by making double walls of planks and lining the inside of both of the plank walls with patent roofing-paper, and so placing the plank that where they join the cracks will not be opposite each other. The doors are made in the same way, and the whole room, fitted in this manner, is made as air-tight as possible. Galvanized-iron pipes, 2¼ inches in diameter, connected together, are placed one above the other, reaching from the ceiling to the floor, 13 in all, and extend around the walls and through the middle of the room, through which brine is forced by a Knowles bilge-pump located outside of the apartment. The pump runs on an average of eighty strokes a minute. The brine is pumped into the top pipe and runs by its own gravity and the pressure of the pump down through all of the pipes, and is returned to the reservoir from whence it came. The reservoir is a water-tight compartment situated alongside of the refrigerator, and is filled with ice and salt, at the rate of twenty sacks, four bushels to a sack, sufficient for preserving the carcasses of one hundred cattle for 13 days, which is longer than the time usually required for transportation from America to England. It is calculated that the pipes will radiate a cold temperature for 18 feet, sufficient to keep the meat, and for any space beyond 18 feet another set or tier of pipes must be had. A waste-pipe at the top

of the reservoir allows any excess of brine to escape. The brine is pumped from the bottom of the reservoir and returned to it from the refrigerator at the top, so that a constant circulation is going on and the extremes of cold are brought into constant use. The ice and salt are put into the reservoir a couple of days before the steamer sails, and before the meat is placed into the refrigerator the pump is set going to cool the room and have it ready for the meat. Water is put into the reservoir to create a brine, if it is necessary to do so before the ice may melt sufficiently to cool the pipes. When the meat is put in and hung up on the hooks overhead — as, under this system, it is never laid on the floor — the refrigerator is closed tight, and the pump kept going constantly during the voyage. The shipper is obliged to have a man in attendance to regulate the pump and watch the temperature, which is kept between 35° and 40° — as near 36° as possible. Greater cold is produced by a more rapid pumping of the brine through the pipes. The steam is supplied by the steamer. A screen is placed over the mouth of the feed-pipe to prevent the pump getting choked. A theremometer is placed near the pipes, and one at some distance off, to note the degree of temperature. These are seen through a glass plate placed in the wall. After the refrigerators have been shut a few hours a rapid condensation takes place, and the pipes are covered over by a coating of ice, and the atmosphere is thereby rendered dry. If the temperature runs up to 40°, it must be reduced rapidly, or the meat will spoil. It costs $2,000 to fit up a refrigerator under the Cravens patent large enough to hold one hundred and fifty cattle. Under the other patents the expense is not so great.

Messrs. Gillett & Sherman have an extensive cooling-room at the slaughter-house connected with the New Jersey stock-yards, which is fitted up with an ice-reservoir and pipes the same as on board of the steamer. This room is used for storing the meat before shipment, but these gentlemen do not think that any artificial cooling is necessary in winter, neither do the other shippers who prepare their meat at these yards. All of the quarters are bagged; that is, sewed up in canvas. Messrs. Gillett & Sherman send from forty to sixty sheep with each shipment of beef, but no hogs, as they are so unsalable in the English market, Englishmen not having learned to eat fresh pork sufficiently to create a demand beyond the

home-production. Forty cubic feet of space are estimated to hold a ton, according to ship-measurement, and the shippers of fresh meat are charged, according to this rating, 30 shillings, English money, per ton. Shippers in all cases have to be at the expense of fitting up the refrigerators, and have to furnish the engine, pumps, and fans, as well as the ice required.

Under the Bate system no extra man is required to go with the shipments. Shippers are required to pay for the space occupied by the refrigerators and ice-chambers on the outward passage, whether used by them or not. On the return voyage they are usually filled with fine goods, being a secure place for such freight.

Though Gillett & Sherman are intending to increase the number of refrigerators, and are now negotiating with the National line for this purpose, Mr. Gillett is of the opinion that the future does not look as promising for success as he wishes it might. The English market is exceedingly sensitive and changeable, and in London the prices of beef have been known to vary a penny in one hour, and two pence in twenty-four hours. They have been obliged to sell as low as four pence per pound, but their average sales have been about six pence, at which price it would pay to ship.

In mutton we can successfully compete with the English and Scotch graziers, as the quality is equal to theirs, although not so fat usually or so thick on the rib; and if our beef was carefully fattened we could challenge competition, and there would be no doubt of the future success of the trade.

Samuels and Company ship from New York on two steamers, on the National line, directly to London, whenever their steamers go out. Each one is fitted up with a meat-chamber large enough to hold one hundred cattle. They use the Smith process, which is similar to that of Bate.

Daniel Toffey and Company also ship on three other steamers of the National line, whenever these vessels sail from America. The refrigerators on these three ships are each calculated for one hundred cattle, and this is the number they send forward. They use the Banta process, which is also similar to that of Bate. They send lighter beef than the others, the carcasses not averaging more than 600 pounds. They do not contemplate, with the present outlook, any increase in their trade.

Martin, Fuller and Company and Messrs. Morris and Allerton ship

from Philadelphia, using the Cravens patent. These two firms together ship five hundred cattle per week. They have all the necessary outfit of chilling-rooms and other appliances under these patents which are required to make their business a success. Live cattle are sent from Philadelphia, but not in any considerable numbers. They have also been shipped from New York in small quantities, but the space required is too great for an extensive trade. From Portland, Maine, about six hundred cattle are shipped weekly by Wells and Company.

When greenbacks get to be at par with gold the margin of profit will be so reduced that, in the opinion of shippers, it can only be maintained by a reduction in home cost and a better quality of meat, so as to compete more successfully with the foreign beef. It is not probable that the cost of transportation of cattle from the west to the seaboard, and also across the Atlantic, can be much reduced. A more systematic and thorough manner of feeding must be inaugurated to cheapen the production. An increase of production will not meet the requirements of the case unless such increase is improved in quality much beyond the average rate now sent to market. Stall-feeding must take the place of the wasteful and careless fattening in the pastures and corn-fields, as is now generally practiced. Let the vast areas of pasture in the border states and territories be employed for breeding and feeding the cattle until they are two years old, and then let them be sent forward to the older sections to be fed a year on corn and rounded up to the proportions of the foreign demand.

The following extract from the London Mark Lane Express of January 15 will be of interest here:

The excitement upon the subject of the importation of meat from America increases as the news of large freights received circulates through the country, losing nothing, we may depend, in its course. There is no doubt that the large supplies recently sent to London and Liverpool have had a considerable effect upon the trade of those important meat-markets, although up to the present, prices in the country have not been appreciably effected. The present supplies of American meat, if spread anything evenly over the country, would be absorbed without producing any noticeable effect upon the demand of home-produced meat. But the supplies are not, nor are they ever likely to be, evenly spread over the country. Indeed, in hot weather, unless the cold-air process is kept up after disembarkation and during transit by rail, the foreign meat cannot be sent far into the inland districts. What, however, will

amount to the same thing will be this, that the price of meat being lower in London and other large ports than in the country markets, less home-grown meat will be sent to the former, and the supply, and therefore the prices, will be again equalized. Then, as we have remarked, if the American supply is not larger than it is now, its effects upon the price of meat will be infinitesimal. But there are those who tell us that the trade is only in its infancy, and as we know but little of the resources of America for meat-producing, we cannot disprove the prediction. Only last week one large importer stated that he had a thousand carcasses of beef, and as many of both mutton and pork as well, on the sea between New York and Liverpool. Such little recitals as that are calculated to cause alarm; but until we know more about American resources it will be foolish to gladden the hearts of consumers and cause producers to tremble with visions of cheap meat. It has not been proved that America can keep up her present shipments of meat of fine quality, and it would not pay to send any other; still less that she can increase the supply. Nor has it yet been shown that American farmers can rear and fatten bullocks to send to England and sell with a profit at six pence a pound. We could not do it here with land rent free.

A new impulse has been given to the business by the increased facilities for handling meat on its arrival in England. An immense refrigerator, covering an area or nearly an acre, with numerous apartments, each of which contains a cooling apparatus like that in use on the steamers, has been built and is used for storing the meat and obviating the necessity of immediate distribution and compulsory sale at any price that could be obtained at the moment.

WISCONSIN AND HER GOVERNORS.

The territory embraced in the present state of Wisconsin was formerly claimed by France, on the ground of discovery by its missionaries in 1671, and was held and ruled by the French for nearly a century. In 1763 the territory was ceded to the English, and held by them until after the War of the Revolution. By the treaty made with Great Britain, in 1787, all the territory northeast of Ohio was ceded to the United States, but actual possession was not given until 1795. It was then known as a part of the Northwest Territory, and comprised within its boundaries five of the

present great states of the union — Ohio, Indiana, Illinois, Michigan and Wisconsin.

In 1800, the Indian Territory was organized, Ohio having become a state. In 1809 Indiana was admitted, and the name of Illinois Territory was given. In 1818 Illinois was admitted, and the name of the Territory of Michigan was applied. In 1836 Michigan was admitted to statehood, and Wisconsin Territory continued until 1848, when she became the thirtieth state of the union. Wisconsin has, therefore, been governed by the King of France ninety-three years, by the King of Great Britain thirty-two years; was also a part of the State of Virginia one year; a part of the Territory of Ohio sixteen years; a part of the Territory of Illinois nine years, and a part of the Territory of Michigan eighteen years. The Territory of Wisconsin continued for twelve years, until admitted on March 13, 1848, into the sisterhood of states.

The following persons have held the office of Civil and Military Governor, from the year 1671, when the French Government assumed jurisdiction, until the present time:

Sieur Daniel de Rime du Courcelles	1671–72
Count Louis de Buade de Frontenac	1672–82
Mile Febre de la Barre	1682–85
Marquis de Deuonville	1685–89
Count Louis de Buade de Frontenac	1689–99
Chevalier de Calliers	1699–1703
Marquis de Vandrentil	1703–26
Marquis de Beauharnois	1726–47
Count de la Galissoniere	1747–48
Marquis de la Jonquire	1749–52
Baron de Sonquell	1752–00
Marquis du Querne de Menneville	1753–55
Marquis de Vandreville de Cavagnal	1755–63
Sir Jeffrey Amherst (under the English)	1763–65
Gen. James Miller	1765–00
Paulus Emelins Irving	1766–00
Sir Guy Carlton	1766–70
Hector T. Cramahe	1770–74
Sir Guy Carlton	1774–78
Gen. Frederick Huldsmand	1778–84
Henry Hamilton	1784–00
Col. Henry Hope	1785–00
Lord Dorchester	1786–91
Gen. Alured Clark	1791–93
Lord Dorchester	1793–96
Gen. Arthur St. Clair, constructively (N. W. Territory)	1787–95
Same, by actual occupation	1795–1800
Gen. William Henry Harrison (Indiana)	1808–09
Ninian Edwards (Illinois)	1809–18
Lewis Cass (Michigan)	1818–28
George B. Porter	1831–34
Stevens T. Mason	1834–36
Henry Dodge (Wis. Ter.)	1836–39

Jas. Duane Doty	1841–44
Nathaniel P. Talmadge	1844–45
Henry Dodge	1845–48
Nelson Dewey (State)	1843–51
Leonard J. Farwell	1852–53
Wm. A. Barstow	1854–55
Coles Bashford	1856–57
Alex. W. Randall	1858–61
Louis A. Harvey	1862–00
Edward Salomon	1862–63
James T. Lewis	1864–65
Lucius Fairchild	1866–71
C. C. Washburn	1872–73
W. R. Taylor	1874–75
Harrison Ludington	1876–77
William E. Smith	1878–79

MODEL FARMING.

At our request Mr. John Landreth has given us the following summary of his farm crops for the year 1877:

	A.	R.	P.		*Bush.*
Peas	79	1	28	Produced	1520
Wheat	22	3	9	do	735
Rye	6	0	0	do	135
Oats	2	2	0	do	225
Potatoes	5	0	13	do	975
Clover	19	1	34	estimated,	40 tons
Meadow	8	1	2	do	9
Pasture	15	0	0	feed for 100 sheep and seven head of cows and colts.	

Wheat, part of the peas and potatoes received a dressing of fertilizer, mixed in proportion, 16 bushels dry ashes, 4 bushels slacked lime, 1 bushel land plaster and 1 bushel of salt. The effect of this dressing was manifest. The varieties of wheat grown were fife and white Russian, the latter a new and approved variety. Five acres of potatoes were planted in fifteen hours, by two men and a team, using a "True's potato planter," which opens a furrow, cuts and drops the potato, drops with ever sett a gauged quantity of fertilizer, and covers all at one operation. They were planted in drills three feet apart, setts eighteen inches apart in the row, and four inches deep; in ten to fourteen days the field was harrowed broadcast with a smoothing harrow, breaking the crust, destroying the first crop of weeds, and in no way injuring the young potato

sprout's. In field culture hoes are never used. Th eafter cultivation, hilling and digging are done by horse power. The growing plants received one sifting of Paris green, one pound mixed with 100 pounds of plaster has proved effectual. Medium sized potatoes for seed gave the best result. The crop was grown at a cost of thirteen cents per bushel. This includes interest and taxes on land, preparation, planting, seed, fertilizer, Paris green, cultivation, and digging. Root, vegetable, and fruit gardens occupied two acres of ground; 1,200 bushels of turnips, carrots, and beets were stored in the root cellar; 66 square rods of beets yielded 450 bushels, at the rate of 1,000 bushels or 32 7-10 tons per acre. From 36 square rods of ground 120 bushels of black seed onions were sold, a lighter yield than the year before, when the same ground produced at the rate of nearly 800 bushels per acre. From 23 square rods of Wilson's Albany strawberry, there were gathered 695 quarts of fruit. From 160 Cotswold sheep, 1,235 lbs. of unwashed wool was sold at a net price of 37 cents per lb. Eighty dollars were realized from two Chester White pigs, dressed weight 1,210 lbs.; 5,838 bushels of peas were grown by contract by farmers. These were shipped east.

PROGRESS OF INDUSTRIAL EDUCATION.

In thirty-six states there are now thirty-nine colleges which have received the congressional land-grant of July 2, 1862. There are also branch institutions in Georgia and Missouri. The Agricultural and Mechanical College of Texas has been opened during the year. All the colleges are now in operation, except that of Florida, which is expected to be opened early in 1877. The professors and assistants in these colleges during the year numbered 473, and the students, 4,211. There are eleven states which have not sold all the scrip or land granted by Congress; Illinois, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Nevada, New York, Oregon and Wisconsin. They have sold during the year 51,405 acres, at an average price of $4.41 per acre, and 1,463,505 remain unsold. The largest average price obtained per acre by any state was $8.38, by Michigan, and the smallest, $2.20, by Iowa. The an-

nual interest received by the agricultural and mechanical colleges of the several states from the proceeds of all the lands thus far sold, amounts this year to $525,745. Thirty-four of the colleges have farms, which contain, in the aggregate, 15,418 acres, and their estimated value is $1,321,092. Statistics more in detail may be found in the tables at the close of this article.

It will be seen that in some of the colleges of which a report is made in the following pages, the number of students pursuing agricultural or mechanical studies is much smaller in proportion to the number in attendance than in others. This may be owing to several causes. In some cases the colleges have been recently established, and have not yet been brought in practical working order; in others the students were poorly prepared when they entered, in consequence of the low standard of education in the surrounding country, and in others inducements were greater to enter upon other courses of study which seemed to promise more immediate profit; but these embarrassments are gradually becoming less, and when agricultural and the mechanic arts require higher qualifications for their practice and become more remunerative, they will, no doubt, entirely disappear. Some of the colleges have already attained a high standard of excellence, considering the time they have been in operation and the fact that they have largely to educate their own educators. A large number of students graduate at these colleges every year, and enter upon practical farming and the mechanic arts, or become professors in industrial institutions of our own or other countries.

ALABAMA.

Agricultural and Mechanical College of Alabama, at Auburn; Rev. I. T. Tichenor, D. D., president.—"Our college," says the president, "is steadily increasing in popularity. The people of the state are beginning to understand our aims and to appreciate our efforts." During the year French and German books, plates, and models, and various kind of apparatus have been imported for reference and illustration for the different branches taught.

The college-farm contains 100 acres, and is valued at $2,000. The soil is naturally poor, but by skillful cultivation and manuring it has been greatly improved. Crops of corn, wheat, oats, cotton, grasses, and a great variety of vegetables have been cultivated dur-

ing the year. Notwithstanding the season was very unfavorable, in consequence of severe drought, corn yielded 50 bushels, wheat 18½ bushels, and cotton 400 pounds per acre. The great success attending the efforts to improve the fertility of the college-farm has excited much interest among the neighboring farmers, and led to a general improvement of the agriculture of the surrounding country. Similar success has attended the labors of the superintendent of the experimental farm, called the Experimental Station, near Courtland, in the valley of the Tennessee river, referred to in our report for 1875. The superintendent says: "The grasses are splendid, far exceeding my most sanguine hopes, and came out of the draught unscathed, except timothy, which is not so promising. They are the admiration of all who see them, and demonstrate that ours is a grass-growing country.

The college building represented in the accompanying engraving, is a fine brick edifice, 70 feet long, 60 wide, and three stories high above the basement, and is said to be the best-constructed building in the state. In the basement there are seven rooms, and twenty-six in the stories above. They consist of lecture, recitation, professors' laboratory, cabinet, library, drawing, reading, assembly and ordnance rooms, and a gymnasium. They are well finished and airy, those of the basement being 10 feet high, of the first and second stories 17, and of the third 13, and each of the towers is 85. The sum of $1,400 has been expended during the year for improvements of various kinds and repairs on the buildings. The annual interest derived from the proceeds of the congressional land-scrip is nominally $20,280, but in consequence of the depreciated state certificates in which it is paid, the college actually receives, on an average, only about $16,224.

Professors during the collegiate year, 5; assistants, 2; students, 104; pursuing agricultural or mechanical studies, 80.

ARKANSAS.

Arkansas Industrial University, at Fayetteville; N. P. Gates, A. M., president. — The annual interest derived from the proceeds of the congressional land-grant now amounts to $10,400. The experimental farm contains 160 acres, and is valued at $12,000. Experiments have been made in testing the qualities and adaptability of Tappahannock wheat, Surprise oats, and clover. Ten acres seeded

to clover, which has been considered a very doubtful crop in Arkansas, have yielded very largely, and indications are that it will succeed well in that climate on soil properly prepared. All the labor on the farm has been performed by the students, at prices varying from 5 to 10 cents per hour, according to their efficiency or skill.

Professors in the university, 9; assistants, 3; students, 270; students in the agricultural course, 25; in the mechanical, 20. The professors give instruction in common in the university and the agricultural and mechanical department.

CALIFORNIA.

University of California — Colleges of Agriculture and Mechanics, at Berkeley; John Le Conte, M. D., president. — The course of study in the college of agriculture has been so changed during the year as to include three instead of two years in the undergraduate course, general and economic botany being taught in the sophomore instead of the junior year. Students are not only enrolled in separate colleges, but in each college they may enter on regular or special courses. The special courses are adapted to those who desire to acquire proficiency in a single branch, or who are unable to remain long enough to pursue a full course. Specialists are also received into post-graduate courses in chemistry and engineering, and such other specialties as may be provided by the heads of the different departments. An opportunity is thus offered to any student who may feel himself deficient in a branch of study which he has pursued in the regular course, to acquire such additional information as he may desire.

The annual interest derived from the proceeds of the congressional land-grant is now $45,000. The college-farm contains 200 acres, and valued at $200,000. This includes the whole domain at Berkeley, 40 acres of which have been under cultivation with experimental crops. It is the design of the university to develop this domain for the purpose of illustrating the capabilities of the state for special cultures, as forests, fruits, field-crops, etc. It will, therefore, be the station where new plants and processes will be tested and the results made known to the public. Experiments have been made on the effects of different depths of plowing and on five kinds of fertilizers in the production of wheat and oats. In the laboratory, investigations have been conducted in the an-

alyses of soils, subsoils, fertilizers, waters and their purification, grape syrups, seeds of the *Rhamnus Californicus*, proposed as a substitute for coffee, and of commercial products for economic use. The garden of economic botany has also been improved by grading and underdraining.

Professors in the colleges, 10; assistants, 9; students, 50; professors in all the departments, 12; assistants, 23; students, 307.

CONNECTICUT.

Yale College — Sheffield Scientific School at New Haven; Rev. Noah Porter, D. D., LL. D., president.—The Peabody Museum of Natural History, referred to in our last report, is now completed, at a cost of $140,000; including cases, $175,000. The money was given for this purpose by George Peabody, of London. The plan of the building is so arranged that it can be enlarged at any time when more room is needed without injuring its symmetry or beauty. The basement is devoted to the sandstone collections of fossil foot-prints from the Connecticut Valley and to work and store-rooms; the first story, to the mineral-cabinet and recitation and lecture rooms; the second, to geology; the third, to zoölogy; the fourth, to archæology and ethnology. A part of the collections have already been deposited in their appropriate rooms and systematically arranged. The museum is now open to students daily. Instruction in mineralogy, zoölogy, and comparative anatomy will be given in this building, and the laboratory of determinative mineralogy has already been moved into it. During the past two years two professors have been added to the faculty of the school, William G. Mixter, Ph. B., professor of chemistry, and Sidney I. Smith, Ph. B., professor of comparative anatomy. These professorships are both new, and the gentlemen selected to fill them have prepared themselves by study in this country and in Germany with special reference to the particular branches they are required to teach.

Large additions have been made to the zoölogical collections, consisting of fishes, insects, and a vast number of the lower orders of invertebrates. The geological cabinet has also been increased by several thousand species of interesting vertebrate fossils, collected in different parts of the country. Among the especially interesting additions may be mentioned the skeleton of the celebra-

ted mare Esnea, imported from Arabia, and a series of fifty casts of human and other mammalian brains, obtained from the Royal College of Surgeons, London. In geology, excursions are made for the purpose of examining geological phenomena and making special collections of rocks and minerals. The governing board in their report say that the school has always had students pursuing agricultural studies, although the number taking the regular agricultural course has been small; that its teachers in agriculture from the foundation of the school have wielded a powerful influence, not only in this state, but also throughout the whole country, in matters appertaining to both practical and scientific agriculture, and that the trustees have constantly endeavored to carry out the intent of the congressional act of 1862 in every particular. The annual interest derived from the proceeds of the congressional land-grant is $8,100. A donation of $1,000 has been made for painting Sheffield Hall, and the work was completed during the summer vacation.

Professors in the scientific school, 16; assistants, 15; students, 230; professors in all departments, 48; assistants, 41; students, 1,021.

DELAWARE.

Delaware College, at Newark; William H. Purnell, LL. D., president. — No changes have been made in the general management of the college. The annual interest derived from the proceeds of the congressional landscrip grant is now $4,980. The professor of agriculture has a farm of 80 acres. The students cultivate portions of it for instruction in practical agriculture, while those who perform labor not educational receive a liberal compensation, by which they are enabled to pay a part of their college expenses. It is the design of the college to give the students such a course of thorough instruction in agriculture as will enable them to conduct the operations of the farm intelligently and profitably, and, at the same time, secure thorough mental discipline by the introduction of such other studies as constitute a substantial education. The usual crops have been cultivated on the farm, among which the sugar-beet has received special attention by the professor of agriculture, who promises a full account of his experiments and their results in a report soon to be published.

Professors, 5; assistants, 3; students, 43, 16 of whom were pursuing agricultural or mechanical studies.

FLORIDA.

Florida State Agricultural College, at Eau Gallie; Mr. William Watkin Hicks president of the trustees. — The college building, referred to in our report of last year, has been completed. It is fire-proof, having stone partitions between the rooms and a tin roof, and is designed principally for lecture-rooms. A dormitory, tool-house, and other outbuildings have also been built during the year. The trustees intend to erect the main college edifice and several cottages as soon as the means can be furnished. The college has not yet been opened, but it is expected that the work of instruction will commence early in the spring of 1877. Professor A. G. Hill has been employed by the trustees to take charge of the buildings, the improvement of the college grounds, and the experimental farm. A fine pair of mules and the necessary tools for farm-work have been provided, and a beginning has been made in clearing up the farm for planting an orange-grove and other tropical fruits.

The annual interest derived from the proceeds of the congressional land-grant now amounts to $6,068, and is paid regularly in gold. The college owns 4,000 acres of good land, mostly wild, which is valued at $5,000, and the improvements already made at $2,500. Of this land, 2,320 acres, besides several village lots, were given by W. H. Gleason, and 1,000 by W. R. Arno.

An avenue nearly two miles long and various cross streets about the buildings have been opened and are in good condition for travel. An avenue has also been opened from Indian River to Lake Washington, a distance of six miles. It passes through the college lands and greatly increases their value. About one hundred lots in the village-plat have been surveyed and will soon be put into the market for sale. All the land, except what is reserved for the college grounds, park, and experimental farm, will ultimately be sold for the benefit of the college. College Place is opposite to College Park, and is designed for the site of the main college edifice. The location is high, salubrious, and picturesque.

GEORGIA.

University of Georgia — Georgia State College of Agriculture and the Mechanic Arts, at Athens; Rev. Henry H. Tucker, D.

D., LL. D., chancellor of the university; L. H. Charbonnier, A. M., president of the college.—No important changes have been made during the year. A considerable amount of apparatus has been purchased for illustration in natural history and chemistry. The interest derived from the proceeds of the congressional land-grant is now $17,010, of which $3,000 are paid to the North Georgia Agricultural College, at Dahlonega. The college farm contains 60 acres, and is valued at $1,500, not including the stone house on it, which originally cost $24,000. Experiments have been made on the farm in the culture of cotton, corn, wheat, oats and potatoes. The prominent agricultural studies with which the students are required to become familiar are agricultural chemistry, physics, mechanics, botany, zoölogy, economics, geology, and jurisprudence.

It is proposed by the trustees to put in operation, as soon as means will permit, a physical laboratory, in which students will have an opportunity of experimentally verifying the laws of mechanics and physics illustrated in the lecture-room ; such as the laws of the mechanical powers, friction, specific gravity, hydronomics, heat, electricity, and magnetism. A large hall, 34 by 50 feet, is used by the students in drawing. They are employed in this exercise during a part of the course from one to two hours each day. The full course includes orthographic and isometrical projections, development of surfaces, practical prospective, linear, free-hand and object drawing, building and architectural drawing, masonry drawing, drafting for carpenters, mechanical drawing, drawing and shading from solid objects, drawing copies, as teeth of wheels, details of the steam-engine, lathes, drilling-machines, pumping-machines, and hydraulic-presses. The students are exercised in military tactics three times a week during the year. The state legislature, at its last session, granted to the university two hundred stands of arms, to be used by the students of the state college and the academic departments. One hundred stands have already been received. All the students of these departments are required to take part in the regular military drills unless excused for satisfactory reasons.

Professors in the college, 8 ; students, 93 ; professors in all the departments, 28 ; assistants, 5 ; students, 512.

North Georgia Agricultural College (a department of the university), at Dahlonega ; David W. Lewis, A. M., president.—The part of the annual interest received by this college on the pro-

ceeds of the congressional land-grant is $3,000. The college-farm contains 25 acres, and is valued at $1,000. In consequence of its limited means, and for other reasons, the college has not been able to enter upon experiments in practical agriculture on the farm. Most of the young men in the college are the sons of farmers, who have more knowledge of farming than of books. As soon as they are sufficiently advanced in the rudimentary branches, they will enter upon a regular course of instruction in agriculture. Education in that part of the state is in a backward condition, and the board of trustees have been making strenuous efforts to raise the standard by establishing common schools in all parts of the surrounding country, and educating competent teachers to instruct them. For this purpose a normal department has, for some time, been established in connection with the college, and no fewer than fifty young men and women who received their education in this school were engaged as teachers during a portion of this year.

The trustees are now fitting up rooms, which will be free of rent, expressly for young men who obligate themselves to teach in the fall months. By these facilities, and free tuition, the expenses of living have been much diminished, and students by clubbing together, have, in some instances, reduced them to about $6 per month. As soon as the students and people are prepared for it, and means can be provided, it is proposed by the trustees to establish a school of mines as a department of the college. Dahlnoega is located in the midst of the gold-belt of Georgia. Gold-mines exist in the immediate vicinity of the college, and nearly all the precious metals may be found within a short distance from it. In the opinion of Professor Raymond and other geologists, no better location for such a school can be found in the United States. Many of the young men now in the college have some practical knowledge of mines and mining. The college has been in operation four years, and has already had under its instruction nearly one thousand students. The average attendance has been very high, not being surpassed by any other institution in the state.

Professors, 5 ; students, 245, 30 of whom pursued agricultural or mechanical studies.

ILLINOIS.

Illinois Industrial University, at Urbana ; John M. Gregory, LL. D., regent.—The annual interest derived from the proceeds of

the congressional land-grant is now $28,200. None of the land has been sold during the year. Experiments were made on the experimental farm with chemical and other fertilizers to ascertain their relative value as compared with stable-manures in the different modes of applying the latter, and in feeding cattle to test the effect of the quantity of food consumed. Investigations have also been made upon the temperature of the soil in different situations and under different treatment, upon the depth of roots of ordinary field-crops, and upon microscopic and injurious fungi. The experimental farm contains 160 acres, and is valued at $16,000. It is used for experiments in testing the different varieties and modes of culture in field-crops and in the treatment of soils, about 60 acres being devoted to this purpose. It is also used for experiments in horticulture and feeding animals of different ages and development on various kinds of food. There is another farm called the stock-farm. It contains 410 acres, and is valued at $40,000. A large stock-barn has been provided for it, with fronts north and west, each 80 feet long, and each limb or L is 40 feet wide, being fitted up with stables, pens, yards, cooking-rooms, steam-boiler for steaming food, and engine for grinding, thrashing, and cutting. This farm is designed more especially for breeding and rearing all kinds of valuable stock, but is also used to illustrate practical agriculture and to exhibit to farmers a model farm. The barn on the experimental farm is of less size, but is fitted up with great convenience, and supplied with a mill for grinding feed, which is run by a large windmill. These farms have been very successfully conducted during the year under the direction of the head farmer, Mr. Edwin L. Lawrence, both in experiments and profit, showing a balance of about $3,500 in their favor.

The university claims to have made a larger exhibit at the Centennial than any other institution of learning, for which it received a medal. Medals were also awarded to it for a cabinet of the woods and minerals of Illinois, which it collected. It also exhibited a collection of climatic varieties of maize, obtained from the whole extent of the corn-growing region of the North American continent. The practical departments are gaining in popularity and efficiency, and the number of students is increasing. In the machine-shop, the odontograph, referred to last year, is now made in quantities for sale to the trade. Three other inventions have

been patented. A number of compound microscopes, excellent working instruments of new patterns, are now being finished.

Professors in the university, 13; assistants, 14; students, 386; of whom 303 were gentlemen and 83 ladies; professors and assistants engaged in giving instruction in agricultural and mechanical studies, 15; students in agriculture and horticulture, 49; in mechanical studies, 138.

INDIANA.

Purdue University — Indiana Agricultural College, at La Fayette; Emerson E. White, LL. D., president. — Judge John Purdue, who donated $150,000 to the university, died on the 12th of September, 1876, in the seventy-fourth year of his age. The money was to be paid in ten equal installments of $15,000 each. At the time of his death six installments, $90,000, had been paid, and the remainder, $60,000, was voluntarily secured by him on a valuable tract of real estate situated in Warren county. The university has been reorganized during the year, and now embraces three departments: 1, the university academy; 2, the college of general science; 3, special schools of science and technology. The agricultural and mechanical college is included in the last department, which embraces the schools of agriculture and horticulture, civil engineering, industrial design, physics and mechanics, chemistry and metallurgy, and natural history.

The buildings of the university now completed and in use are the boarding-house, dormitory, laboratory, boiler and gas house, military hall, gymnasium, farm-house, and barn. The barn has been built during the year, at a cost of $4,000. It is 42 by 60 feet, with stone basement, and all the improvements of modern construction. The rooms of the dormitory are now used for recitation rooms, cabinet, and library. A large college building, with suitable rooms for recitation, chapel, library, cabinet, and societies is now in course of construction. The foundation walls and basement story are finished, and it is expected that the building will be completed during 1877. Other improvements have been made on grounds, farm, etc., to the amount of $4,239. Also, $3,442 were paid for apparatus and machinery, and $1,051 for books and periodicals. The college is well supplied with apparatus for imparting instruction in agriculture and the mechanic arts. The farm is

large, in good condition, and well stocked; and students in the mechanic arts have an opportunity of working a part of each day at the bench, vise, lathe, drill, or planer. In the laboratory analyses have been made in various soils, indigenous woods, and milk from the farm cows. A large number of forest and ornamental trees have been set out, two acres planted with grapes, and four acres with orchard trees of various kinds.

The annual interest derived from the proceeds of the congressional land-grant is now $20,314. The college farm contains 159 acres, and is valued at $47,700. Experiments have been made in the culture of various crops. One hundred and sixty bushels of Fulz wheat were raised on five and one-third acres, 120 bushels of Alabama wheat on five and two-thirds acres, 360 bushels of oats on ten acres, 1,950 bushels of corn on thirty acres, 75 tons of hay on forty-five acres, and a large supply of garden vegetables for the boarding-house during the season and for winter use. Five thoroughbred Jersey cattle and several Berkshire, Essex, and Poland-China swine have been added to the live stock kept on the farm. The herd of cattle now consists of five Short-horns and five Jerseys. The five Short-horns cost $3,000.

Professors in the university, 6; assistants, 2; students, 120; 16 of whom are in the regular university classes, and the remainder, 104, are in the preparatory department. Only one student has been pursuing a course of agricultural studies, but it is probable that several now in the preparatory department will enter upon this course when they are properly prepared to do so.

IOWA.

Iowa State Agricultural College, at Ames; A. S. Welch, LL. D., president. — It has been a prominent object of the trustees to make this college really an agricultural and mechanical institution. Seven-eighths of the branches taught have an immediate relation to agriculture and the mechanic arts. During the year special courses have been prepared in chemistry, botany, veterinary science, geology, physics, and general agriculture; so that any student who desires to do so may become a proficient in any one of them. A boiler-house has been erected and a new heating apparatus put into the main college building, by which it is heated throughout by steam. The building has also been thoroughly repaired, at an

expense of $15,000. The heating apparatus cost $11,000. Seven pure-blood Short-horns have been purchased for the farm.

The annual interest derived from the proceeds of the congressional land-grant now amounts to $34,822. The number of acres of the grant sold during the fiscal year is 5,956, at $2.20 per acre, and the number remaining unsold is 175,244. The experimental farm contains 850 acres, and is valued at $51,000. Experiments have been made with different varieties of grain and corn, and with grasses; also, chemical analyses of several of the cereals, as corn, oats, rye, and barley, have been made by the chemist. Nearly all the heavy work on the farm has been performed by students, largely from the freshman class, who have been paid for their labor from 3 to 9 cents per hour. A few seniors, who have special capacity for the business, are employed as foremen under the several superintendents. At the spring of the year the young men are detailed for manual labor, in convenient numbers, to the farm, garden, and workshop; and the young women are appointed to the different departments of the dining-room and kitchen. No difference is made in the pay of the young men and young women for their labor.

Sixty-nine of the ninety-nine counties of the state sent students to the college. The largest number was from Story county, in which the college is located, being fifty-six. Several hundred volumes have been added to the library, which now contains 5,000 volumes, among which may be mentioned the Encyclopædia Britannica, Chambers' Encyclopædia, and the American Cyclopædia, Audubon's Birds of America, and the prominent works on agriculture, horticulture, and applied science.

Professors, 7; assistants, 8; students, 300, 62 of whom were in the agricultural course, and 13 in the mechanical.

KANSAS.

Kansas State Agricultural College, at Manhattan; Rev. John A. Anderson, president. — During the year a laboratory building, having the form of a cross, has been built of stone, at a cost of $8,000. It is one story, containing a large office, lecture-room, balance-room, and four spacious rooms for laboratory work. The professor of chemistry, William K. Kedzie, says that the building has more than realized the expectations which has been entertained

of it. The water-system proves perfect. The sky-light ventilators maintain the air of the working-laboratory as fresh as a home parlor. The system of sky-light ventilators in the large physical laboratory gives not only admirable perpendicular light for handling apparatus, but, when partitioned off by white screens, furnishes an apartment for photograph purposes which is equaled by few galleries in the state. Also a stone horticultural building has been erected, one story high, with basement, and containing two large lecture-rooms, recitation-rooms, workshop and cellars. Besides these, a small blacksmith-shop, with two forges, has been built. The college buildings now completed are as follows: The old college building, three stories, 40 by 60; college building, two stories, 42 by 100; laboratory building, one story, 109 by 109; horticultural building, one story, 31 by 80; mechanical building, two stories; 38 by 102; and blacksmith-shop, 20 by 40; all of stone except the latter, which is of wood.

The college-farm contains 225 acres, and is valued at $25,000. Experiments have been made with corn, wheat, rye, oats, potatoes, and grasses. In the experiment of potatoes, 250 varieties were employed, including nearly all those cultivated in the eastern states. Those which succeeded best were the Kansas, Chenery, Red Jacket, Carpenter's Seedling, Extra Early White, Great Britain, and Ohio Beauty. Among the forage-plants and grasses, alfalfa, timothy, and orchard-grass proved the most satisfactory. The result of the experiment with corn, by planting in hills and drills, was 62½ bushels per acre by the former mode and 71 by the latter. An experiment in labor on the farm is being tried by giving to each student who desires it the use of a plat of land, teams, etc., and allowing him to cultivate it as he pleases, under the direction of the superintendent, and to have the profit of the crop. This is extra labor, as all the students are required by the regulations of the college to devote daily one hour each to educational labor without compenation.

The annual interest from the proceeds of the congressional land-grant is $20,491. During the fiscal year 5,604 acres have been sold, at $5.83 per acre, and 31,461 acres remain unsold. A paper, called the Industrial, is published weekly by the printing department of the college, on a neat quarto sheet, at 75 cents per year, postage prepaid. It is devoted principally to science and college matters.

Professors, 6; assistants, 8; lecturers, 2; students, 303, 186 males and 117 females, all pursuing agricultural or mechanical studies. In addition to the regular six years' course of study, females receive practical instruction in dress-making, printing, telegraphy, scroll-sawing, carving, engraving, photography, and instrumental music.

KENTUCKY.

Kentucky University — Agricultural and Mechanical College, at Lexington; John B. Bowman, LL. D., regent. — No changes have been made in the course of study, except that the military school has been placed on the same basis as the other schools, and made optional. The patronage of the college has been considerably reduced for the last two or three years by the necessity of discouraging the attendance of poor young men, not state students, who wished to secure their education by their labor, for the compensation of which no means were available.

The farm contains 433 acres, and is valued at $130,000. Experiments have been made with new varieties of wheat, rye, oats, and hemp. The Clawson wheat, furnished by the Department of Agriculture, proved to be a successful variety. Valuable collections of plants have been received from the commissioner of agriculture and the superintendent of the congressional greenhouses at Washington. The annual interest derived from the proceeds of the congressional land-grant is $9,900.

Professors in the college, 7; assistants, 1; students, 94, all pursuing agricultural or mechanical studies; professors in the university, 24; assistants, 3; students 273.

LOUISIANA.

Louisana State Agricultural and Mechanical College, at New Orleans; Mr. J. L. Cross, president. — The "Board of Control" say that the college has made very satisfactory progress during the past year, and that, considering the short time it has been in operation and the limited means at its command, they may justly feel a pride in its present flourishing condition. At the close of the summer session six gold medals were bestowed on the most deserving students, according to general merit, as indicated by the result of daily markings for scholarship and deportment. The

night-school has been continued for the convenience of mechanics and other students, who, in consequence of daily labor at their trades, cannot attend during the day; and such has been its popularity and success, that there are now fifty students in constant attendance on its exercises. The chemical and philosophical apparatus is quite deficient at present, but additions will be made as soon as an appropriation from the state can be obtained.

The annual interest derived from the proceeds of the land-scrip grant now amounts to $13,734. The part of the fund, amounting to $130,800, pledged by the state to make good the loss occasioned when the proceeds of the national endowment was consolidated into new state bonds, has not yet been paid, and no interest is at present derived from this source. A bill has been prepared and presented to the legislature of the state, which provides for its payment by a special state tax of three-fourths of a mill on a dollar. It is expected that the fund will be restored to its original value. The land owned by the college comprises 600 acres, a part of which will be used as an experimental farm, when the college buildings are erected upon it. The land is valued at $40,000.

Professors, 6; students, 209, of whom 115 were pursuing agricultural or mechanical studies.

MAINE.

Maine State College of Agriculture and the Mechanic Arts, at Orono; Charles F. Allen, D. D., president. — The terms of the college-year have been changed from three to two and the courses of study revised. The course for students not intending to pursue agriculture is called "the course of science and literature." A building, called Society Hall, has been erected by the students for society meetings. A vertical circle, made by Messrs. Repsold and Sons, of Hamburg, Germany, has been added to the astronomical apparatus, and 271 volumes and 167 pamphlets given to the library.

In the laboratory, determinations of the percentage of sugar in various kinds of sugar-beets raised on the farm have been made, and also numerous analyses of common grasses, clover, and cereals at different stages of their growth, including both roots and foliage.

Experiments have been conducted on the farm in testlng the

efficacy of Professor Stockbridge's fertilizers, the value of different manures in top-dressing grass-land, the effect of subsoiling on the wheat crop, the different methods of sowing wheat and planting potatoes, the comparative merits of different breeds of cows for the production of milk and butter, and the value of cooked and raw meal and skimmed milk in feeding swine. The farm contains 370 acres, and is valued at $10,000. The annual interest from the proceeds of the congressional land-scrip is $7,864.

Professors, 6; assistants, 2; students, 115. All the students pursue agricultural or mechanical studies.

MARYLAND.

Maryland Agricultural College, at College Station; William H. Parker, President. — The financial condition of the college has been greatly improved during the last two years. The total amount received from the state since September, 1875, is $15,709.50. During the same period there have been paid on the old college debt $10,561.46; for necessary repairs, $3,916.89; and on the farm, $1,138.25. The amount remaining unpaid on the debt is $2,215.42; due for tuition, $1,436.86; leaving the present indebtedness of the college only $778.56.

Experiments have been made on the farm with wheat, rye, barley, garden seeds, fertilizers, Cotswold sheep, and Berkshire and Chester hogs. Twenty-one acres have been sown with wheat and grass, and fertilized with Missouri bone, British mixture, and Taylor superphosphate, at the rate of 200 pounds per acre. The boundaries of each kind of fertilizer used were marked, so that its effects could be easily ascertained. There have been raised on the farm 800 bushels of shelled corn, 200 of oats, 600 of turnips, large quantities of both summer and winter vegetables, and 30 tons of hay. Five Cotswold sheep sheared 55 pounds of wool, 8 calves were sold, and 2,000 pounds of pork will be packed. The farm contains 285 acres, and is valued at $14,250. The annual interest on the proceeds of the congressional land-script is $6,900.

Professors, 6; students, 77, 40 of whom pursued agricultural or mechanical studies.

MASSACHUSETTS.

Massachusetts Agricultural College, at Amherst; William S. Clark, Ph. D., LL. D., President. — In consequence of an invita-

tion from the government of Japan, President Clark obtained a leave of absence and sailed for that country on the 1st of June, 1876, for the purpose of establishing there an agricultural college like that of Massachusetts. Three graduates of the college went with him, expecting to remain as professors. The professor of veterinary science and practice has been dismissed, in consequence of inadequacy of means to pay his salary, and the superintendent of the farm has been superseded by a graduate of the college. The farm contains 383 acres, and is valued at $37,000. Great improvements have been made on it during the year by underdraining, grading, and filling depressions; and a change has also been made in its general objects and management. Experiments have been conducted in growing crops with chemical fertilizers, and in feeding fruit-bearing plants with different substances to ascertain their effect on the quality and quantity of the fruit produced. Professor Stockbridge says that "this is the eighth year that crops have been grown on the same land with chemicals, and, as a result, it may be said that it is conclusively proved that chemicals may be substituted for barn-yard manure, if they are properly compounded and used. In fact, in some circumstances these are altogether preferable. In answer to the inquiry whether these fertilizers do not leave the land in an exhausted condition, he says that his experiments thus far show that it is left in a better condition than before the crops were taken from it; and as to the cost of fertilizers, it is not so great that the crop does not pay a large profit over the cost of production. By this method of culture he has raised 104 bushels of shelled corn per acre. Both the prepared fertilizers and the materials for compounding them can be obtained in Boston. In the laboratory, analyses of plants, milk, and fertilizers have been made on a large scale, and also of animal excretions, to ascertain how they are affected, as to their quality for fertilizers, by the food the animal consumes.

The annual interest derived from the part (two-thirds) of the congressional land-grant received by this college amounts to $8,022. The national endowment fund has, at different times, received large additions by the state, so that the permanent interest-bearing fund of the college is $360,067. A post-graduate course has been provided, by which graduates of colleges and scientific schools may pursue their studies under the direction of President Clark in

botany, Professor Goessmann in chemistry, or other members of the faculty in their respective departments. A model dairy-house has been built, with all the modern appliances; also a steam boiler and engine have been placed in the barn to cut and steam fodder and roots, and for all purposes for which power is needed. The barns, sheds, and farm-house have been painted and otherwise improved.

Professors, 5; assistants, 3; students, 111.

Massachusetts Institute of Technology, at Boston; John D. Runkle, Ph. D., LL. D., President. — A new department, called "Practical mechanism," has been opened, designed especially for the benefit of those who wish to become master-mechanics, rather than engineers, and for affording a course of thorough preparation for all the higher courses in the institute. There is no other school for mental working, so far as is known, conducted on the same plan, except in Russia. For admission the applicant must be fifteen years of age, and pass a satisfactory examination in arithmetic, geography, spelling, punctuation, English composition, English and American history, and algebra through simple equations. The course, occupying two years, includes shop instruction, algebra, plane and solid geometry, rhetoric and composition, mechanical and free-hand drawing, English literature, and the French language.

Tuition in this course of two years is a $125 a year. For a more detailed account of this system, the reader is referred to the report of Dr. John D. Runkle, president of the institute, on the "Russian system of shop-work instruction for engineers and machinists."

By the co-operation of the Woman's Education Association of Boston, new laboratories have been provided for the special instruction of women. The design is to furnish every facility for the study of chemical analysis, industrial chemistry, mineralogy, and chemistry, as related to vegetable and animal physiology. These courses are intended for such persons as may be able to devote their whole time to the work, as well as for those who can spend only a few hours a week in the exercises. The laboratories are open from half-past eight in the morning till half-past five in the afternoon. Students in these laboratories pay the same tuition as other students in the institute. The institute, however, provides several courses unconnected with this without charge for tuition, the ex-

pense being paid by the trustee of the Lowell Institute. The annual interest derived from the part (one-third) of the proceeds of the congressional land-grant received by this institute, is now $4,011.

Professors, 21; assistants, 15, students, 293. Of this number, 54 were ladies, 38 of whom were special students in design; 14 special students in chemistry, and 2 students in the first year not candidates for a degree.

MICHIGAN.

Michigan State Agricultural College at Lansing; Theophilus C. Abbott, LL. D., President.—The college year has been divided into three terms instead of two, but its length has not been altered. It appears to be a primary object of the directors to make it in the highest degree agricultural, and a considerable portion of the time is devoted yearly to original investigation. Special attention is given to the study of botany. The freshman class devote one-third to one-half of their time to it daily for eighteen weeks, and are required to make rigid analyses and microscopic dissections of a great number of plants, both phenogamic and cryptogamic, with the most approved instruments.

Experiments have been made in the garden by the botanist with two hundred and forty-four varieties of potatoes, and the yield of each is given. He has also conducted some interesting experiments in the production of new varieties. The seeds of fifty varieties were sown in boxes, hot-beds and in the greenhouse, at the time of sowing seeds for early tomatoes. When of sufficient size, a selection was made of the plants, and they were set two inches apart each way, and, after danger from frost was passed, were reset, two feet apart, in rows in the garden. About six hundred of them produced potatoes. The yield was surprising. Instead of a few little tubers the size of bullets, many of them were four to five inches long and of good size. In one instance, a single plant produced eight pounds of potatoes, many of them being of good size. The yield in many cases was better than from old potatoes planted in the usual way. A test of their qualities will be made next year. From the many experiments which he has made with potatoes, he has come to the conclusion that new varities must be originated every few years, as old ones degenerate in size and quality in most cases, and that farmers will soon make it a common practice to

raise them themselves. In his experiments with apple-trees, he has found that applying manure close about the foot of the trees, or removing the grass and cultivating small circles about them, has very little beneficial effect. It is only by cultivating very large circles, equal to the extent of the branches, or the whole ground, that beneficial results can be obtained.

The college-farm contains 676 acres, and is valued at $47,320. About 300 cares are cultivated with crops in a regular system of rotation. Experiments have been made with White Schonen and and Excelsior oats; Clawson, Asiatic, Gold-medal, and Diehl wheat; Yellow-blaze corn; roots and grasses. The Gold-medal wheat yielded best. The students have been paid for their labor on the farm and elsewhere during the year $4,464, the price paid them being about 10 cents per hour. The farm-crops were valued at $3,154, and the labor required for their production $2,819. The farm live stock is worth $10,888, and the implements $1,685. The annual interest derived from the proceeds of the congressional land-grant, is now $16,880. Of this grant there have been sold during the fiscal year 2,474 acres, at an average price of $8.38 per acre, and 164,799 remain unsold. Three hundred and twenty-eighth volumes have been added to the library, and twenty-seven agricultural, scientific and literary periodicals are received regularly by the college.

Professors, 6; assistants, 7; students, 166, 4 of whom are ladies.

MINNESOTA.

University of Minnesota — Colleges of Agriculture and Mechanic Arts, at Minneapolis; William Folwell, M. A., President. — The plant-house has been completed, and the collection and propagation of plants commenced. A belt of trees, designed as a wind-break, has been planted around the barn and another around a portion of the barn.

The annual interest derived from the proceeds of the congressional land-grant is now $13,901. The number of acres of the grant sold during the fiscal year is 3,706, at an average price of $5.44 per acre; the number remaining unsold is 52,187. The college-farm contains 120 acres, and is valued at $12,000. Experiments have been made with 12 varieties of wheat, 20 kinds of fertilizers being used; with 8 varieties of oats, thick and thin seeded; with five varie-

ties of corn and 19 varieties of potatoes, both on sandy soil and vegetable loam, 18 kinds of fertilizers being used; and with 225 varieties of garden-vegetables. It has been found by experiment on the farm that corn immersed in tar-water and rolled in gypsum, is twenty-four hours longer in germinating, but that there is no difference in yield, and that birds, squirrels and insects, except the wire-worm, do not touch it; that banking up the earth around the trunks of trees, about the 1st of September, to a heighth of 15 to 30 inches, according to their size, will cause an early ripening of the wood; and enable the trees to withstand better the sudden changes of temperature to which they are subject; that stripping off the leaves and cutting back the branches appear to produce in a measure the same result; and that want of cultivation is the greatest retarding influence to a successful tree-culture.

The professor of agriculture, in giving his views of what an agricultural college should be, says that intelligent agriculture is based upon a knowledge of the natural and physical sciences; therefore the students should be acquainted with these sciences before receiving systematic and connected instructions in the art and practice of agriculture. All practical instruction is not, however, to be deferred until the last year. Verbal instruction and manual practice should be provided in each operation as it occurs in the natural course of events; but the main part, the body, of practical instruction can be fully appreciated only when some knowledge of the sciences has been acquired; therefore let language, mathematics, and natural and physical sciences come in the first years of the course, and practical agriculture later. The library, museum, stock, farm and gardens are to serve as auxiliaries to this course of instruction.

Professors in the Colleges of Agriculture and the Mechanic Arts, 6; assistants, 2; students, 6; professors in all the departments, 11; assistants, 8; students, 267, 196 of whom were gentlemen and 71 ladies.

MISSISSIPPI.

University of Mississippi — College of Agriculture and the Mechanical Arts, at Oxford; General Alexander P. Stewart, chancellor.—Few changes have been made in this college since our last report. The annual interest derived from one-half of the proceeds of the congressional land-grant is now received by this college, according to the law of 1875, which amounts to $5,678.75.

The college-farm contains 100 acres, and is valued at $2,000. The trustees have suspended operations on it for the present, but they will probably be resumed when there are students in the college who need instruction in practical agriculture.

The laboratory for practical work in chemistry is large and well furnished with apparatus. Special attention is given to the chemistry of geology and its economical products bearing on agriculture. A collection of several thousand geological specimens from all the formations of the state has been made, consisting of various kinds of economic rocks, fossils, soils, marls, etc. The collection of soils is of great interest, having been obtained from every county of the state. The analyses which have been made of most of them show all their characteristics, and enable the student to comprehend at once the agricultural resources of every part of the state. The Markoe collection of minerals is claimed to be inferior to none in the world. It includes a large number of rocks, simple minerals, and fossils, sufficient for the fullest illustration of mineralogy and its related subjects. The herbarium contains specimens of all the plants indigenous to Mississippi, and some from the adjoining states.

Professors in the college, 5; assistants, 1; professors in all the departments, 8; assistants, 4; students, 131. There are no students in the college pursuing a regular course in agriculture, but there are 15 in the course of science, which embraces some studies relating to agriculture and the mechanic arts.

Alcorn University—Agricultural and Mechanical College, at Rodney; Rev. Hyram R. Revels, D. D., president.—The university is slowly recovering from the embarrassment occasioned by the abolition of free scholarships by the state legislature and the removal of the board of trustees and the faculty last year. On the 20th of July, 1876, Dr. Revels was reappointed president and a professor was added to the faculty. The prospects of the university are more encouraging than in 1875; but it is believed that at least two years will be required before it can regain its former standing.

The annual interest derived from one-half of the proceeds of the congressional land-grant, the part now received by this university, amounts to $5,678.75. The experimental farm contains 250 acres, and is valued at $5,000. Experiments have been made in the culture of yellow Maryland corn, Boyd's prolific cotton, and with clover. The results were very satisfactory. Seventy-five acres have

been under cultivation. There have been raised 450 bushels of corn, 150 bushels of sweet-potatoes, half a bale of cotton, 2,500 bundles of corn-fodder, and 1½ tons of hay.

Professors, 2; assistants, 2; students, 57. None of the students pursued the agricultural or mechanical course, but 14 were preparing to enter upon it as soon as they were able to do so.

MISSOURI.

University of the State of Missouri—Agricultural and Mechanical College, at Columbia; Samuel S. Laws, LL. D., president; George C. Swallow, LL. D., dean of college.—No important changes have taken place in the college during the year. Some improvements have been made on the university grounds, which are spacious and very tastefully laid out. An engraving of the university buildings and a portion of the grounds is here presented. The scientific building or agric ultural and mechanical college is a large edifice built of brick, 106 feet long, 60 ieet wide, and three stories high, not including the stone basement. It contains twenty-five rooms. Every room is supplied with water and gas, and the chemical laboratory is equipped with the most recent and approved apparatus.

The experimental farm contains 640 acres, and is valued at $60,000. Experiments have been made in fruits, hedges, forest-trees, pear-blight, and several wild plants, with the hope of developing some new principles which may be of benefit to agriculture. It is the determination of the college to enter more extensively upon experimentation with farm-crops than it has previously done. The lectures on agricultural chemistry, delivered to the junior class comprise a scientific exposition of the production of organic matter within the plant, beginning with the structure of the vegetable-cell, and proving the office of chlorophyl to be an apparatus for doing the chemical work in building up the plant. The nitrogenous constituentes of the plant are treated in reference to its organs, to the nitrogenous fertilizers, and to the nitrogen of the air, leading to the considerating of the mineral matter or ash, to the growth of plants, and to the soil. The chemical and physical properties of the soil, and the relative values of the different fertilizers now in use, and their employment in cultivation as a paying investment, are fully discussed.

The annual interest derived from the proceeds of the congressional land-grant was $3,040, of which $2,018 were received by the agricultural and mechanical college, and the remainder, $1,022, by the school of mines and metallurgy, at Rolla. None of the land has been sold during the year. Several thousand dollars have been appropriated for apparatus and large purchases made of books for the library.

Professors in the agricultural and mechanical college, 7; assistants, 1; students, 21; professors in all the departments, 17; assistants, 11; students, 391, 70 of whom are in the school of mines and metallurgy.

Missouri School of Mines and Metallurgy, at Rolla (a department of the University of the State of Missouri); Charles P. Williams, Ph. D., director.—This school combines theory with practice. In addition to the duties of school-instruction, the director and professors, with the assistance of the students, have done a large amount of work for the state in the chemical analyses of lead, copper, zinc, and iron ores from different mines of the state. The percentage of the several metals and the associated minerals of the ores has been accurately ascertained. Seventeen distinct analyses of lead ores, from different mines, have been made and formulated. The ores employed in these analyses were of great purity, having in no case yielded less than 99 per cent. of lead. The associated minerals were arsenic, antimony, silver, copper, iron, cadimum, zinc, and nickel. It is thought by the director of the school that the results arrived at by these analyses will very much increase the value of the industrial resources of the state.

Maps of surveys of mines and drawings of furnaces and reduction-works have been made by the more advanced students, and display much art and skill in their preparation. The school received, as its share of the annual interest derived from the proceeds of the congressional land-grant, $1,022. None of the land has been sold during the year.

Professors, 5; assistants, 1; students, 70.

NEBRASKA.

University of Nebraska — Agricultural College at Lincoln; Rev. Edmund B. Fairchild, D. D., LL. D., Chancellor. — The present chancellor was inaugurated on the 22d of June, 1876, and

his inaugural address is given in the register of the university for 1876. He shows what, in his opinion, a university in this country ought to be. Of the agricultural college, he says: "You have done well in attaching the agricultural department to the State University. Scientific agriculture belongs of right to every university arrangement, especially in a country of which agriculture is so important and general an interest as it is with us."

None of the congressional land-grant of July 2, 1862, has been sold, and the expectation is that it will not be disposed of for some time to come. The land is rapidly increasing in value, and by a provision of the new constitution of the state, none can be sold for less than $7 per acre. In consequence of this foresight in withholding the land from sale, a large endowment fund will accumulate. The state received another grant of 44,800 acres from congress for the establishment of the university, and it is estimated by the president of the board of regents, Mr. S. J. Tuttle, that the aggregate endowment fund of the college and university will amount to at least $1,000,000, and very probably to $1,500,000 when the land is all sold. The university building and grounds were paid for by the proceeds of the sale of lots in Lincoln, and the experimental farm, consisting of 320 acres, by the sale of two sections of land granted by the state for that purpose. The farm is valued at $18,422. Experiments have been made on it during the year to determine the effect of fall and spring plowing on crops; with grasses, to ascertain what kinds are best adapted to the climate of Nebraska; with oats, wheat, and barley, received from the department of agriculture; and with mangel-wurzels and sugar-beets, to learn which would be the most profitable for stock-feeding. A slight change has been made in the manual-labor system, by which students, instead of doing any labor that may come to hand, are to have special charge of certain kinds of work, under the oversight of the superintendent, to be responsible for the manner in which it is performed and for the results obtained, and to keep an exact account of the expenses and labor bestowed upon it. Students are paid for their labor ten to fifteen cents per hour, according to the work done.

Professors in the college, 5; students, 13; professors in all the departments, 9; students, 282; 122 of whom are ladies.

NEVADA.

Nothing has been done during the year in relation to the establishment of an agricultural and mechanical college in this state. Applications have been made at the state land-office for portions of the congressional land-grant of July 2, 1862, at $1.25 per acre, but no land has been sold.

NEW HAMPSHIRE.

Dartmouth College — New Hampshire College of Agriculture and the Mechanic Arts, at Hanover; Rev. Asa D. Smith, D. D., LL. D., President. — The exercises of the graduating class are represented by the examining committee to have been of a high order. The subjects were as follows: "Cotton and its manufactures;" "Water and its domestic uses;" "Building materials of New Hampshire;" "Irrigation;" "The manufacture of paper;" "Copper and its refining;" "Education of farmers." Of the students who have graduated since the opening of the college, twelve have engaged in agriculture, nine in mechanical occupations, and five in other employments. Thirty students have labored the past season on the farm, and have earned from $20 to $90 each, according to the number of hours occupied.

The farm contains 365 acres, and is valued at $21,000. There have been raised on it 150 bushels of corn, 610 of oats, 168 of barley, 100 tons of hay, and a large quantity of garden vegetables. Only a small part of it is under cultivation; 16 acres being devoted to tilled crops, and the remainder to hay. The uncultivated part is timber and pasture land. The yield of hay was from 2 to 4 tons per acre. The stock kept on the farm consists of 8 cows, worth $440; 1 yoke of oxen, $200; 4 heifers, $200; 11 heifers, $407; 2 horses, $300; 12 shoats, $300; 4 pigs, $16; and 1 full-blood Durham bull-calf, $200; total value, $2,063. The barn has been completed. It is a fine building, 100 by 50 feet, clapboarded and painted. It has a capacity for storing nearly 200 tons of hay; a tool-room 20 by 20 feet; 24 stalls for cattle; 4 calf-pens; and the usual arrangements in the basement. It has a good supply of pure water, brought in pipes from a neighboring spring.

The annual interest derived from the proceeds of the congressional land-grant is now $4,800. The examining committee thus

speaks of the success of the college: "In closing this report, we deem it a duty, as well as a pleasure, to bear our testimony to the eminent ability evinced by the president in discharging the difficult duties of his position, and by his able corps of professors, who have labored so long and earnestly to raise this institution to the highly respectable position it now occupies among the agricultural colleges of our country."

Professors in the College of Agriculture and the Mechanics Arts, 7; assistants, 4; students, 24; professors in all the departments, 22; assistants, 7; students, 439.

NEW JERSEY.

Rutgers College — Scientific School, at New Brunswick; Rev. William H. Campbell, D. D.. LL. D., President. — During the year the facilities afforded the students for studying analytical chemistry have been much improved, and a large amount of work has been done in the laboratory in analyzing commercial fertilizers and other substances. The trustees, in their report, say that the progress of the school has been highly gratifying and satisfactory. The laboratory work of the students in analytical chemistry has received the marked approval and commendation of proficients who have visited the rooms, and will compare favorably with the best results of other institutions.

A barn has been built, and the outbuildings re-arranged and improved. The barn is 60 feet long and 40 wide, with posts 22 feet. The main floor has stables for seven horses, feed-room, large threshing-floor, and spacious bays for hay. There is a cellar under the whole barn on a level with the cattle yard, which is on the south side. It has in it stanchions for 17 cows, a room for roots, and places for storage of cut straw, hay, or stalks. Water is supplied for the stables and yards from the city water works. Lapping on the large barn about 6 feet, is another, 48 feet long and 26 wide, with posts 18 feet. In the lower part are rooms for a horse, milk-wagon, and for loading cans of milk; pens for bull and calves, and open space unappropriated. The upper part is designed for hay and straw.

The experimental farm contains 100 acres, and is valued at $45,000. When purchased it was almost worthless for farming purposes, but by removing stones, thorough drainage, and skillful

cultivation, it has been brought into a high state of fertility. Experiments have been made on it with fertilizers on wheat, oats, corn, potatoes, turnips, and in feeding milch-cows. The long drought in 1876 caused a failure in these experiments, and also in the crops. It was the most severe ever known in New Jersey. The crops began to suffer in the latter part of June, and there was no rain to afford them any material benefit till the 17th of September. Potatoes were entirely destroyed; corn did not grow to half its common height, and the crop was only about one-fifth of its usual amount; pastures dried up; cabbage-plants could not be set out; turnip-seed would not sprout when planted, and carrots and mangolds could make no growth. For want of pasture and green fodder it was found necessary to feed farm-stock on other substances through July and August. The average rain-fall in the months of June, July, and August was only 3.17 inches; for twenty-two years previous to this it averaged for the same months 14.03, and the lowest amount recorded for these months in any previous year is 6.09 inches. The only good crops raised on the farm were wheat and rye, which had made most of their growth before the drought became severe. The yield of wheat on 14 acres of not very good ground was 25 bushels per acre, but on some experimental plots it was 40 to 48 bushels. The variety cultivated was the Fultz. The loss of crops on this farm, occasioned by the drought, is estimated to be at least $1,000. The annual interest derived from the proceeds of the congressional land-grant is now $6,960.

Professors in the scientific school, 9; assistants, 1; students, 42; professors in the college, 11; assistants, 1; students in all the departments, 162.

NEW YORK.

Cornell University — Colleges of Agriculture and the Mechanic Arts, at Ithaca; Andrew D. White, LL. D., President.— No changes have been made during the year in the literary operations of the colleges. The teaching-force of the university has been increased by the addition of six instructors. The college farm contains 150 acres, and is valued at $22,000. Experiments have been made on twenty-two plats with oats as a soiling crop, cut early and late; to assertain the effects of sowing in drill and broadcast; of rolling the ground; of gypsum, lime, and salt; of thick and thin

sowing; the comparative values of different varieties; to test the effects of Professor Stockbridge's fertilizers: on twelve plots of wheat, to try the Lois Weedon system modified; to show the effect of gypsum and superphosphate; the results of continuous crops with perfect cultivation, but without fertilizers; to ascertain the amount of seed required: on fifty plats of corn, to ascertain the effects of various commercial fertilizers, gypsum, and ashes; to compare results of planting soaked and unsoaked seed; to determine the proper number of stalks in a hill; to compare the productiveness of suckered and unsuckered plants; the values of seeds from the butts, middle, and tops of ears; to ascertain the comparative value of seven varieties of fertilizers; and of pure fertilizers compounded by Professor Caldwell: on twenty-eight plats of grass, to test the effects of various fertilizers as top-dressing: in feeding cattle, to ascertain the effects of various kinds and quantities of food on the quantity and quality of milk: and in breeding cattle, to ascertain the value in the milk-dairy of the progeny of certain pure breeds crossed with the common cow.

The following are some of the conclusions arrived at, viz.: that gypsum is of little value to corn and grass in wet seasons, but of great valne in dry; that superphosphates are of very unequal values, those of the best reputation proving of little value on the soil of this farm when applied to moderately-fertile and well-cultivated land; that strict laws are needed in the state of New York to control the sale and manufacture of commercial fertilizers; that failures in farming result not so much from poor soil as from poor culture, imperfect preparation of the soil, and stagnant water in the subsoil; that clover and cattle are the cheapest renovators of worn-out fields; that early-sown crops require the least quantity of seed, and promise the best results; that heavy land should not be deeply plowed in the spring; the best results are obtained from land plowed moderately deep in the fall, covered with manure in the winter, and replowed to half the depth in the spring.

The annual interest derived from the proceeds of the congressional land-scrip is $35,000. There have been sold during the fiscal year 17,447 acres of the land, at an average price of $4. 65per acre, and 375,000 acres remain unsold.

Professors in the College of Agriculture, 20; assistants, 12; students, 26; in the College of Mechanic Arts, professors, 11; assis-

tants, 10; students, 58; in all the departments professors, 31; assistants, 23; students, 526.

NORTH CAROLINA.

University of North Carolina. — College of Agriculture and the Mechanic Arts, at Chapel Hill; Mr. Kemp P. Battle, President. — During the year a chemical laboratory has been thoroughly fitted up for qualitative and quantitative analyses with apparatus and gas, the apparatus costing $2,000; also, a large and commodious hall for lectures on physics, with apparatus worth $2,000. As soon as means will permit, the trustees of the college will make arrangements to give students efficient and practical instruction in matters pertaining to the farm. In addition to the regular course of study in agriculture, instrnction will be given largely by lectures, not only by resident professors, but by practical farmers who have devoted time, study and attention to certain specialties. The college owns some land, which it intends to use for an experimental farm, but it has not yet been surveyed, nor brought into a proper condition for the cultivation of farm crops. A gold medal, worth $10, is offered to the scholar who, after one year's study, shall pass the most meritorious written examination in chemistry.

The university has an extensive collection of minerals, both native and foreign, to illustrate the courses of study in mineralogy and geology. The Vienna cabinet comprises 2,000 fine specimens of minerals, collected from every quarter of the globe. The large collections of ores, minerals, and fossils, made by Dr. Emmons, and given to the university by the state, has been classified and neatly arranged in a room fitted up especially for the purpose. An instructor in natural history has been employed, and some collections for a museum in this department of study have been made; also, hall has been provided for an agricultural museum, and a few agricultural implements have been deposited in it. The library contains 5,000 volumes of well selected books, especially adapted to illustrate the branches taught in the different courses of study. The students of agricultural and the mechanic arts have free access to these works in the same manner as those of the other departments. The annual interest derived from the proceeds of the congressional land-grant is now $7,500, being the interest, at 6 per cent., on the new state bonds, which amount to $125,000. The interest

on these bonds is now collected and paid over regularly to the trustees for the support of the college. The college-year is divided into two terms. The expenses of a student for room-rent, washing, board, wood, light, and books are from $93.50 to $123.50 per term; tuition free.

Professors 7; assistants, 2; students in the college, 61; in all the departments, 106.

OHIO.

Ohio Agricultural and Mechanical College, at Columbus; Edward Orton, Ph. D., President.—This college has been in operation three years, and is now in complete working order. The report of the president shows that a large amount of work has been accomplished in all the departments. Military science and tactics have been introduced as a regular branch of study and drill, and Lieut. Luigi Lomia has been detailed by the Secretary of War to take charge of the instruction in this new department. All male students, not incapacitated by bodily infirmity or exempted on the ground of conscientious scruples, are required to take part in the military drill, but are at liberty to choose for themselves whether they will pursue the course in the military science or not. Four drill exercises, of thirty-five minutes each are required weekly. The War Department has furnished the college with a full supply of arms and ordnance of the most approved patterns.

The college-farm contains 320 acres, and is valued at $200,000. Its value has been recently much increased by its being brought within the city limits. Extensive improvements have been made upon it during the year. A swamp of 60 acres has been reclaimed by under-draining, and the most of it is now dry and in good condition for cultivation. Fences have been built, one small building removed and another erected, and a supply of excellent water furnished for the stock at the barn. The total cost of these improvements was $1,690. Experiments have been made with wheat to determine the comparative value of thick and thin sowing; with oats, to ascertain which varieties were most productive; and with corn, to test the effects of different fertilizers. There were raised on the farm 1,975 bushels of corn, on 46 acres; 363 bushels of wheat, on 32 acres; and 75 tons of hay, on 57 acres; total value of all the crops, $2,122; net profit, $1,342. A part of the work was done by

students and a part by hired labor. Nine head of fat cattle were sold from the pasture for $835; 32 hogs, for $733; 14 pigs, for $42. Six of these cattle, having been bought the year before, were kept through the winter, and sold for $90 each. The stock now kept on the farm is valued at $1,812, and the farm-implements at $994.

The annual interest derived from the proceeds of the congressional land-grant is $30,000. The receipts of the college from all sources during the fiscal year were $40,539; the disbursements $38,517, of which $26,970 were paid for salaries. John H. Wright, A. B., assistant professor in the Latin and Greek languages, has resigned his professorship to enter upon an extended course of study in Europe. His place has been filled by Josiah R. Smith, A. B., graduate of Amherst College.

Professors, 10; assistant, 1; students, 140; pursuing agricultural or mechanical studies, 126.

OREGON.

Corvallis College—State Agricultural College, at Corvallis; B. R. Arnold, Ph. D. President.—The president, says that the college is in a healthy condition and well attended. During the past two years about one hundred young men have pursued agricultural studies. They have received instruction in practical agriculture, the physiology and chemistry of plants, analysis and improvement of soils, animal physiology, the economic use and preservation of farm-crops, and other branches of the agricultural course important for farmers to understand. A wing has been added to the college building, and other improvements have been made, the whole costing about $3,000. The building as now improved is of such size as to afford ample room for several years. A green-house will be built in a few months. The apparatus has been so much increased by yearly additions that it is now sufficient for illustration of all the fundamental principles of chemistry and physics. A fine collection of minerals has been added to the cabinet, for the special use of the class-room, through the kindness of A. H. Brown, secretary of state.

The experimental farm contains 35 acres, and is valued at $5,000. Experiments have been made with wheat in connection with soda, potash, lime in three forms, ashes, sulphuric acid, marl, chlorine, superphosphate of lime, urine, and ammoniated phosphate. The

conclusion was that the fertilizer last named is by far the best; it hastens the crop, and causes a much larger yield than any of the others. Analyses and tests of the "white soil," mentioned in a previous report, have been continued, and the conclusion arrived at is that if it is thoroughly drained, well plowed, and cultivated with green crops for several years, it will produce grain as well as any other. All students are required to perform a small amount of labor on the farm and to practice the military drill daily.

The annual interest from the proceeds of the congressional land-grant has not been reported. The state makes an annual appropriation of $5,000 for current expenses of conducting the college. During the fiscal year 10,000 acres of the land-grant have been sold at an average of $2.50 per acre, and 79,300 remain unsold.

Professors, 4; students in agricultural college, 51; in all departments, 147.

PENNSYLVANIA.

Pennsylvania State College, Centre County; Rev. James Calder, D. D., President.—The college has undergone some changes in its name, but its purposes as an agricultural and mechanical college remains the same. According to the latest documentary authority it was first incorporated as "The Farmers' High School of Pennsylvania," February 22: 1855; next as "The Agricultural College of Pennsylvania," May 1, 1862; lastly as "The Pennsylvania State College," July 26, 1874.

The four farms belonging to the college contain 600 acres, and are valued at $75,000, as follows: The college-farm, 300 acres, at $100 per acre, $30,000; the central experimental, 100 acres, at $100 per acre, $10,000; the eastern experimental, 100 acres, at $200 per acre, $20,000; the western experimental, 100 acres, at $150 per acre, $15,000. The work which has been done on these farms for many successive years in experimentation and with the aim of presenting model farms has been extensive, and results have been arrived at which are of high practical value to the farmers of the state. Experiments have been made during the year in acclimating seeds, testing varieties of seeds and grains, methods of cultivation, the use of manures, various rotations of crops, the culture of wheat and patatoes, soiling cattle, and culture of fruit trees.

From various experiments continued for several years the professor of agriculture has come to the conclusion that it is profitable

to feed cattle during the winter for furnishing manure; that stock, when confined to small lots or yards and soiled, do equally as well, if carefully attended, as when allowed the liberty of the fields, and can be fed on the product of one-third less land; that purple lucerne (*Medicago sativa*) is a good soiling plant on strong land, yields heavily, grows rapidly, bears cutting, and is perennial; that the old method of cutting indiscriminately the large and small potatoes for seed, not going to extremes, and of planting the seed and root ends, is practically as good as any other; that in planting apple orchards it is the most profitable to plant only two or three varieties, and these of the most marketable kinds; that surface-culture, good manuring, scraping, and washing the trees with an alkaline mixture, and a dressing of five or six pounds of muriate of potash per tree, has proved to be a very profitable of treatment. The college farm has been very much improved by clearing off old stone fences, removing worthless hedges, and planting fruit trees; and the campus, by constructing roads and filling up inequalities.

The annual interest derived from the proceeds of the congressional land-grant is now $24,420. Some small buildings have been erected and others repaired, and arrangements have been made for supplying the college with an abundance of pure spring water. About $500 have been expended for apparatus for the physical department, and $100 for increasing the library.

Professors, 12; assistant, 1; students, 161.

RHODE ISLAND.

Brown University — Agricultural and Mechanical Department, at Providence; Rev. E. G. Robinson, D. D., LL. D., President. — The course of study in the department of practical science for the degree of bachelor of philosophy has been extended from three years to four, as contemplated by the university last year. There is no prescribed course laid down in the catalogue for students in agriculture, but provision has been made in the department of practical science for selected courses of instruction in such branches of learning as are related to agriculture and the mechanic arts. Students who enter with the intention of pursuing selected studies are subject to the same conditions of admission as for the regular scientific courses; and when they have completed the studies which they have selected, they are entitled to a certifi-

cate stating the time of their connection with the university and the amount of their acquisitions. Direct instruction in agriculture appears to have been given by the professor of agricultural zoology and curator of the museum. He says that during the last half of the year a weekly course of lectures on agricultural zoology has been given to the senior class. About one-fourth of the class have also attended to taxidermy as a voluntary exercise throughout the year.

The annual interest from the original fund derived from the proceeds of the congressional land-grant is $3,000; but this fund has been allowed to accumulate by judicious management, so that the annual interest now amounts to $6,624. Very valuable additions have been made to the museum, consisting of about 100 specimens of fishes; 50 of woods native to Massachusetts; a large collection of plants, insects, and native weapons; war implements, domestic utensils, and fabrics from the interior of Africa; several species of mammals, and numerous miscellaneous specimens.

Professors in the agricultural and mechanical department, 10; assistants, 3; students, 35; professors in all the departments, 13; assistants, 3; students, 251.

SOUTH CAROLINA.

Claflin University — South Carolina Agricultural College and Mechanics' Institute, at Orangeburg; Rev. Edward Cooke, D. D., President. — The annual interest derived from the proceeds of the congressional land-grant is $11,508, but the whole amount is not always paid to the college by the State. This year it received $10,000, leaving a balance of $1,508 unpaid. Of the sum received, $4,000 were used for expenses in conducting the college, and the remainder in payment of the experimental farm. The farm contains 116 acres, and is valued at $10,000. It has been considerably improved during the year, and the facilities for students to engage in manual labor have been much increased. Experiments have been made with different kinds of manures and in plowing, to ascertain the kind best adapted to the soil and climate of that part of the State. Crops have been cultivated successfully, and 43 bushels of shelled corn were produced per acre, which is much above the usual yield in the State. A neat and commodious brick building is in course of construction on the site of the one burned a year ago, and will be completed next spring.

It will be occupied jointly by the university and college. It is 80 feet long and 40 wide, three stories high, with mansard roof, making a fourth story, and has a piazza on the front and back sides. It contains two school-rooms, three recitation-rooms, library-room, and thirteen dormitories in the mansard story; also, a chapel which will seat two hundred persons, and a family residence, with parlors, kitchen, and dining-room. Besides this building, there are several others which are used for school purposes. The collegiate year is divided into three terms of eleven weeks each. Tuition is free; care of room per term, $1; board in hall per week, $2.50; room-rent and fuel for self-boarders per term, $3. Students have an opportunity of paying their bills in part by manual labor.

Professors in the college, 3; assistants, 3; students, 40; professors in all the departments, 4; assistants, 3; students, 195.

TENNESSEE.

East Tennessee University — Tennessee Agricultural College, at Knoxville; Rev. Thomas W. Humes, S. T. D., President. — Some changes have been made during the year in the agricultural course of study, by which additional instruction is given in chemistry and botany in the freshman year, and in market-gardening and dairy-farming in the junior. A few additional branches have also been introduced into this course.

The annual interest derived from the proceeds of the congressional land-grant is $23,760, but the college has not always received the full amount, the payment having sometimes been made in State treasury warrants, on which there is a discount in the market. The college farm contains 260 acres, and is valued at $24,000. Important improvements have been made on it during the year, and experiments conducted in the cultivation of wheat with different fertilizers, with white rye received from the Department of Agriculture, and with barley. From experiments made with timothy grass it has been discovered that it cannot be relied on as a permanent crop in the locality of the college, being incapable of resisting the drought, and after two cuttings dies out. Orchard grass, on the contrary, flourishes well, and is not permanently injured by dry weather. A new barn has been erected on the farm, and apparatus for instruction in chemistry has been purchased to the amount of $300; $72 worth has also been purchased for the use of the professor of agriculture.

Professors in the agricultural college, 9; assistants, 3; students, 58; professors in all the departments, 9; assistants, 8; students, 300.

TEXAS.

Agricultural and Mechanical College of Texas, at Bryan; Thomas S. Gathright, A. M., President. — The college was inaugurated and opened for the reception of students October 4, 1876. It is beautifully located, in a healthy section, four miles from Bryan, on the Houston and Texas Central Railroad, and is easily accessible from all parts of the state. The college building, of which an engraving is here presented, is claimed to be equal to the best in the country. It is 153 feet long, 60 wide, four stories high, and is built of brick, except the foundation, which is stone. The window and door sills and caps are made of Texas granite. On each floor, except the fourth, it contains three halls, running the entire length of the building. The two set apart for literary societies will each accommodate 400 persons. On the fourth floor are a chapel, 60 feet square, six lecture-rooms, library, president's office, cadets' room, armory, and guard-room. The remaining rooms are for students' dormitories. The inside of the building is finished with native cypress in the highest style of architecture, varnished to show the texture of the wood to the best advantage. Besides the college building, there is another called the "students' hall," four stories high, and built of the same materials as the main building, but not so elaborately finished. Also four brick cottages for professors' residences, and a nice barn. The cost of the college building was $100,000; of the students' hall, $32,000; and of the smaller buildings, $20,000. The state appropriated the liberal sum of $187,000 for the erection of these buildings and the purchase of the farm. None of the fund granted by congress has been used.

There are five courses of study in the college: (1) Preparatory and general; (2) in agriculture; (3) in mechanics and engineering; (4) in languages and literature; (5) in military tactics. The first-named course occupies three years. It is designed to afford the student a good education for the practical duties of life, or to prepare him for entering upon any special course he may choose. Each of the special courses occupies two years. The general course includes rhetorical reading, declamation, English grammar, compos - tion, higher arithmetic, geography, history, drawing, algebra, geom-

etry, trigonometry, physics, chemistry, geology, plain and topographical surveying, zoölogy, animal and vegetable physiology, elements of agriculture, French, Spanish, German, Latin, Greek, and military tactics. Modern languages may be substituted for Latin and Greek, if desired. The course in agriculture includes analytical geometry, conics, calculus, physics, astronomy, chemistry, structure and physiology of plants, water, the atmosphere, soils in their relation to vegetable products, improvement of the soil by chemical and mechanical means; history, care, breeding, diseases, food digestion, respiration, assimilation, and excretions of domestic animals; milk, butter, cheese, flesh, and wool as agricultural products; development and present condition of agriculture as an art, its principles, economic requirements of vegetable growth, soils and theory of manures, plowing, physical manipulations of land, implements and machinery; drainage, construction, and arrangement of farm buildings; care of grass and pasture lands, rotation of crops, use of artificial fertilizers, designs for farm machinery, meteorology, farm and road surveying, water-courses for irrigation and draining, book-keeping, free-hand drawing and sketching, strength of materials, practical hydraulics and pneumatics, mineralogy, geology, zoölogy, insects injurious and beneficial to agriculture; care and marketing of crops; orchard and vine culture; Latin, French or German, and military tactics.

It is prescribed, "as a permanent rule of this college, that no applicant for admission as a student shall be received unless of the white race." Provision is made for educating, free of tuition, "state students," as follows: Two to be appointed from the state by the United States senators, one from each congressional district by the member representing it, and three from each state senatorial district. In the latter case, the choice is to be determined by a competitive examination under the direction of the district senator. Tuition for other than state students is $50 per annum. The estimated expenses of a state student for a year of nine months, including matriculation-fee, board, washing, fuel, lights, two suits of clothing, and medical attendance, are $200; of other students, $250.

Special care is taken to give thorough instruction in military tactics, including, besides the general drill, guard duty and outpost picket service. To aid in teaching this branch in the best manner,

the state has provided the students with complete sets of breech-loading cadet rifles, swords, and accouterments.

In August of the present year an act was passed by the legislature to establish another agricultural and mechanical college for the education of colored youth of the state, and the college will be organized and put in operation at the earliest day practicable.

The annual income from the proceeds of the congressional land-scrip is $10,962 in gold, which, in the present currency, is equal to about $12,000. The land appropriated by the state to the college, and on which the college buildings are located, embraces 2,200 acres, a part of which is used for an experimental farm, and the remainder is unimproved. The entire tract is valued at $20,000. Liberal appropriations have been made for chemical and philosophical apparatus, and it is intended to purchase such as will be equal in quality to the best used in the agricultural colleges of the other states.

Professors, 6; students, 50. Sufficient time has not been given for the organization of classes in the agricultural course of study.

VERMONT.

University of Vermont and State Agricultural College, at Burlington; Matthew H. Buckham, A. M., President.—The college has not yet entered into the work of conducting an experimental farm, although it has land in ample quantity for experimental purposes, and would gladly use it for a farm if the funds could be procured to provide the necessary equipments and a professor of agriculture to superintend it. The annual interest derived from the proceeds of the congressional land-grant is $8,130. Professors in the agricultural college, 7; assistant, 1; students, 23; professors in all the departments, 22; assistants, 3; students, 168; 14 of whom were ladies; lady graduates, 5. The following statement has been received from the president:

An attempt to establish a separate institution out of the proceeds of the congressional land-grant having failed for want of sufficient additional endowment, the legislature, in 1865, offered the fund to the State University on the condition that it should accept a new charter conforming it to the requirements of the act of Congress establishing colleges of agriculture and the mechanic arts. The institution thus chartered is the "University of Vermont and State Agricultural College," having one board of trustees, one treasury,

one faculty, but several departments. The state has as yet done nothingt o increase the resources of the institntion. On accepting its new trust, the university raised a subscription of $80,000, mainly among its alumni and old friends, to enable it to meet its new responsibilities. Three new departments were created, that of general and agricultural chemistry, that of civil engineering, and that of modern languages.

Besides these, the department of natural history was modified and enlarged so as to give greater scope to the studies bearing directly on agriculture, such as mineralogy, botany, physiology, aud zoology. This institution does not manage a farm, but it has land ample for experimental purposes if funds should be supplied therefor. About 100 students are in attendance, the numbers in the scientific departments being from one-quarter to one-third the total number. By the statistics furnished for the report of the congressional committee in 1874, it appears that of those who have been members of the institution for a longer or shorter time since 1865, a large number have entered into the various industrial pursuits by which the resources of the country are developed, and that thus the college is fulfilling the designs of its founders by sending well-trained men into the great industries of the nation. In addition to the work of the institution in its new ground, it has done considerable missionary work through the state by sending its professors to farmers' meetings, teachers' associations, and other general gatherings. During the past winter, Professor Cressy, late of the Massachusetts Agricultural College, was employed by the university to lecture in every county in the state on the diseases of animals, and to give a consecutive course on veterinary medicine and surgery in Burlington. These lectures were provided in the hope that in this way the attention of young farmers might be drawn to the college, and that they might be induced to pursue other branches of study bearing on agriculture. Finding that these lectures through the state awakened a great interest on the subject, the college had the lecture in Burlington reported, and a large edition of the reports in pamphlet form distributed gratuitously among the farmers and stock-raisers of the State.

From the beginning the institution has had to encounter opposition from those whose ideas of an agricultural college is a mere manual-labor school for apprentices to farm-work. The aim of the institution has been to provide, first, for instruction in those sciences — those "branches of learning" which relate to agriculture and the mechanic arts; to equip laboratories, to furnish museums, to secure apparatus, to gather all the appliances for imparting scientific and practical instruction, and to add, as fast as funds could be got, the means of exemplifying such instruction in farm, stock, machinery, &c.

VIRGINIA.

Virginia Agricultural and Mechanical College, at Blacksburg; Charles L. C. Minor, LL. D., President. — One of the two

college buildings, referred to in our report of last year as being in course of construction, is now completed and occupied. It is used for lecture and recitation rooms, laboratories, etc. The other, which is of the same size and finish and designed for similar purposes, will be completed and ready for occupacy early in the spring of 1877. The two dwelling-houses, begun last year and intended for professors' residences, are also completed and occupied. They are neatly finished and of excellent quality. So great has been the increase of students since the opening of the college in 1872, that the number is now doubled, and no more can be received in future until the resources of the college are augumented. The machine-shop which was completed two yeras ago, has been enlarged and furnished with additional machinery and tools. A grist-mill has been erected adjoining it, and is driven by the same engine as the machinery of the shop. The addition to the shop, the mill, and a brick kitchen were all built by the students, except the mason-work. They have alto set up a line of telegraph, connecting the college with the Western Union Telegraph line, and thus furnished for themselves a practical school for learning the art of telegraphy. They have removed two houses, and remodeled three messing and lodging houses. By employing the messing system, they have sometimes reduced the price of board to $6.50 per month. Board with lodging can be had for $10 per month, and never exceeds $15. Many students pay a large part of their expenses by their work, and some who have skill in trades, have been able to cancel the whole.

The college-farm contains 250 acres, and is valued at $28,000. Important additions have been made to the stock kept on the farm. Daily instruction is given in practical agriculture to details of students during the crop-season, and in mechanics throughout the collegiate year. The school of drawing, including free-hand drawing, has been attended with great efficiency and success. The course of instruction in the college is confined strictly to what is believed to be best for fitting young men for success as farmers and mechanics. The annual interest derived from the two-thirds ($190,000) of the proceeds of the congressional land-scrip received by this college is $20,638.72, which is nearly 11 per cent. on the $190,000 invested in Virginia State bonds. The bonds were purchased at a little more than 50 cents on the dollar, and interest is paid on their full amount.

Professors, 7; assistants, 3; students, 255, all of whom pursued agricultural or mechanical studies; graduates, 27, 22 being graduates in agriculture, and 5 in both agriculture and mechanic arts.

Hampton Normal and Agricultural Institute, at Hampton; General Samuel C. Armstrong, President. — The receipts of the institute for the fiscal year of 1876, were $67,444.94. Of this sum, $39,235.74 were derived principally from private donations made by benevolent persons in the several states. The disbursements were $67,332.41, leaving a balance of $112.53 in the hands of the treasurer. The indebtedness of the institute is only about $4,000.

During the year a new Hoadley agricultural steam-engine, of nine horse-power, has been purchased for $1,200, and the small three horse-power Baxter engine used last year, has been transferred to the printing office, where it is used with profit. The earnings of the agricultural engine, for work done in threshing for farmers unconnected with the institute, have amounted to $200. In addition to this, a steam digester for steaming bone has been bought for $154, and a buhr-stone mill for grinding corn for stock and steamed bones into flour of bone for manure. Also a Hunneman hand fire-engine, with 700 feet of hose, for $1,200, to be used in protecting the institute buildings. A fire company has been formed by the students, who have been drilled and are capable of performing efficient duty in case of fire. The grounds have been graded and improved by filling up a malarious marsh in the vicinity of the institute buildings, an ornamental pond being left in the centre, which adds much to the beauty of the landscape and serves for a reservoir from which water can be taken in case of fire and thrown upon five adjacent buildings. Hundreds of shade trees have been set out, taken from the farm nursury, which was planted five years ago. More than 2,000 small ornamental trees have been added to the nursury stock, for sale and for use in increasing the beauty and value of the premises. A substantial brick engine house has been built and a corridor finished off in the upper story of Virginia Hall, making ten dormitories for girls. A cooper shop has also been put into operation for the manufacture of market barrels. The work has been done by two students, and proved profitable. Two hundred and twenty-four thousand bricks have been manufactured and sold at a profit of $1,246. Three-fourths of the students pay their own board bills, $10 per month, half in cash and

half in labor. About $7,000 are paid annually for students' labor in all the industries pursued. Mr. F. Marquand, of New York City, gave, in June last, $5,000 for the erection of a building for a home for male students. It is now completed, and called Marquand College. It affords comfortable and excellent rooms for thirty-eight young men. The furniture will be made by the students in the normal-school workshop.

Sixty-nine girls have worked in the industrial room during the year, and about 1,200 pieces of work have been finished, and 200 mended by them each week, besides making dresses and other garments for themselves in time not devoted to required labor. Sewing machines are used by the more advanced pupils. Those in the middle and senior classes receive weekly instructions in housekeeping, bread-making, and plain cooking, eight being detailed every Saturday to the different housekeepers on the premises, who teach them in these useful arts. Last winter about $4,000 colored children were under the instruction of teachers who have graduated at this institution. A teachers' institute has been held for the benefit of the graduating class and such post-graduates as might desire to attend. Twenty post-graduates and more than forty of the graduating class availed themselves of the advantages of its exercises.

The farm contains 190 acres, and is valued at $33,000. During the year 40 acres of corn have been cultivated, 25 of oats, 1 of rye, 12 of clover, 7 of early potatoes, 8 of sweet potatoes, 9 of corn-fodder, 3 of sorghum, 3 of pease, 2½ of cabbages, 2 of onions, 4 of asparagus, 2 of roots, 1 of snap-beans, 4½ of vegetables and strawberries, and 4 of broom-corn. The stock on the farm consists of 9 horses and mules, 5 colts, 18 cows, 4 oxen, 16 yearlings and calves, 1 thoroughbred Ayreshire bull, 50 hogs, and 20 sheep. Seventy head of cattle and horses were wintered on the farm the past season. The care of this stock furnished labor for students, and a large amount of manure is made for the farm. Cash received from sales of beef amounted to $3,840. The income of the farm exceeded the expenditures by $833.43, while the knowledge acquired by the students in its cultivation is incalculable.

The annual interest on the one-third ($95,000), of the proceeds of the congressional land-grant received by this institution is $10,319.36, being nearly 11 per cent. on the sum invested. About

$200 more are received from a small private endowment-fund. In addition to the income derived from these sources, $17,000 are required annually to pay the expenses of conducting the institute. The money thus far has been derived from private contributions, principally in the Northern States.

Teachers, 17; assistants, 3; students, 256; pursuing agricultural or mechanical studies, 99.

WEST VIRGINIA.

West Virginia University — Agricultural Department, at Morgantown; Rev. J. W. Scott, D. D., LL. D., Acting President. — A permanent president of the university has not yet been elected, but it is expected that one will be soon. The central portion of University Hall, or the Agricultural College, has been completed during the year. It is claimed there is no better finished public building in the State. The wings will be erected as soon as means will permit. The following is the plan of the entire building when completed: Length, including the wings, 150 feet; breadth of the main central section, 104 feet; of each of the wings, 65 feet; heighth of basement, 11 feet; of first floor, 17½ feet; of second floor, 15½ feet; of mansard story, 20 feet; of the main tower from basement, 101 feet. There are four rooms each on the basement and second and third floors, measuring 23½ by 35 feet each. They are for laboratory and lecture rooms. In the the mansard story is the commencement hall, 55 by 78 feet. The basement walls are made of light sandstone, of uniform color and texture; the other walls, of pressed brick, laid in white mortar; window-sills, corbels, and keystones, of light sandstone; finials and belts on pilasters of entrances, etc., cut stone; belt-course on both towers, composed of *fascia*, and water-table, of cut stone. The inside is elegantly finished with chestnut. Estimated cost of the entire building when completed, $75,000. A new building, called University Boarding-hall, has been erected by private enterprise in close proximity to the university, designed to supply a want which the regents had been unable to meet. It is heated by furnaces, has a plentiful supply of soft water, and is furnished with modern appliances for thorough ventilation and conveniences for outdoor exercise. Board, including everything except washing and lights, is furnished to students for $3.75 per week.

The annual interest on the proceeds derived from the congressional land-grant is $5,400. The State has made at different times two appropriations of $10,000 each to the university for a permanent fund, the interest of which is shared in common by the different departments. It amounts to $1,200 annually. These incomes and the tuition received from the students are not, however sufficient to pay the annual expenses of conducting the institution, but the deficiency has been generously supplied by the State, so that there is no incumbrance of debt. An effort has been made to induce students to pursue the agricultural course of study, but not with the success desired. Quite a number, however, pursue studies relating to agriculture and the mechanic arts. It is expected that this embarrassment will be corrected when the college becomes older and the importance of an agricultural education is more highly appreciated. The university has no farm. The campus contains 25 acres, but is not used for agricultural purposes.

Professors in the university, 8; assistants, 5; students, 96; professors in the agricultural department, devoting a part of their time, 5; students, 2.

PROF. SYMMES ON THE OPEN POLAR SEA—HE CONTRASTS HIS FATHER'S WITH THE NEWTONIAN THEORY.

As I am making an effort to have the "Symmes Theory" thoroughly tested by the Howgate Exploring Expedition, and so few persons understand what that theory is, I will undertake to state what it is, and show the difference between it and the Newtonian theory. According to the Newtonian, it is one vast solitude of eternal ice, clear up to the 90th° of north latitude. According to the Symmes theory (that is, my father's, Capt. John Cleve Symmes), the explorer will find that, after he passes the 80th °, the weather grows milder; when he reaches the 81st ° he will find some open water; when the 82d ° is reached he will find much open water and great quantities of wild animals, and some water fowls; when the 83rd ° is reached, he will find the open Polar Sea, that is 2000 miles in diameter, and, if he will go out into that sea when the weather is warm and genial, he will find the country that the Symmes theory

says can be found, of large forests of timber, large rivers; and rich land, and the home of more wild animals than can be found anywhere else in creation, and water fowls in abundance.

Now sir, I propose to give the experience of many explorers in the north, and if they don't prove that there is more truth in the Symmes theory than in the Newtonian, then the world may say, as they said of my father during his life, that his theory is "reared upon the baseless fabric of a vision."

I will briefly state the experience of Capt. Parry, who made five voyages up there, and after the experience he had I do not think any man can doubt for a moment which theory has the most truth in it. Parry knew nothing of the Symmes theory, nor did any of the explorers I will mention.

You will bear in mind that all the explores start to go to the North Pole, and expect to get there *on ice*. When Capt. Parry made his third voyage he was provided with reindeer and sleds so that he could travel speedily over the ice to the Pole. He could not get his deer beyond the eighty-first degree for the much *open water* he encountered; but he went on, making his men propel his sleds (which were small boats on sled-runners,) and when he came to open water he used the little boats to ferry from one cake of ice to the next, and the further north he got the more water he found, and the milder grew the weather. When he got up to the 82d° he found the ice only four feet thick, and his only safety in a storm was in pulling his boats or sleds upon a cake of ice, and thus outride the storm, and he began to feel some alarm but he went on, and when he got up to 82½° he found the ice only three feet thick, but he encouraged his men to *go on north*, as he thought the ice would certainly get stronger; but when he got up to 82¾° he could not find a cake of ice that would bear his own weight, and the sun so hot as to melt the tar out of the seams of his boats, and small flies came on board, and all open water north of him, so he had to turn back, and came safely home. How does that agree with the Symmes theory?

Capt. Ross, who made two voyages up there, says: "I stood on the bank of the open sea when it was calm and clear of ice, and experienced warm winds coming directly from the north, that melted, the snow and ice about him and far south of him." How is that for the Symmes theory?

Dr. Kane's men found open water when up to the eighty-second degree, and "climbed a mountain 500 feet high, and gazed out on a great waste of waters and not a speck of ice to be seen, and a wind coming directly from the north blew a gale part of the time for three days, and came so warm as to melt snow and ice far south of them.

"They found water-fowls in abuudance, and their nests so plenty on the mountain-side that they could have gathered a wagon-load of eggs." They saw extensive grass plains, and gathered many kinds of flowers.

Capt. Hill went into winter quarters with his vessel at 80° 38' and from thence took a sled-ride directly north, and did not go but fifty miles before he came to an *open sea*, and encamped on the bank of it and spent two days, and while there, wrote his last dispatch to the secretary of the navy, in which he says: "I find this a much warmer country than I expected, and it abounds with life — seal, game, geese, ducks, musk cattle, wolves, foxes, deer, bear, rabbits, partridges, teeming with snipe and plover, and all kinds of wading birds." Does not all this go to prove that there is more truth in the Symmes theory than the Newtonian? Yet who knows anything about the Symmes theory, that has been lying dormant as it were since the death of its author in 1829? He petitioned Congress in 1822 and 1823 to fit out an exploring expedition for him, and in his petition said: "I will go as far north as I can get with the vessel and then go on shore and go north by land, and will follow in the wake of the wild animals that go north *in the fall* from Greenland and return back there in the spring fat and leading their young, and where they go I can follow and they will show me the way to the *new world* that I say can be found, that I intend to call Symmzonia."

Congress thought this theory "wild and visionary," and laid his petition on the table; but now they will fit out Capt. Howgate, at an expense of $50,000 to do the *very same thing* that Capt. Symmes proposed fifty years ago. Howgate is to land his men as near the eighty-first degree as he can, and then go by land in search of the North Pole; but instead of reaching the pole he will find his way into Symmes' Hole, or all of the experience of explorers will amount to nothing. There are 1,131,000 *square miles* of this world laying in the north yet undiscovered, and I want to accompany the How-

gate expedition so that there will be no turning back when it is found that the Newtonian theory will *not carry the exploring party on ice* to the North Pole, but into "Symmes' Hole," where the climate is warm and genial, and where the big trees and the vegetables and flowers grow that come floating down from the north and lodge on the northern coast of Spitzbergen and Norway. All explorers in the extreme north will tell you that such is the fact. Where do they come from? Certainly there is no country laid down in the Newtonian theory from whence they could come.

FISH CULTURE.

By P. R. HOY, M. D., Racine.

It is of the first importance to assertain the nature of the water which we desire to stock with fish, its depth, temperature and chemical character; also the nature of the bottom, and of the shore, how supplied, and what becomes of the surplus water; what species of fish, crustacea, mollusks, annelida, and insect larvæ are found in the water and in the mud of the bottom; what aquatic plants are found growing in the water, and on the margin of the lake, pond or stream. An intelligent answer to these several interrogatives would furnish data, that will enable us to escape the danger of certain failure. For it is evident to the most careless, that these conditions should agree with the instincts, habits, and way of life of the animals to be developed there. The neglect to observe, or properly appreciate these natural conditions has, in many instances, been the cause of total failure of fish culture, even when in other respects, the men have been skillful pisciculturists. All our lakes should be surveyed in the most careful manner, under the supervision of men fitted for such investigations. The paper prepared by the lamented Dr. Lapham, on Lake Oconomowoc, is a model in almost all points. It only remains for us to dredge the bottom in order to secure the lower forms of life, to ascertain their species and abundance, so that in all future time it can be known to a scientific certainty what valuable species of fish will thrive in its waters.

What species of fish are best to cultivate in order to stock our

hundreds of small inland lakes? This is a question of great moment, and one that should be answered with caution in any given case. I will however in a general way state a few of the species that will be suitable for many of these charming sheets of water.

White-fish. — The genus Coregonus includes the true white-fish of the great lakes. They may be known by their blunt nose and short underjaw. These fish are, undoubtedly, superior as an article of diet to any other fresh-water fish. They feed on small crustacea and occasionally on the larvæ of insects. Whether this fish will thrive in any of these smaller lakes is still doubtful. However, it is worth the trial surely. The genus Argyrosomus includes those smaller species of whitefish, having a sharp nose and projecting underjaw. There are at least four species known, three of them are found only in the largest lakes. The fourth, the Sisco, inhabits several of the smaller lakes. There is at least one species, the Lake-herring, *a cluperiformis*, that can be transferred to all those lakes where the Sisco is now found. All of these small whitefish take the baited hook at certain seasons of the year. The other two species inhabit the profound depths of Lake Michigan and Superior, and will not flourish if taken from these waters. The Salmon trout — *Salmo namaycush* is one of the largest and best of the fresh water salmon; a species that is one of the easiest to propagate artificially, the egg being large and hardy. We have many lakes, undoubtedly, where this great gamefish would multiply and be at home. Why should we be running after strange gods, when we have such a treasure at home? At Racine and Milwaukee the egg can be procured in any numbers desired.

The so-called brook-trout (*Salmo fontinalis*) are just the thing for ponds supplied by free flowing springs of pure cold water. For this purpose they have no equal, but it is probable that it would be hardly expedient to use this species for stocking public waters. There is a species of salmon that has lost the instincts of its distant relation, the *Salmo salor*, so that it has no longer a desire to visit the ocean. The "land-locked salmon" (*Salmo sebago*) is not quite one half as large as the salmon trout, but is an excellent game fish; one that will thrive in a number of the lakes. We have quite a number now in the state of Wisconsin, and hope soon to be able to stock some of the lakes with this fish. The black bass (*Micropterus nigricans and M. Salmoides*), are excellent fish, but difficult to

propagate in consequence of their eggs having a mucous coat that causes them to adhere in packets. There is an interesting paper published in the U. S. Fish Commissioners Report, for 1872 and 1873, on page 567, by Rudolph Hessel, of Germany, "On methods of treating adhesive eggs of certain fishes on artificial propagation." Hessel, it is hoped, had struck the right method, and we hope that in a short time we shall be able to propagate bass, and especially the European Carp (*Cyprinus carpio and other species*), which deposits her eggs on the underside of submerged aquatic plants, only an inch or two under the surface of the water. The Carp is extremely tenacious of life, but flourishes in shallow lakes with muddy bottom and partly filled with vegetation. We have numerous lakes of this description where the bass will not thrive, but where all the conditions are favorable for the healthy development of the Carp. I look with great hope in that direction. Prof. Baird will secure abundance of Carp spawn as soon as it is proven that we can manage them artificially. When you can go with hook and line and bag ten pound specimens of that most desirable fish, the carp, then you will feel like thanking the men who have so persistently persevered in investigating every condition that can secure benefits so great. These waters that now produce so slendar a supply of ordinary fish, then will teem with the best; such as but few men can now afford to eat.

UNITED STATES SOVEREIGNTY — WHENCE DERIVED, AND WHERE VESTED.

By W. F. ALLEN, A. M.

Professor of History and Latin in the University of Wisconsin.

The late war brought to an end the long and fierce controversy as to the nature of the Federal Union. What argument had not been able to decide, was decided by arms; and the United States are recognized as a nation, possessed of sovereignty. With the determination of this controversy, however, another question has come into prominence, as to the origin of this sovereignty. Before the war it was commonly held that the act which severed the colonies from the mother country had as its effect the creation of

thirteen independent and sovereign atates; and that it was not until the formation of the federal constitution that sovereignty was conferred upon the central government. This doctrine, however, of the original sovereignty of the states, has been thought to afford some foundation for the doctrine of secession. Some of the most ardent advocates, therefore, of the national and sovereign character of our union, have, since the war, brought into great prominence the theory that the nation was not created by the states, but the states by the nation; that the states were never, in any true sense of the term, sovereign, but that the act of independence created at once a sovereign nation. This view has been most fully elaborated in a series of articles in the first volume (1865) of the *Nation*, by Hon. Geo. P. Marsh, United States minister to Italy; it is presented also by Professor Pomeroy in his Introduction to Constitutional Law." In this work the authority of Hamilton, Jay, Marshall, Story and Webster is claimed for this theory. I do not think, however, that Marshall and Webster can fairly be cited as its adherents. Mr. Pomeroy has given no citations in support of his view, and on the other hand both these jurists have expressed themselves unequivocally in favor of the original sovereignty of the states. Webster says of the Confederation: "It was a league, and nothing but a league." Chief Justice Marshall's language is: "It has been said, that they (the states under the Confederation) were sovereign, were completely independent, and were connected with each other only by a league. This is true."

Admitting, therefore, that the one theory has in its behalf the authority of Jay, Hamilton, Story and Kent, the other has the equally high authority of Marshall, Madison and Webster. We may, therefore, where authorities disagree, proceed to examine the arguments with perfect freedom from bias. The question is eminently an historical one — that is, a question of facts, not of theory. Sovereignty being the supreme power to command it is simply a question of fact what organization was found in possession of this power, when it ceased to be exercised by Great Britain.

It requires no argument to show that before the revolution the colonies were absolutely dependent upon Great Britain; whatever powers of government they severally possessed was in virtue purely of sufferance or explicit grant, on the part of the mother country. It is equally clear that the colonies were connected with one an-

other by no organic bond. There was no government of the united colonies; each colony had its own government; and if sometimes, for the convenience of administration, two or more colonies were united under the same royal governor, this was simply an administrative union—one official managing two independent governments at a time, not a single government resulting from the fusion or union of two individual ones. There were thirteen organized communities, standing in a condition of coequal dependence upon the government of Great Britain. This tie of dependence was severed by the Declaration of Independence, July 4th, 1776, sustained, as this act was, by armed force.

Two points fall here under consideration: first, the power which severed the tie; second, the logical effects of the act of severance.

First, the power that performed the act of severance was the Continental Congress. But by what authority, and in virtue of what delegation of power did the Continental Congress act? Was the Congress the organ of the several states, or of the "people at large" (to use Mr. Marsh's expression). To answer this question, which rests at the bottom of the argument, we must trace briefly the history of this congress.

In the year 1764, upon motion of James Otis, the general court of Massachusetts passed a resolution proposing to the other colonies to form a union for the purpose of resisting the acts of the British government. This proposition was accepted, first by Virginia, then by the other colonies. The congress met the next year (1765), and shortly afterward, as a result of the spirit thus manifested, the stamp act was repealed. The Second Continental Congress met in 1774, called in a precisely similar manner. In both cases the members of the congress were elected by the several colonies, and in both cases it was only a portion of the colonies — nine the first time, twelve the second — that were represented. Now so long as Georgia staid away, it is clear that not "the people at large of the United States," but only the people of twelve colonies, were engaged in formal acts of resistance. In the assembly thus composed of delegates from the several colonies, the colonies voted *as such;* no measure was adopted by a majority of votes, as would have been the case if they had been considered to represent the people at large; a majority of the *colonies* must always decide. It was by colonies that the Declaration of Independence was passed,

and in this document the several colonies are declared to be "free and independent states."

Let us pause a moment upon this word "state," which thus makes its appearance in our political vocabulary. The great convenience of having a different term to denote the units which compose our federal government from that which designates the federal government itself, has established in American constitutional law a fundamental difference in the meaning of the respective terms. By *state* we understand a political organization inferior to the *nation*. But this distinction is peculiar to American public law. The two terms are originally identical in meaning, or rather in application; being applied indifferently to the same object, but from different points of view. A state is, in public law, a nation, regarded from the point of view of its organization; a nation is a state, regarded from the point of view of its individuality. We must not, therefore, suppose that when the colonies, in 1776, declared themselves to be free and independent states, they attributed to the word state the same inferiority which we now associate with the word. They understood by it, a sovereign political organization. That they selected this term, rather than nation, is no doubt partly due to its expressing more distinctly the idea of organization; partly, I am ready to admit, to the feeling that *nation* was a larger term, and that a higher organization, which should embrace all these individuals in one whole, was destined to result. Nay, we meet the term nation very early, as applied to the united body.

That the congress considered itself as acting as the organ of the colonies or states, and not of the people at large, appears manifest from the language habitually used. On the tenth of May, 1776, congress resolved to "recommend" to the "respective assemblies and conventions of the united colonies," to form permanent governments. August 21, of the same year, it made use of the expression: "All persons not members of, nor owing allegiance to any of the United States of America," — showing that allegiance was regarded as due to the several states. Its constant title for itself was "the United States in congress assembled" — a term which plainly recognizes that the United States, as an organized body, has no existence except in the congress, which congress, as we have seen, acted purely as the organ of the several states.

I pass now to the nature and effect of the act of severance. This

act was in the first place purely negative in its intrinsic character. It simply put an end to a certain previously existing relation — that by which the colonies individually depended upon the British sovereignty. The relations of the several colonies to one another could not be affected by it. If before the act they formed a united, organized body, this united body, in virtue of the act of independence, succeeded to the sovereignty surrendered by the mother country; if they were individual and disconnected before, they remained so after the act, and each individual passed into the full enjoyment of sovereignty.

Now I have shown first, that before the revolution the colonies had no organic connection with one another, but only with the mother country; second, that the union which they formed for purposes of resistence professed to be nothing but a voluntary, incomplete and temporary association, with only limited and temporary aims, possessing none of the essentials of a permanent government, capable, it is true, of developing into a complete sovereignty, but in all its acts and words appearing as not itself an organic body, but the representative of certain organic bodies. "The United States in congress assembled," made no claim to individual or independent existence, but acted avowedly as a mere intermediary or instrument of joint action for organisms which did possess individual existence. And this practical independence accrued to the several colonies simply from the fact that, upon the severance of the tie which connected them severally to the mother country, each was left standing legally alone; and, standing alone having no legal superior, but possessing a complete and adequate organization of its own, each colony passed into the undisputed enjoyment of sovereignty.

Neither before nor after the commencement of the revolution, therefore, did there exist any united organic body which could supersede the several colonies, and assert a claim to the lapsed sovereignty of Great Britain. And if this is true for the period of inchoate nationality which intervened between the first acts of resistance and the practical establishment of independence, still more is it true for the ensuing period of the confederation. It needs no argument to show that the states were at this time recognized as fully and exclusively sovereign; its Articles explicitly provide "that each state retains its sovereignty and power which is not

by this confederation expressly delegated to "the United States in congress assembled." All that can be said in opposition to this view is that this was a "palpable usurpation," set on foot during this "embryonic or inchoate period; and their arguments plainly imply that they understand the Articles of Confederation to represent a different phase of national life from the Declaration of Independence, and as requiriug therefore to be construed from a different point of view; they were adopted by congress sixteen months later than the other act (Nov. 15, 1777), and in this period of time, it is hinted, the "flow of enthusiasm," under which the united act of independence had been accomplished, "receded," and selfish and local prejudices took its place. Now, if the Articles of Confederation were really drawn up a year and a half after the Declaration of Independence, this reasoning would have much weight. But the date here given is only that of the *adoption* of the articles by congress. They were reported to congress July 12, 1776, just a week after the Declaration — the preliminary steps, indeed, were taken in June, before the passage of the act of independence. It is therefore perfectly legitimate to interpret the act of independence in the light of the government which was established after it. The two acts were to all intents and purposes parts of one and the same act. In the very act of declaring their independence, the states formed themselves into a federal union; and in this union the several states were explicitly declared to be independent and sovereign; from which it necessarily follows that the union thus formed, was, in Webster's words, "a league and nothing but a league."

It will be seen that the whole controversy turns upon the period between the suspension of the royal authority and the establishment of the confederation. While the royal authority continued to be recognized, sovereignty of course belonged to Great Britain; after the establishment of the confederation, it as manifestly belonged to the several states. Was there an interval during which it was possessed by the United Colonies? Mr. Marsh says: "it was not for a moment imagined that the sovereignty was in the interim lodged anywhere except in the whole people of the United Colonies." But he brings no facts to prove this assertion.

At the beginning of this discussion it was remarked that the

question was essentially an historical one, and must find its decision in historical facts — that is, in the series of events by which the sovereignty was transferred from Great Britain to the United States; and I think I have shown that, as a matter of fact, this transfer was not made at one stroke, but that the sovereignty was actually possessed for a while by the several states, before it was transferred by a deliberate act to the nation. There remain, however, some theoretical objections to this view, which it will be necessary to consider.

Mr. Pomeroy states these theoretical objections in the following strong terms: "Grant that in the beginning the several states were, in any true sense, independent sovereignties, and I see no escape from the extreme positions reached by Mr. Calhoun." No arguments are presented in support of this startling assertion, except the doctrine that among the attributes of sovereignty, "the one which underlies all others, and is, in fact, necessarily implied in the very conception of separate nationality, is that of supreme continued self-existence. This inherent right can only be destroyed by overwhelming opposing force; it cannot be permanently parted with by any constitution, treaty, league, or bargain, which shall forever completely resign or essentially limit their sovereignty, and restrain the people from asserting it." There is no attempt made to prove this doctrine; it rests simply upon Mr. Pomeroy's assertion, backed by references to the works of half a dozen European publicists. According to this doctrine, Texas was never annexed; if the United States had conquered her, and forced her into the Union, her status would have been a legal one; but as she came in voluntarily, surrendered her sovereignity and individual existence, the act was null and void. According to this doctrine, the act of union by which, in 1706, England and Scotland surrendered their individual sovereignty, and united into the new sovereignty of Great Britain, was an impossible act; and Scotland might now, if she chose, re-establish her Parliament at Edinburgh, and crown a Presbyterian King at Scone. Again; on this theory, what are we to do with Rhode Island and North Carolina in the interval between the establishment of the Federal Government, and their accession to it? They were certainly not members of the new Union; which made no claim to extend its power over them. The Confederation of which they had been members, no longer existed. There is but

one answer to this question. They were independent, sovereign States, as independent and as sovereign as Costa Rica, or San Marino, or the Free City of Hamburg.

In arguing for the original sovereignty of the states, I would not be understood to advocate the modern doctrine of State Rights. I hold with Marshall, Webster and Story, with Mr. Marsh and Mr. Pomeroy, that the United States form a nation, and possess full powers of soveregnty. But I hold that this sovereignty was formally and voluntarily conferred upon them by the states in the act of forming the Federal Constitution. The doctrine advanced by Mr. Pomeroy as to the relation of the States to the United States, which is essentially that of Mr. Austin, I fully accept. "The people of the United States, as a nation, is the ultimate source of all power, both that conferred upon the General Government, that conferred upon each state as a separate political society, and that retained by themselves." Only, by "ultimate source" I do not understand historical filiation, but legal authority, under the constitution; the states — meaning by that the people of the several states — formed themselves, by this act, "into the People of the United States;" and this sovereign people, as organized in states, exercises its sovereign powers by the two-fold instrumentality of the National Government and the States' Governments, distributing these powers between these two instrumentalities as seems most expedient. Thus the states are as much sovereign as the Nation; but in truth, neither is sovereign, but each is an organization for the exercise of a certain definite portion of the powers of government. The sovereignty is not divided between states and nation, because sovereignty is indivisible and absolute; but the functions of government, in which consists the exercise of the powers of sovereignty, can be divided, and are divided between these two organizations.

INDUSTRIAL EDUCATION.

By F. M. HOLLAND, Baraboo.

This is a topic peculiarly appropriate here, in an association which is the pinnacle of the State temple of public instruction.

Our public school system is enlarging its field of force so rapidly, that it is well to enquire if the improvement in quality keeps pace with that in quanity.

We shall probably soon imitate the example of the states that have established compulsory, or as it might better be called, guarantied education, a measure for which there need be given no other argument than Professor Huxley's, "If my neighbor brings up his children untaught and untrained, to earn their living, he is doing his best to destroy my freedom by increasing the burden of taxation for the support of jails and work-houses for which I have to pay."

The force of this argument, however, depends on the extent to which the children are really trained to earn their living in the public schools. And so does much of the force of all arguments for public schools at which attendance is voluntary. The fact that we are taxed to keep up these schools gives us a right to require that the instruction be made as practically useful and generally valuable as possible.

Of course the whole aim of the public school should not be to teach children to earn their living, but this is certainly a part of the legitimate aim and might be largely developed in harmony with other parts, as is actually the practice in Europe.

No knowledge of any kind can be acquired without increasing all the powers of usefulness, but some kind of knowledge do immensely more than others, to develop particular powers. A law student would learn more in a theological seminary than in a factory, but not so much in a year as he would in a law school in a single month. Neither law school nor theological seminary would particularly increase the skill of the mechanic. These seem truisms, but just consider how much better fitted our public schools are to prepare men to be law and theological students than to be farmers or mechanics It is these branches of manual labor that most of the boys are to go into, but their schooling does not teach them how to use their hands and muscles, but rather their brains.

Our public school system would be practically perfect, provided all the pupils were going to be clergymen, lawyers, doctors, or teachers. Indeed, the village schools under my own observation seem to aim mainly at turning out school teachers. Every girl, at least, who graduates, tries immediately to get a school, for her

training has exactly fitted her to earn her living in just that and no other way. No wonder teachers' wages are low, when the number of teachers is thus continually increased.

In view of this lowness of wages, as well as the pressing demand for skilled workers in many other fields, it seems to me that something might be done in our public schools to fit pupils to earn their living in other ways. If our schools are merely going to educate teachers, and these to educate still other teachers, the whole system might be compared to a grtst mill, of which the wheel is so large and the stones so heavy that the force of the stream is spent in turning them around, without grinding any grist.

Even if the aims of the public school are legitimate enough, there seems to me much room for improvement in the choice of means. Let me quote from Dr. Bartol, who says; "He that can sketch an object with a pencil understands it better than he who recites all its titles in the epoch of every tribe under the sun.

Possibly we have yet to learn what education is beyond a series of tasks in sentences and mathematical figures. Was Horatio Greenough educated, when glued to the bench for a Latin recitation, or loath to demonstrate the sum of degrees in a triangle, and not when he picked up a piece of plaster in the streets to carve the head of a Roman Emperor?

Michelet says a man always clears his mind by doing something with his hands. The poor girl goes to school with the rich, and learns to scorn her mother who cannot read, to envy her mates' costlier dress, and to steer for means of like adornment into temptation in the course of study. The education is a curse that puts notions into her head but no skill into her hand. Taught to create value, she would disown the tempter." (Rising Faith, p. 177.)

The possibility of making Wisconsin a great manufacturing state gives peculiar importance to the immense results achieved in Europe by Industrial or as it is sometime called, "Technical Education." For instance the great iron works of Creuzat, France, which in 1867 employed 10,000 workmen and turned out $3,000,000 worth of products annually, rose from small beginings through the systematic training of laborers in schools opened for this purpose more than thirty years ago.

When the first International Exposition was held in London, in

1851, English workmen excelled in ninety departments out of one hundred; but in the Paris Exposition of 1867, England carried off 10 per cent. instead of 90 per cent. of the honors. The introduction of drawing into the public schools, with the opening of special schools in all the great centres of industry in France, Germany, Switzerlannd and Austria, had made these countries equal to Great Britain where she had hitherto reigned supreme. The British Government took the alarm, and made general inquries, to which the Birmingham Chamber of Commerce replied that every trade in Brimingham suffered from lack of technical education. Similar answers came from Sheffield, Kendall and Staffordshire, except that the potteries in the last district were found to be kept up by the importation of properly educated foreigners.

Active exertions have since been made in Great Britain to recover the lost scepter by imitating the course adopted on the continent, but the Swiss, French and German workman are still superior in training, not only to the British but to the American ones, according to the report of the Massachusetts Commissioners of Education for 1873. These Commissioners report that in Pennsylvania the great body of skilled artisans are foreigners. Mr. Stetson, in a work on Technical Education, published during the year 1874, declares "it is not the pauper labor but the educated labor of Europe which America has good reason to fear." A country, ninteen twentieths of whose artisans are unable to work from drawings, has good reason to dread the rivalry of countries where a mechanic who cannot draw is a rare exception.

When we consider, further, that as good a judge as Mr. Russell, the builder of the Great Eastern, declares that if in Great Britain, one-half the laborers were as highly skilled as one-quarter of them are at present, the change would be worth 50,000,000 pounds sterling, or one quarter of a billion dollars a year, as it would enable the mechanical power of the kingdom to be used to three or four times as great advantage as at present, we can imagine what a mine of wealth lies almost unbroken at our feet. And again from the fact that in this country the highly skilled worker earns $3 where the utterly unskilled laborer earns $1, we can see how immensely the condition of our laboring classes is capible of being improved at little cost.

One of the principal means has been already mentioned; this is drawing, knowledge of which helps a mechanic to work from plans, and trains eye and hand to act in union. Four or five years ago this branch was introduced into the public schools of Massachusetts, New York and Connecticut, and the example is being generally followed all over the country. The lack, however, not only of properly qualified teachers, but of sufficient public interest, often prevents the instruction from being much better than nominal. We are very far behind the French practice of teaching every scholar seven years old, to draw and write simultaneously, so that each of the two acquirements may help the other. The Swiss and German primary schools also give to drawing a prominent place. So small a part of the primary school session in this country is spent in actual study, that not only drawing but object lessons and Kindergarten exercises, as well as needle work for the girls, might be introduced for two or three hours a day without hindrance to the present instruction, and with immense gain not only to the discipline but to the intellectual spirit of the school.

Enough free hand drawing should be taught in the primary schools to enable the pupils in the grammar schools to use drawing instruments, draft plans, and copy geometrical solids, and it is very important that they should be restricted to these and similar branches of purely industrial drawing; otherwise the desire to make a show at exhibitions, to get something pretty to hang up in the parlor, and to amuse oneselfs with little efforts, will tempt both pupils and teachers into giving their attention almost exclusively to fancy drawing of too little industrial value to be paid for justly out of the school fund. And in the grammar schools might also be given some knowledge of the practical teachings of chemistry, such as would be of assistance not only to the bleacher, dyer, founder, miner, and machinist, but to every farmer and housekeeper. The high school should continue the instruction in chemistry and drawing, and add the study of perspective, descriptive geometry and mechanical proportion. Of course, these high school studies should be electives, alternatives with Latin and Greek perhaps.

It would also be possible for instruction in one or two trades to be given to a few of the most skillful pupils in every high school. One teacher in the girls' high school of Boston has introduced the study of photography, mainly at her own expense. Other trades

which might be taught with advantage, are telegraphing, wood-carving, engraving, stenography, dress-making, watch-making, pharmacy, designing, and painting. I mean, of course, not artistic but industrial painting; not painting pictures, but furniture and signs, and I speak particularly of this branch because it might be taught with advantage to the community in most of the village high schools.

The industrial course in our public high schools would then be: Primary School, drawing, sewing. and kindergarten lessons; Grammar School, mechanical drawing and chemistry; High School, chemistry, drawing, persective, geometry, and some special trade.

The pupils who need this teaching most would not, however, be able to go through the high school course, and special trade schools should be opened to allow them to pass through the whole course in two or three years after leaving the primary school.

The same teachers could carry on the instruction in drawing and other industrial studies in the common schools and also in the trade schools, where the training could be made extremely practical. One of the highest class of trade schools, which might well be imitated in America, is that for the French watchmakers at Besancon. The course is three years; first year mechanical drawing and general principles of the trade; the second year adds geometry, designing various parts of the watch, and modelling the tools used; the third year adds the study of mechanics and practice in modelling various parts of the watch, mechanical drawing and designing being continued. Among the industrial schools especially worthy of note, are those for carpenters and builders held in the large cities of Germany for four or five months, beginning with the 1st of November, and giving instructions in "elements of physics and knowledge of materils, details of the art of building, plotting, geometrical and ornamental drawing and modelling," and other practical studies, described at length on page 124 of the report on education made in 1870 by Dr. Hoyt, who wisely recommends the opening of such schools in all the cities of the United States. Similar schools might be opened at the same season for the improvement of farmers. There are also many laborers who cannot attend any day school, even an industrial one, but who would go to an evening school gladly. The workman who is too tired to study anything else has been found able to learn drawing in such a school with great advantage.

A state which has so many German and Scandinavian inhabitants as Wisconsin really seems to me also bound to give the men and women some such facilities for perfecting their knowledge of the English language. Allow me to suggest further, that in a great railroad center, like Madison, evening schools should be opened to teach railroad hands, and workers in machine shops, mechanical drawing, modelling, the use of every part of the steam engine and all the scientific principles involved in the running of railway trains and the manufacturing of cars and locomotives. The gain merely to the morals of the pupils, by removing them from temptation, would fully justify all the outlay necessary. I am glad to hear that twenty-nine evening schools for adults are in successful operation in Philadelphia, and hope the time will come when similar statistics can be furnished by Chicago, Milwaukee and Madison.

In one point we are already wiser in America than they are in Great Britain, or on the continent of Europe. Scarcely any industrial schools for women have been opened there, or seem likely to be. Of what little has been done in the United States, woman has had her full share. A prominent place in the Boston public school system is occupied by what are called the "designing young ladies;" and the philanthropic women in that city are attempting to follow the example of their sisters in New York, who have for the last two years been giving instruction in running sewing machines, housework, sewing of all kinds, laundry work, cooking, book-keeping, proof-reading and other useful employments with great success.

Of the many female colleges springing up all over the land, none deserve more praise than that already founded by John Simmons, of Boston, who bequeathed $1,400,000 "to provide for the teaching of medicine, music, drawing, designing, telegraphing and other branches of art, science and industry best calculated to enable the scholars to acquire an indepeadent livelihood."

Among the branches in which women might engage with advantage are those pursued by decorators of glass, porcelain and china, artificial flower makers, feather colorers, retouchers of photographs, wood carvers, fan and toy makers, watchmakers, jewelers, lapidaries and cameo cutters, workers in wax, plaster and ivory, glass cutters and grinders, piano tuners, designers, engravers, telegraph operators, compositors, druggists, photographers, florists, dentists and

journalists. Indeed, all the arts in which a good eye for color is needed, seem to be especially suited for women.

And let me here suggest that our State Univesity, having shown its enterprise in establishing departments of law, military science, agriculture, civil engineering and mining and metallurgy, should give similar attention to the industrial education of the "better half" of its pupils by opening one or more departments especially adapted for training women in some of the occupations just mentioned. In closing I would say that no industrial training is complete without artistic culture, which, though never its equivalent, should always be its inspiration.

CURRENCY.

By JOHN JOHNSTON, Milwaukee, Wis.

I believe we are all more anxious to find out what is best for the interests of our country, than we are to achieve a victory over our opponents. There are different kinds of greenback men, and with some of them I have no particular controversy. I do not know that I should oppose the United States issuing our circulating medium, *provided* that they could so regulate its quantity that it would be governed by the laws of trade, and rise and fall according to the demands of business, and that it be not subject to the whims of every succeeding congress, or the caprice of changing secretaries of the treasury. If not so regulated, it would become the foot-ball of political parties, and be subject to such conditions as could not fail to be very detrimental to all classes of our people. Above all, I should insist that even the United States government, if it issues our currency, shall redeem it in coin whenever a demand for its redemption is made.

The question whether the government or the banks shall issue our currency is not a question of so much importance as the question whether our circulating notes shall be convertible into specie on demand, or whether they shall not.

The greenback men with whom I have the controversy are those who maintain that the government should not redeem its notes.

They regard the greenback as an ultimatum, a finality. They look upon it as not only a meduim of exchange, but in itself a desirable standard of value. My object is to show the folly of such a position.

Judging from the ease with which everybody can, at the present time, take hold of a discussion of question pertaining to money and currency, an observer would naturally suppose these questions to be of the simplest kind, and such as can be fully understood with but little consideration or study.

If a discussion arose on questions of medicine, chemistry, music, astronomy, or the manufacture of iron, it would be considered somewhat out of place in bankers, grocers, commodores and generals to come forward, without any previous study, and volunteer their modes of settling such questions to men who had made medicine, chemistry, music, astronomy, or the manufacture of iron, their study for years.

Now, however, you will find at every street corner and country cross-road, men who have never given an hour's study to questions of finance, and who never read a page on political economy in their lives, ready on the shortest notice to furnish prescriptions to cure all our financial ills, and to solve problems off-hand which have taxed the mental energies of the ablest political economists.

There seems to be an opinion in some quarters that the more thought a man may have given to the question of our finances the less are his views to be trusted, and if a man be a banker he is supposed to be a kind of public enemy, an Ishmael, "whose hand is against every man, and against whom is every man's hand." Some demagogues do not fail to intimate that the interests of bankers and the interests of the rest of the community are necessarily antagonistic, and that when hard times are pressing on the commercial interests of the nation at large, banks are then especially prosperous and *vice versa*. There never was a greater mistake.

It is forgotten that probably no business is so seriously affected by hard times as that of the banker. The parties to whom he has loaned his deposits fail, and offer him from 20 to 50 cents on the dollar, while those who have confided their money to his care expect prompt payment, dollar for dollar. When a financial earthquake is rumbling all around him, he is at his wit's end to know whom to trust, or to whom it will be safe to lend the money which

the widow and the orphan have placed in his charge, and on which he is paying interest. If he do *not* lend it, he is denounced for hoarding up the money which should move the wheels of commerce; and if he *do* lend it, and lend it foolishly to those who cannot repay him, he will be denounced as a rogue and a villain if the money be not forthcoming when the depositors call for it. He is denounced by your professional demagogue as a monopolist, or worse yet, as a capitalist. A tramp is respectable as compared to him.

NO MONOPOLY.

There is no monopoly about banking. John Smith and Tom Jones can put up their sign to-morrow, "Smith & Jones, Bankers." Even the business of banking under our national system is perfectly free, and all may participate in its profits, whatever these may be. Bankers are not necessarily capitalists. A capitalist lends his own money, while the bulk of the money loaned out by the banker is the money of other people. A thousand laborer's deposit $100 each with a banker and he lends the money out again, but the parties depositing are the capitalists, and the banker is merely their agent. These thousand laborers have no time to search for some one who wants to borrow their money, and they would be in doubt whom to trust. The bank is the grand reservoir for the petty savings of thousands, each trifling in itself, but taken as a whole, of mighty power to drive the wheels of commerce. Small sums in many hands are of little use, but when accumulated in the banks, they become a mighty power for the development of industry and trade. There are five millions of dollars used through the banks of Milwaukee in moving the crops of the west, and in assisting our merchants and manufacturers, which, without banks, would be comparatively useless. I have never been able to see wherein the interest of the capitalist and the workingman are hostile to each other. Capital is accumulated crystalized labor. If any one, by active labor, earns $500 and saves $100 of that sum, then, to that extent, he becomes a capitalist; you have accumulated or embalmed, as it were, so much active labor. This accumulated labor or capital is in a position to employ active labor, and why they should be hostile I cannot see. Whatever cripples capital or accumulated labor renders it less able to employ active labor, and so injures it as well. There may be some capitalists who do not

do the fair thing by those whom they employ, and there may be workingmen who do not act fairly towards their employers; but there should be no more hostility between capital and labor than between a man's legs and his arms. Both are essential, and each is necessary for the well-being of the other.

Those men who attempt to stir up hostility between capital and labor, will generally be found to be the friends of neither capital nor labor.

The currency of a nation has a double duty to perform. It should not only be an instrument of exchange — a counter — but it should also be a measure of value — a standard of value. Suppose I have several books and you a knife, and we wish to exchange. It might be difficult for us to know the relative value of the books and knife; but there are two commodies, gold and silver, which have been for many ages adopted by all civilized nations as standards of value. Twenty-five 8-10 grains of gold is called a dollar. You compare the value of your knife with gold, and say that your knife is worth two dollars; that is, 51 3-5 grains of gold. I think each of my books is worth one dollar, or, 25 8-10 grains of gold, so that I will have to give you two books for your knife.

The reason why gold and silver have been taken as the standard or measure of value are many. I need not repeat them. Gold and silver are durable and do not vary suddenly in quantity or value. They are portable; they are admirably adapted for coinage; they are of uniform quality; they are unaffected by atmospheric influences; they do not decay with age.

The stamp of the government does not give the value to gold or silver. It merely certifies that the coin contains a certain weight and fineness of metal. If you have a bar of gold and wish to use it to pay your debts, it would be desirable to send it to the mint, where the government will stamp it into such coins as you may desire. But any intelligent man will not refuse gold, even unstamped, if you can satisfy him as to its fineness and weight. Labor is the creator of all exchangeable value. The labor it requires to procure them is what gives to gold and silver their value, and not the stamp of the government. The standard of value is coin, but the medium of exchange may be a paper credit currency. Gold and silver are the best measures of money, but paper is the best instrument of exchange. Paper notes cost little to print, and are easily carried

about; but they must represent value — they must conform to the standard and measure of value, "coin."

Every piece of paper currency issued by this government is born of some transaction in which the government got value for its note, and the same is true of the notes of individuals.

I buy a book from you. This book has value, and I should give you something of value in return — a knife, a pen, a piece of gold, or something else of value. You, however, may not desire any article of value immediately, or I may have no article which suits you, and you prefer a credit for the book rather than to be paid off at once by an article of value. I give you, then, for the book a credit which I have been carrying in the shape of a piece of paper, for which some one promises to pay one dollar, or 25 8–10 grains of gold.

Having faith that this is good for this gold, and that you can get almost any article for it of equal gold value, instead of insisting on my giving you a knife, or a pen, or 25 8–10 grains of gold in exchange for your book, you are satisfied to take the paper note.

Now the question at issue between the redeemable and the irredeemable currency men is this: Shall the parties issuing our circulating notes be expected to keep them equal to the standard of value, and be expected to pay them when they are presented for payment? The redeemable currency men hold that not only do the first principles of honesty call for this, but also that the *interests of all classes of citizens*, rich and poor, employed and unemployed, will be best promoted by a circulation of notes which are kept equal to that standard of value which they are supposed to represent, and that the government of this great republic should stand ready to fulfill its promises to pay whenever any of its notes are presented for that purpose.

The government received a valuable consideration for every greenback in existence.

After the war had run its course for a few months the government had not the means to pay the soldiers and furnish horses, clothes, amunition and food for the men it had called into the field. The government acknowledged that it should pay in something of value, for the valuable clothing, cannon, flour and potatoes which it had received. As it had not then, in the hour of its extremity, the means to pay in gold, it issued its notes or promises to pay.

For each greenback in circulation, the government received some valuable consideration ; the soldier gave his services, the manufacturer his clothing and cannon, and the farmer his produce. For all these valuable commodities given by its citizens to the government, the United States, in harmony with the practice of all civilized nations for ages past, promised to pay one dollar, that is, a piece of gold or silver of certain fineness and weight. And the question is simply this: Shall the United States, pay as it *promised*, these notes when presented for payment, or shall it leave them, abandoned orphans, with no one to father them when a call is made for their honest payment, according to the promise written on their face?

ETERNAL PRINCIPLES DO NOT CHANGE.

To hear some men talk you would imagine that under the wings of the American spread-eagle all the laws of political enonomy are suspended, and that in this age and country of the steam-engine, the sewing-machine and the telephone, the old-fogy principles and laws of trade which hold good in Europe, are of no account. The American eagle is no doubt a great bird, but I "guess" that even under his wonderful rule the laws of gravitation and political economy are still in force, and "even from the Atlantic on the east to the Pacific on the west, and from the Great Lakes to the Gulf of Mexico, wherever the bird of freedom soars," twice two continues to be four, and twice five is still ten, "just as among the moulder-cerements of the antiquated despotisms of Europe" !

It is not much to the credit of this great nation, with its vast resources, and which put a million of men in the field and expended four thousand millions of dollars for its unity and honor — I say it is a disgrace in it not to live up to its pledges and stand ready to redeem so many of its three hundred millions of greenbacks as may be presented for payment, or as may be necessary to bring its notes to a par with gold.

Redeemability in coin is mainly important, not because of any hidden virtue in coin or any taint of sin in paper, but because it offers the only means of keeping the quantity of the circulating medium in its proper relation to the business of the community ; because this is the only way in which the people can retain control over the "instrument of exchange." Whenever it becomes redundant the people send it home to the issuers for redemption. When

too many carriages are hired for the number of people to be carried, some of them are sent back to the stable. So when paper is redeemable, and too much is out for the work it has to do, it goes back from whence it came, and the people retain control of the quantity; when it is irredeemable, the secretary of the treasury or a committee of ignorant and needy congressmen may decide how much of it shall circulate. When paper is redeemable in coin, if the government or banks issue too much of it, prices at once begin to rise, *i. e.*, the paper representing coin becomes less valuable than other articles, and the country discovers that coin is the cheapest thing it can send abroad, so the notes are taken back to the treasury or the banks, and gold is drawn out. In this way the volume of currency is diminished and equilibrium restored. When irredeemable paper is issued, and made a legal tender, the coin in the country becomes of no further use, and any that may be mined or imported will speedily leave, as there is no office for it to perform; and the paper currency being irredeemable, gets beyond the control of the people as to quantity and away from the standard of value as to quality. History has depicted in no doubtful terms the disastrous effects of a depreciated and irredeemable currency. The fact that it is depreciated shows that it is in excess, and this excess breeds extravagance and speculation. The spirit of the gambler enters into the heart of the nation, and it becomes the hotbed of extravagance, speculation and crime.

The worst evils of an unsound currency fall upon the poor. As a direct consequence of depreciated money, prices fluctuate, so the man who buys cannot tell for what he will sell, or what his money will be worth when he gets his pay. Against this uncertainty the rich man can hedge. The poor man who buys, buys to consume, not to sell again, and pays the increased percentage out of wages which have not increased. The rich man adds to the price of his commodoties the premium on gold at each rise, and by continual exchange adjusts or shifts the loss.

The poor man has but one thing to exchange, his labor; and he does not know the hourly, daily, or weekly rise of gold, and if he do, he cannot daily, hourly, weekly, or even monthly, add it to his wages. He cannot readily make new contraets for his labor; and his wages, last of all have the premium of gold added on to them. Clothes, fuel, and groceries, all feel the inflation of prices before

salaries or day's wages do. Hence, Duniel Webster truly said, that of all contrivances for cheating mankind, none has been more effectual than that which deludes them with irredeemable paper money. This is the most effectual of inventions to fertilize the rich man's field with the sweat of the poor man's brow. The workingman, for whose interest the increase of currency is now demanded, is the residuary legatee of all the losses arising from inflation and its consequences. The irredeemable currency men have failed signally to show how the mere multiplication of counters is to add to the wealth, capital or general prosperity of the nation. As has been well said by some one, "What we want is an inflation of collaterals. With the collaterals we can always command the currency."

There is a great deal said about the debtor class and the creditor class, and the idea is meant to be conveyed that the workingmen are generally to be ranked as debtors. This is a great mistake. Our workingmen do not generally belong to the debtor class. They are not in a position to borrow money, and all attempts to curry favor with the workingmen by getting up commiseration for the debtor class, are based upon false premises.

It has been argued by those who oppose a coin basis for our paper currency, that such is impossible because there is not coin enough if all the paper currency was returned for redemption at one time. Well, it may be answered that there are not greenbacks enough to to pay one-tenth of the debts of the country, if everybody went to everybody else the same day and insisted on getting what was due to him. Instead of four hundred millions of greenbacks, four thousand millions would not suffice.

The fact is, all business and all legislation are conducted on the idea that men are not crazy lunatics, but are sane, rational beings. It may be asked where would all the life insurance companies be if everybody insured in them should die about the same time.

Nothing can prevent panics, and nothing can prevent a periodic expansion of credits and a subsequent collapse. A coin basis, however, instead of fostering such expansions, has an opposite effect. It used to be considered bad enough when banks could not pay coin, but under the greenback legal tender regime, in 1873, the banks in many of our great cities could not even pay paper, much less coin. I care not what the currency is, the proper amount for ordinary times will never be enough when half the people get crazy and rush

for currency and lock it up. But such periodic storms are less likely to gather when the currency is only a specie basis. Some assert that contraction caused the crash of 1873. Far otherwise; inflation caused it. The immense increase of bank loans show that. The circulation, in 1874, was twenty-nine millions greater than in in 1869. It was expansion, and not contraction, which brought on all the disasters of 1873. The resumption act was not passed until 1875. We have been living for years on stimulants, and as we are getting to a sound and healthy diet, our heads ache and the temptation is strong to take more stimulant; but we will be better hereafter if we bear the headache a little longer, and come out, by and by, just as well, or nearly as well, as if we had not been "on a bender."

It would, no doubt, have been worth millions to this country had congress, immediately after the war, taken steps to bring about resumption by easy stages. The inflated, irredeemable currency which was then poisoning the blood of the nation, led, from 1865 to 1873, to so much wild speculation and mistaken enterprise that it is estimated the amount of municipal corporate and private indebtedness increased during those eight years nearly threefold. There was recently published a list of American cities whose debts had increased from $221,000,000, in 1866, to $644,378,663, in 1876.

It is customary for the inflationist to talk in the most denunciatory terms of the gold gamblers and the gold room in New York; yet, strange to say, the period from 1865 to 1873, which was the millenium of the irredeemable-currency men, was also the hey-day of the New York gold room, and when gold touched a premium of 5 per cent. on its downward march, and the funeral notes of Carey and his compeers were heard through the land, the New York gold room also read the signs of the times and closed its doors. If gold and currency were equal and interconvertible there would be no need of gold brokers, and it is the very state of affairs advocated by Gen. Carey which brings into existence the gold room and gold brokers, which he tries to win popular applause by denouncing. It is customary in order to bring discredit on the position that our currency should be redeemable in coin, to point to the old wildcat banking in this and other states. But these banks were splendid examples of an irredeemable currency in the strongest sense of the term.

Your wildcat or red-dog banks built a shanty in some impassable

swamp or out-of-the-way corner of the forest, and having deposited their bonds at Madison, got their friends to start their notes in circulation; but any one desiring to get coin for their bills could never find the bank, so that the notes were just as irredeemable as our greenbacks have been, and the multiplication of these wildcat and red-dog banks produced similar results to the irredeemble currency which helped to bring on the crisis of 1873.

It would be very interesting to trace the rise and fall of an irredeemable currency in England, and show by the discounts of the Bank of England and otherwise, the gradual inflation of the bullion and its consequence, collapse, but I can do no more than allude to it.

For twenty-four years were specie payments suspended in England, viz.: from 1797 to 1821. The circulation of the Bank of England increased from eleven million pounds in 1797 to twenty-seven millions in 1815, and the bills discounted increased from five millions to fifteen millions. They were enjoying just such times as we had before 1873, when in 1815 they had just such a collapse as we had in 1873. It came on the full height of inflation. Over three hundred banks closed their doors in 1815, and there were great riots and much distress. After just such discussions as we are now going through, a resumption bill was passed in 1819, providing for specie payments in four years, viz.: in 1823. Four years were allowed to get ready and to quiet the fears of those who predicted great financial disasters.

Two years before the time fixed, the bank began to pay in coin, and there was no unusual demand for it.

Everybody felt so well at the return to a specie basis that they began again to expand their credits, and in 1825 they had another financial crisis. Allison says that the years of feverish and unnatural excitement which they had during the period of inflation and suspension had to be followed by a long period of languor and depression.

The experience of France is even, if possible, still more interesting, for she twice went through the terrible ordeal of an inflated, depreciated currency. Any one who reads the speeches of the French assembly, about the year 1790, would imagine he was listening to some of the greenback orators of the present time. The *assignats* are lauded to the skies as just what is necessary

to bring prosperity to the country; as being a great step in advance of the antiquated hallucination which believed in a coin basis. It was necessary to have a currency which would not go out of the country; and being founded not only on the plighted faith of the whole people, but also on one-third the real estate of the nation, and bearing interest, it could never fail to be eagerly sought after.

Talleyrand and a few other leaders opposed those issues as certain to cause depreciation; but Mirabeau and others ridiculed the idea of their becoming depreciated.

Such an abundance did they have of this currency founded on the plighted faith of the people and the total resources of the whole republic, that sugar was 500 francs per pound, everything was inflated but wages, but as the manufactories were closed there were thousands unemployed. The paper run its course, the delirium abated, but everything was confusion. Bonaparte, in his first cabinet council, said, "I will pay cash, or pay nothing," and he conducted his campaign against united Europe on this basis. When hard pressed financially, it was proposed that he issue paper money, but he wrote his answer, "While I live I will never resort to irredeemable paper." When Waterloo came, the allies in Paris, Napoleon in exile and war indemnities to be paid, France on a specie basis was in a better financial condition than any nation in Europe.

The anti-resumptionists in this country assert that the reason why the irredeemable paper money of France was at par for a year or more past, was because she received it for her customs dues; and they argue that if we would do the same our paper would be at par. I think our paper would be at par if we had one dollar of gold in the treasury for every paper dollar in circulation, and were to resume at once, whether we took our greenbacks for customs dues or not. The amount daily collected by the government as custom dues is not so much as the average daily deposits of one of the Milwaukee banks, and it is absurd to suppose such an insignificant amount could have any appreciable effect in bringing our greenbacks to par.

There are a good many clap-trap phrases used by those who oppose a specie basis for our currency, to one or two of which I will allude.

One is, that the currency which brought us through the war is good enough for us in peace. I seriously doubt this. We were in desperate straits during the war, and were in no condition to redeem our paper in specie; but I cannot think that because we could not do our duty during a fierce civil war we should therefore never attempt to do it. We were in a tight place during the war, and the issuing of paper promises was thought to be the best thing we could do, and they brought us through successfully, though at great cost.

To say that we are not to redeem those promises is unpatriotic and dishonest.

It is nothing but cheap buncombe to say, as paper promises brought us through the war they are good enough for us now, and shall forever remain unfulfilled.

We are told by the irredeemable-currency advocates that while we propose only a little coin for the basis of the currency, they believe in having the whole resources and plighted faith of the nation as the foundation of their system.

The truth is, we, the redeemable currency men, advocate as our security, the whole resources and faith of the nation, *plus* the coin. We believe that the sufficiency of these resources and honesty of that faith shall be manifested by the providing of the coin necessary to redeem any notes that may be presented. We believe that faith without works is dead, and that it becomes us to use some of our vast resources to redeem our pledges and not violate our faith.

While we are indebted for untold blessings to the era of commerce in which we live, with its attendant telegraphs, banks, bills of exchange, and all our immense system of credits, yet, to these must we also attribute the great financial disasters which periodically overtake us.

Daniel Webster said that "the system of credit, as it now prevails, is the vital air of commerce, and has done more, a thousand times, to enrich the nation than all the mines in the world."

Like many other mighty machines, capable of untold good to men when properly used, they are capable of great mischief when abused. When the railroad train runs off the track and is demolished, the havoc and ruin that follow outweigh the disaster arising from the over-turning of a stage by just so much as the locomotive and railroad cars outstrip the stage coach in usefulness,

when they are properly handled. So with the credit system and with banks. They are powerful instrumentalities for the diffusion of blessings, but when abused they are liable to bring on no little suffering. It is hard to keep men from abusing the most beneficent instrumentalities; so we find, every ten or twenty years, the credit system getting more and more expanded — rising prices, everybody trusting everybody, everybody scrambling to get rich, and everybody thinking he is getting rich. New schemes and speculations born with every rising sun. New banks, new railroads, new city plats, trust funds invested in bubbles, fortunes made without trouble, splendid equipages and entertainments; then the bubble bursts when no one expects it to break. The results are: Merchants bankrupt, stagnation in the streets, real estate unsalable, mortgages foreclosed, debtors absconding, widows and orphans ruined. Such are the storms which periodically gather and burst in the commercial world, and I know not if the time will ever come when men will be able to so control themselves as not to be carried away by this speculative mania which from time to time creeps stealthily upon them.

These financial troubles which periodically come upon us are produced by an undue expansion of the credit system. Men do not pay as they go, but run in debt. Prices are rising; they think they can see where, by running in debt, they can make a good thing. Thousands do this, and the volume of bills and checks afloat becomes very great. Bye and bye some prominent house cannot pay its notes; then confidence becomes shaken, and everybody wants those who owe him to pay up at once. Many go to the wall, and a panic with all its evils ensues. The surest way to bring on one of these financial hurricanes is to inflate the currency. Such was the case in 1837 and 1857, and during our recent war. It is considered rather a dishonest thing to water railroad stocks, but that is mere child's play to the iniquity of watering the currency. It is about par with clipping the coins of the realm, which used to be a fashionable amusement with the robber kings of Europe.

This inflation of the currency, it is said, is in the interest of the workingman and the farmer. Heaven save the mark! The workingman feels the disastrous effect of these periodic financial storms more than any other class. The workingman is, as I have already

said, the residuary legatee of all the losses; and yet we are told that it is in his interests that the credit system should be expanded and another period of inflation and consequent disaster should be invited. By the inflation of the currency prices will rise. But the workingmen and all salaried men will find that their grocery bills will rise a good deal faster than their wages, and when the explosion comes which the inflation of credits will certainly bring on — it may be in one, or five, or ten years — then the workingmen by the thousands will be thrown out of employment.

Equally absurd is the idea that the issue of an additional lot of paper promises will benefit the farmer. So far from that, next to the workingman, he will be the sufferer. His expenses will be gauged by the inflated prices of a redundant currency, while the prices of his crops will be governed by the prices of the European markets. It will be asked why it comes that so many who are opposed to an inflated currency are capitalists? To which I answer that they of all others desire the business of the country conducted on safe, sure, conservative business principles. They oppose everything dangerous or revolutionary. Capital is exceedingly sensitive.

Inflation will add to the income of the capitalist for the time; but as in the long run it may endanger the principal, he opposes it. Probably the men of all others who will be the worst fooled by inflation are those who expect that an inflation of the currency will lower the rate of interest. The opposite has invariably been the case. An increase of currency increases speculation, increases the demand for money and increases the rate of interest, on account of the continuous rise in prices, dazzling borrowers with visions of future profits.

The rate of interest for the use of money depends, subject to some other contingencies, mainly on the profits to be made by the use of money. That is, if a man can make fifteen per cent. by hiring money, he can afford to pay ten per cent. for it; and though you double the quantity of currency, you would not touch the rate of interest. In not one of a hundred loans does currency ever appear. A man gives a note, and the money goes to his credit, and when he pays it out he gives his check, transferring it to some other person's credit; so that the quantity of currency has nothing to do with the rate of interest, and those who expect lower interest

from inflation are the victims of misplaced confidence. Interest, since 1873, has been lower at the east than usual, because money is seeking *safe* investments rather than highly remunerative investment which are full of risks. In England, where there is but little currency, interest is low because the profits of business are small.

In the foregoing remarks I have confined myself to a discussion of the question, whether an increase of currency is desirable, and, above all, whether our currency should be convertible into coin, or whether it should not.

I have no time to take hold of some of the other important questions, such as whether silver shall be remonetized without limit, and whether shall the banks or the government issue the circulating notes. My position has been, that whoever issues our notes must stand ready to pay them when payment is demanded; but as to who shall issue them is another question which I have not time to discuss. There is no safety in a paper currency unless it be on a coin basis. When overtrading, speculating and inflation of credits began to prevail, warning is given by the gradual diminution of the hard basis on which the system stands. Those who issue the circulation take the hint and begin gradually to contract, and many a financial storm has thereby been prevented. Convertibility of the paper currency into coin does not always prevent financial convulsions. The safety valve on a boiler does not always prevent explosions; but they very often do, and they ought to be on every boiler.

When we speak of convertibility into coin, it is not that everybody in America who holds a paper promise may all in one day be able to get its equivalent in coin. That is impossible and unnecessary. As I have already said, the importance of redemption arises from the fact that it is the only means of keeping the currency in its proper relation to the business of the community, and also of regulating our trade with foreign nations. It is the only way by which the instruments of trade can be regulated by the wants of trade. We do not doubt but many an incipient crisis has been averted under the reign of redeemable currency, that would have grown to fearful proportions under the stimulus of irredeemable notes. A currency with no specie basis to it has no certainty as to its validity or stability, or as to its value.

Resumption means that this great republic will speak the truth and be honest. "It means that there shall be thirty-six inches in the

yard, and sixteen ounces to the pound;" and the astonishment is that there can be found intelligent men to oppose such a resumption as soon as it can be brought around to stay. As Gov. S. L. Woodbord said: "In the memory of these years of panic and disorder, of shrinkage of values and palsied energies, by the fading light of dying forges, and in the silence of idle looms, I read one lesson. It is written alike on the laborer's cabin and the banker's vault. That lesson in simple words is this: 'No more legalized quackery, no more financial falsehood, no more unkept promises, compelled by force of political laws to attempt the work of coin and at the last compelled by the higher laws of nature and morality to begin with inflation and end in bankruptcy. But honest money — the same money for the bondholder, billholder, and plowholder — the money of the constitution, clear, ringing, full-weighted, honest coin — money that costs labor, and is therefore the just reward and payment of labor.' "

WILLIAM CULLEN BRYANT.

[It has seemed to me that there was no more appropriate method of closing this 16th volume than by publishing the following address, delivered by Col. Elias A. Calkins to the Wisconsin press, at Ashland, Wisconsin, situated upon the shore of the largest lake in the world, with a harbor capable of safely floating every ship that sails. William Cullen Bryant, aside from being a poet and an editor, was a great farmer, and his beautiful estate, situated upon an island washed by the Atlantic waves, was tilled as becometh a good husbandman to ever till his land. Bryant's inspirations, in a great degree, were caught from associations with nature, and that nature every farmer sees and feels. G. E. B.]

There can be no question as to the propriety of rendering, at this meeting of our association, a tribute of respect to the memory of William Cullen Bryant, upon whom the grave has recently closed, the most illustrious member of our profession which either hemisphere has produced, with the sole exception of Benjamin Franklin. It is peculiarly appropriate that this tribute should be paid now, in this month of June, month of

"Soft airs, and song, and light, and bloom,"

which some of his most touching verse has celebrated, and that it should be paid here on this spot of superlative loveliness, which the nature that he adored planted in its bounty, and which the art that he loved so skillfully embellished.

Mr. Bryant was born in 1794, in Massachusetts. He had a liberal education, and was trained for the bar; in fact, he opened a law office and sought clients in an obscure village in his native state. In 1825, he became connected with the press, as associate editor of a magazine printed in New York city, and in 1826, he became one of the editors of the *New York Evening Post*, succeeding in 1829 to the chief editorship of that journal, a position which he held to the time of his death. He was a writer of poetry when a mere lad, and, at the age of twenty-two, published Thanatopsis. He traveled widely, wrote much prose and verse, was an active citizen, a political journalist, a man of the highest and purest personal character, and he died June 12th of the present year, at the age of eighty-four. That is the history of his life. The details of his journalistic career, and of his literary undertakings and triumphs, are to be found in his biographies.

In professional, political and private life, Mr. Bryant's character was as nearly stainless as any example in our history. In his newspaper, he was almost always moderate, conservative, and elevated in tone, and was absolutely unsensational. If there was an occasional exception to the uniform moderation of his opinions, and of his manner in giving them expression, it was only in times of great excitement, or in emergencies which unbalanced most men; and when compared with the stormy violence of all around him, the violence which he assumed appeared like a halcyon calm. In all his writings, there is not a phrase or sentiment which would tend to pervert the heart, not one unclean or immoral thought. In a life vastly beyond the average of mankind, his example, his precepts, and all his influence tended constantly to good, and to make his fellow men better and wiser, and to make society purer, and to make politics honest and patriotic.

Of genius, as it is called, the power which creates and quickens, the essence which enlivens, illumines and inspires, which vivifies, electrifies, glorifies — which is mature without growth and perfect without culture — which is a gleam of supernatural origin, a divine particle enkindled by living fire — which is a fine frenzy and a con-

secration, and is the vision, the joy and the sorrow with which no stranger intermeddleth, Mr. Bryant was comparatively destitute. But with that mentality which is better than genius, which strengthens and ripens with years, which study develops and completes, which thinks, reasons and refines, which derives polish from attrition and symmetry from symmetrical moulds of thought and growth, he was abundantly endowed. His poetry was not a sunburst of inspiration; it did not come without volition or labor like summer winds and the light of summer noons; it was not the wild outbreak of pent up power. It was planned with deliberate forethought; the structure was prearranged to its slightest detail; it was built and finished with painful care; its exquisite polish was the result of slow, elaborate and conscientious toil. His poetry was simply the choicest rhetoric in verse, never touching sublime and radiant heights, but always even, exact, musical and complete in all its parts. It was not genius, but a lofty didactic eloquence and a charming humanity, which told us:

"So live, that when thy summons comes to join
The innumerable caravan, which moves
To that mysterious realm, where each shall take
His chamber in the silent hall of death,
Thou go not like the quarry-slave at night,
Scourged to his dungeon, but, sustained and soothed
By unaltering trust, approach thy grave,
Like one who wraps the drapery of his couch
About him, and lies down to pleasant dreams."

It was not genius, but an exalted and sublimated common sense, the richest fruit of experience and philosophy, which declared:

"Truth crushed to earth shall rise again,
The eternal years of God are hers;
But Error, wounded, writhes in pain,
And dies amid its worshippers."

It was not genius, but glowing patriotism and an enthusiastic faith in American manifest destiny, which proclaimed:

"Here the free spirit of mankind at length,
Throws its last fetters off, and who shall place
A limit to the giants' untamed strength
Or curb his swiftness in the forward race."

It was not genius, but piety, pathetic in its tone and heavenly in its aspirations, which, in describing the flight of the waterfowl, breathes:

"He who from zone to zone
Guides through the sky thy certain flight
In the long way that I must tread alone,
Will guide my steps aright."

The story of love he never told. "The fierce theme of love," as Byron calls it, never thrilled his pen nor warmed the chill propriety of his verse. His poetry was of the brain, not of the heart. He deliberately and coldly reasoned out his melodies; they are as chaste as the icicles on Diana's temple; they are as destitute of the glowing inspiration and of the ministering flame of passion as were his free-trade leading editorials in the Evening Post.

Mr. Bryant was a lover of nature, and of all its multitudinous forms and sounds, and lights and shadows. It had for him a myriad airy shapes and voices which the common eye did not see, and the vulgar ear did not hear. The groves, the streams, the prairies, the evening clouds, the changes of the months and seasons, the rolling years, the rolling earth, the rolling skies, were to him as they were to Wordsworth, a passion and an appetite. No poet in our language has paid to nature a sweeter and choicer worship, or a more profound reverence, or a greater wealth of thought and language. Nature had for him endless charms and ravishments, and a witchery which he never saw in human beauty, nor in the achievements of human art. He gathered from nature a creed of divine humanity, and

> "He heard the voice of that Almighty One
> In every breeze that blew and wave that murmured."

Like Benjamin Franklin, also, Mr. Bryant lived with unimpaired faculties to octogenarian age; and they were years of honor and usefulness; his daily life was an example; his writings are a gospel!

BROTHER JONATHAN ABROAD.

Give Brother Jonathan a chance, and he will always keep his end level, in international commere. Just now, England is considerably exercised to think that "The Yankees" are stealing her foreign market away from her, and even underselling her at her own doors. It offends John Bull to the soul to observe that the butchers of Her Majesty's realm are so depraved and disloyal that they will persist in buying American beef. Last year, this fraternity and those associated with them, the cattle dealers of England, bought of their trans-

Atlantic brethren, to the amount of four million pounds. This year the trade will be yet larger. The rush of American bacon to England is said to be unprecedented. The increase in this article for the month of May, was no less than 78.6 per cent. over the same month last year.

But it is not alone American beef that makes John Bull feel gloomy. He finds that American iron is rapidly getting into use on English railways, and that American calicoes are on sale in all the dry goods shops in London. As for American grain, he long ago got accustomed to paying out heavily for that staple, and this year, owing to the fact that his own crops are looking poorly, while our own never were more more promising, he realizes that he will have to put his hand deep into his pocket to pay the bills which Yankee grangers will have against him for wheat and corn. Then there are the Yankee butter men and the Yankee cheese men, sending over more and more of their commodities every month, finding a ready market for them and taking so much gold out of the country. There is considerable in this status of the times, that is encouraging. We may not be making much money on this side the sea, but we are vastly better off than "the mother country." A glance of late British trade returns, induces the New York *Journal of Commerce* to declare, that "what with European uncertainties, the famine in China, which cuts England out of a market, the Lancashire strikes, and competition from America, there is no gleam of promise in the British commercial sky."

An eastern journal very truly remarks, that this is a dreary picture, and the contemplation of it ought to make the United States put an end to croaking about hard times. We are not handicapped as England is, the expression on our farmers' faces was never more beaming, there is no prospect of a strike this summer, and Congress is out of the way. One of the New York *World's* foreign correspondents, notes the fact that the English political economists and financial writers are beginning to realize that American competition is not temporary, but a steady, permanent movement, and he predicts that foreign capital must necessarily pour into the United States, "infusing new life and energy into all departments of trade, and restoring American prosperity." Unless all signs fail, the live Yankee will soon be himself again, and go on prospering and to prosper.

Wisconsin. State Ag. Society.
Transactions
16
1877-78

RBW7
.AG75
16