

U. S. DEPARTMENT OF AGRICULTURE
OFFICE OF EXPERIMENT STATIONS

PROCEEDINGS

OF THE

EIGHTH ANNUAL CONVENTION

OF THE ASSOCIATION OF

American Agricultural Colleges and Experiment Stations

HELD AT

WASHINGTON, D. C., NOVEMBER 13-15, 1894

EDITED BY

A. C. TRUE, for the Office of Experiment Stations

AND

H. H. GOODELL, for the Executive Committee of the Association



WASHINGTON
GOVERNMENT PRINTING OFFICE

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U. S. DEPARTMENT OF AGRICULTURE.

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<p>ALABAMA—<i>Auburn</i>: College Station; W. L. Brown.† <i>Uniontown</i>: Canebrake Station; H. Benton.‡</p> <p>ARIZONA—<i>Tucson</i>: T. B. Comstock.§</p> <p>ARKANSAS—<i>Fayetteville</i>: R. L. Bennett.*</p> <p>CALIFORNIA—<i>Berkeley</i>: E. W. Hilgard.*</p> <p>COLORADO—<i>Fort Collins</i>: Alston Ellis.*</p> <p>CONNECTICUT—<i>New Haven</i>: State Station; S. W. Johnson.* <i>Storrs</i>: Storrs Station; W. O. Atwater.*</p> <p>DELAWARE—<i>Newark</i>: A. T. Neale.*</p> <p>FLORIDA—<i>Lake City</i>: O. Clute.*</p> <p>GEORGIA—<i>Experiment</i>: R. J. Redding.*</p> <p>IDAHO—<i>Moscow</i>: C. P. Fox.*</p> <p>ILLINOIS—<i>Urbana</i>: T. J. Burrill.†</p> <p>INDIANA—<i>Lafayette</i>: C. S. Plumb.*</p> <p>IOWA—<i>Ames</i>: James Wilson.*</p> <p>KANSAS—<i>Manhattan</i>: G. T. Fairchild.§</p> <p>KENTUCKY—<i>Lexington</i>: M. A. Scovell.*</p> <p>LOUISIANA—<i>Audubon Park, New Orleans</i>: Sugar Station. <i>Baton Rouge</i>: State Station. <i>Calhoun</i>: North Louisiana Station. W. C. Stubbs.*</p> <p>MAINE—<i>Orono</i>: W. H. Jordan.*</p> <p>MARYLAND—<i>College Park</i>: R. H. Miller.*</p> <p>MASSACHUSETTS—<i>Amherst</i>: Hatch Station; H. H. Goodell.*</p> <p>MICHIGAN—<i>Agricultural College</i>: C. D. Smith.*</p> <p>MINNESOTA—<i>St. Anthony Park</i>: W. M. Liggett.§</p> <p>MISSISSIPPI—<i>Agricultural College</i>: S. M. Tracy.*</p> <p>MISSOURI—<i>Columbia</i>: P. Schweitzer.¶</p>	<p>MONTANA—<i>Bozeman</i>: S. M. Emery.*</p> <p>NEBRASKA—<i>Lincoln</i>: C. L. Ingersoll.*</p> <p>NEVADA—<i>Reno</i>: J. E. Stubbs.*</p> <p>NEW HAMPSHIRE—<i>Durham</i>: C. S. Murkland.¶</p> <p>NEW JERSEY—<i>New Brunswick</i>: State Station; E. B. Voorhees.* <i>New Brunswick</i>: College Station; A. Scott.*</p> <p>NEW MEXICO—<i>Mesilla Park</i>: S. P. McCrea.*</p> <p>NEW YORK—<i>Geneva</i>: State Station; P. Collier.* <i>Ithaca</i>: Cornell University Station; I. P. Roberts.*</p> <p>NORTH CAROLINA—<i>Raleigh</i>: H. B. Battle.*</p> <p>NORTH DAKOTA—<i>Fargo</i>: J. B. Power.*</p> <p>OHIO—<i>Wooster</i>: C. E. Thorne.*</p> <p>OKLAHOMA—<i>Stillwater</i>: J. C. Neal.*</p> <p>OREGON—<i>Corvallis</i>: J. M. Bloss.*</p> <p>PENNSYLVANIA—<i>State College</i>: H. P. Armsby.*</p> <p>RHODE ISLAND—<i>Kingston</i>: C. O. Flagg.*</p> <p>SOUTH CAROLINA—<i>Clemson College</i>: E. B. Craighead.*</p> <p>SOUTH DAKOTA—<i>Brookings</i>: J. H. Shepard.*</p> <p>TENNESSEE—<i>Knoxville</i>: C. F. Vanderford.¶</p> <p>TEXAS—<i>College Station</i>: J. H. Connell.*</p> <p>UTAH—<i>Logan</i>: J. H. Paul.*</p> <p>VERMONT—<i>Wurlington</i>: J. L. Hills.*</p> <p>VIRGINIA—<i>Blacksburg</i>: J. M. McBryde.*</p> <p>WASHINGTON—<i>Pullman</i>: E. A. Bryan.*</p> <p>WEST VIRGINIA—<i>Morgantown</i>: J. A. Myers.*</p> <p>WISCONSIN—<i>Madison</i>: W. A. Henry.*</p> <p>WYOMING—<i>Laramie</i>: A. A. Johnson.*</p>
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* Director.

† President of board of direction.

‡ Assistant director in charge.

§ Chairman of council.

¶ Secretary.

¶ Acting director.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., April 25, 1895.

SIR: I have the honor to transmit herewith for publication Bulletin No. 24 of this Office, containing the proceedings of the Eighth Annual Convention of the Association of American Agricultural Colleges and Experiment Stations, held at Washington, D. C., November 13-15, 1894. The stenographic report of this meeting was made by Mr. R. M. Reese, of the Division of Entomology of this Department.

Respectfully,

A. C. TRUE,
Director.

Hon. J. STERLING MORTON,
Secretary of Agriculture.

CONSTITUTION
OF THE
ASSOCIATION OF AMERICAN AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.

NAME.

This Association shall be called the Association of American Agricultural Colleges and Experiment Stations.

OBJECT.

The object of this Association shall be the consideration and discussion of all questions pertaining to the successful progress and administration of the colleges and stations included in the Association, and to secure to that end mutual cooperation.

MEMBERSHIP.

(1) Every college established under the act of Congress approved July 2, 1862, or receiving the benefits of the act of Congress approved August 30, 1890, and every agricultural experiment station established under State or Congressional authority, the Bureau of Education of the Department of the Interior, the Department of Agriculture, and the Office of Experiment Stations of the last-named Department, shall be eligible to membership in this Association.

(2) Any institution a member of the Association in full standing may send any number of delegates to the meetings of the Association, but one shall be designated to the Association as the regular representative and voting delegate. The same delegate may represent both a college and a station, but shall cast only one vote in general sessions. Other delegates may be designated by any institution to represent it in specified sections of the Association, but such delegates shall vote only in such sections, and no institution shall be allowed more than one vote in any sectional meeting.

(3) Delegates from other institutions engaged in educational or experimental work in the interest of agriculture or mechanic arts may, by a majority vote, be admitted to conventions of the Association, with all privileges except the right to vote.

(4) In like manner, any person engaged or directly interested in agriculture or mechanic arts who shall attend any convention of this Association may be admitted to similar privileges.

SECTIONS.

(1) The Association shall be organized into sections upon (1) college work; (2) agriculture and chemistry; (3) horticulture and botany; (4) entomology; (5) mechanic arts. The executive committee shall, upon the request of any ten institutions represented in the Association, provide for the organization of provisional sections at any convention.

(2) Each section shall conduct its own proceedings and shall keep record of the same, and present a synopsis thereof to the Association at the close of every convention; and no action of a section, by resolution or otherwise, shall be valid until the same shall have been ratified by the Association in general session.

MEETINGS.

(1) This Association shall hold at least one meeting in every calendar year, to be designated as the annual convention of the Association. Special meetings may be held at other times, upon the call of the executive committee, for purposes to be specified in the call.

(2) The annual convention of the Association shall comprise general sessions and meetings of the sections, and provision shall be made therefor in the programme. The section meetings may be simultaneous or otherwise, at the discretion of the executive committee, but at least two sections of the Association, to be designated each year by the executive committee, shall present in general session of each convention a portion of the subjects coming before them.

OFFICERS.

(1) The general officers of this Association shall be a president, five vice-presidents, a bibliographer, and a secretary, who shall also be treasurer. The president, junior ex-president, the secretary, and four persons to be chosen by the Association, shall constitute an executive committee, which shall elect its own chairman.

(2) Each section shall, by ballot, nominate to the Association in general session, for its action, a chairman and a secretary for such section.

(3) Officers shall be chosen by ballot at the annual convention of the Association, and shall hold office from the close of the convention at which they are elected until their successors shall be chosen.

(4) Any person being an accredited delegate to an annual meeting of the Association, or an officer of an institution which is a member of the Association in full standing at the time of election, shall be eligible to office.

DUTIES OF OFFICERS.

(1) The officers of the Association shall perform the duties which usually devolve upon their respective offices.

(2) The president shall deliver an address at the annual convention before the Association in general session.

(3) The chairman of each section shall make, at the annual convention, a report to the Association in general session of the progress during the preceding year of the subject or subjects appertaining to his section, and such reports shall not occupy more than twenty minutes each.

(4) The executive committee shall determine the time and place of the annual conventions and other meetings of the Association, and shall, between such conventions and meetings, act for the Association in all matters of business. It shall issue its call for the annual conventions of the Association not less than sixty days before the date on which they are to be held, and for special meetings not less than ten days before such date. It shall be charged with the general arrangement and conduct of all meetings called by it. It shall designate the two sections to present in general session a portion of the subjects coming before them, and shall give notice thereof to the chairmen of such sections at least ninety days prior to the annual convention. It shall provide a well-prepared order of business and a programme of exercises, and shall make a seasonable issue of said programme. Said committee may fill any vacancy in an office or committee of the Association occurring after the adjournment of the annual convention, such appointee to serve until the next annual election.

FINANCES.

At every annual convention the Association, in general session, shall provide for obtaining the funds necessary for its legitimate expenses, and may, by appropriate action, call for contributions upon the several institutions eligible to membership; and no institution shall be entitled to representation or participation in the benefits

of the Association unless such institution shall have made the designated contribution for the year previous to that in and for which such question of privilege shall arise, or shall have had said payment remitted by the unanimous vote of the executive committee.

AMENDMENTS.

This constitution may be amended at any regular convention of the Association by a two-thirds vote of the delegates present, if the number constitute a quorum: *Provided*, That notice of any proposed amendment, together with the full text thereof and the name of the mover, shall have been given in the call for the convention. Every such proposition of amendment shall be subject to modification or amendment in the same manner as other propositions, and the final vote on the adoption or rejection shall be taken by yeas and nays of the institutions then and there represented.

RULES OF ORDER.

(1) The executive committee shall be charged with the order of business, subject to special action of the convention, and this committee may report at any time.

(2) All business or topics proposed for discussion and all resolutions submitted for consideration of the convention shall be read and then referred, without debate, to the executive committee, to be assigned positions on the programme.

(3) Speakers invited to open discussion shall be entitled to twenty minutes each.

(4) In general discussions the ten-minute rule shall be enforced.

(5) No speaker shall be recognized a second time on any one subject while any delegate who has not spoken thereon desires to do so.

(6) The hours of meeting and adjournment adopted with the general programme shall be closely observed, unless changed by a two-thirds vote of delegates present.

(7) The presiding officer shall enforce the parliamentary rules usual in such assemblies and not inconsistent with the foregoing.

OFFICERS OF THE ASSOCIATION OF AMERICAN AGRICULTURAL
COLLEGES AND EXPERIMENT STATIONS.

President,

H. E. ALVORD, of Oklahoma.

Vice-Presidents,

A. A. JOHNSON, of Wyoming; T. B. COMSTOCK, of Arizona;
A. Q. HOLLADAY, of North Carolina; E. B. CRAIGHEAD, of South Carolina;
O. CLUTE, of Florida.

Secretary and Treasurer,

J. H. WASHBURN, of Rhode Island.

Bibliographer,

S. W. JOHNSON, of Connecticut.

Executive Committee,

H. H. GOODELL, of Massachusetts, *Chair.*; M. A. SCOVELL, of Kentucky;
H. C. WHITE, of Georgia; H. P. ARMSBY, of Pennsylvania;
Ex officio: The PRESIDENT; the JUNIOR EX-PRESIDENT (S. D. LEE, of Mississippi);
the SECRETARY.

Chairmen of Sections,

Agriculture and Chemistry, E. B. VOORHEES, of New Jersey; College work, A. W. HARRIS, of Maine;
Entomology, C. P. GILLETTE, of Colorado;
Botany and Horticulture, S. M. TRACY, of Mississippi; Mechanic Arts, J. K. PATTERSON, of Kentucky.

Secretaries of Sections,

Agriculture and Chemistry, C. C. GEORGE-SON, of Kansas; College work, H. H. WING, of New York;
Entomology, J. M. ALDRICH, of Idaho;
Botany and Horticulture, W. R. LAZENBY, of Ohio; Mechanic Arts, F. P. ANDERSON, of Kentucky.

LIST OF DELEGATES AND VISITORS IN ATTENDANCE.

Alabama:

College: W. L. Brown, president; J. J. Wilmore, professor of mechanical engineering.

Station (Auburn): P. H. Mell, botanist and geologist.

Arizona:

College: T. B. Comstock, president.

Colorado:

College: A. L. Emigh, president of board of control.

Station: W. P. Headden, chemist.

Connecticut:

College (*Storrs*): B. F. Koons, president.

Station (*Storrs*): W. O. Atwater, director; C. D. Woods, vice-director and chemist.

Station (*State*): E. H. Jenkins, vice-director and chemist; W. E. Britton, horticulturist.

Delaware:

College: A. N. Raub, president; W. H. Bishop, professor of agriculture.

Station: M. H. Beckwith, horticulturist and entomologist.

Florida:

College: O. Clute, president.

Georgia:

College: H. C. White, president.

Station: R. J. Redding, director.

Illinois:

College: T. J. Burrill, professor of botany and horticulture; G. E. Morrow.

Indiana:

Station: C. S. Plumb, director.

Iowa:

College: H. Osborn, professor of zoology and entomology.

Kentucky:

College: J. K. Patterson, president; F. P. Anderson, professor of mechanical engineering.

Station: M. A. Scovell, director.

Louisiana:

College (Southern University, New Orleans): V. L. Roy, professor of chemistry and physics.

Maine:

College: A. W. Harris, president.

Maryland:

College: R. W. Silvester, president; W. T. L. Taliaferro, professor of agriculture; M. P. Scott, professor of biology and comparative anatomy; H. B. McDonnell, professor of chemistry; J. S. Robinson, professor of botany and horticulture.

Station: R. H. Miller, director; C. V. Eley, entomologist and physiologist; H. J. Patterson, chemist; E. H. Brinkley, assistant agriculturist; S. Key, assistant soil physicist; J. R. Owens, treasurer.

Massachusetts:*College:* H. H. Goodell, president.*College (Institute of Technology):* W. W. Tyler, professor of mathematics.**Michigan:***College:* L. G. Gorton, president; C. W. Garfield, trustee.*Station:* C. D. Smith, agriculturist.**Minnesota:***College:* W. M. Hays, professor of agriculture.**Mississippi:***College:* W. C. Welborn, professor of agriculture.*Station:* S. M. Tracy, director.**Missouri:***College:* R. H. Jesse, president.**Nebraska:***College:* L. Bruner, instructor in entomology.**New Hampshire:***College:* C. S. Murkland, president.**New Jersey:***College:* A. Scott, president.*Station (State):* E. B. Voorhees, director.*Station (College):* B. D. Halsted, botanist and horticulturist.**New Mexico:***College:* S. P. McCrea, president.*Station:* A. E. Blount, agriculturist and horticulturist.**New York:***Station (Cornell):* I. P. Roberts, director; H. H. Wing, deputy director and secretary.**North Carolina:***College:* A. Q. Holladay, president; B. Irby, professor of agriculture.*Station:* F. E. Emery, agriculturist.**North Dakota:***College:* J. B. Power, president.*Station:* E. F. Ladd, chemist.**Ohio:***College:* W. H. Scott, president; T. J. Godfrey, trustee; T. F. Hunt, professor of agriculture; W. R. Lazenby, professor of horticulture.*Station:* W. J. Green, vice-director and horticulturist.**Oklahoma:***College:* H. E. Alvord, president.**Pennsylvania:***College:* G. W. Atherton, president.*Station:* H. P. Armsby, director; W. Frear, vice-director and chemist.**Rhode Island:***College:* J. H. Washburn, president; W. E. Drake, professor of mechanical engineering.*Station:* C. O. Flagg, director.**South Carolina:***College:* E. B. Craighead, president.*Station:* W. L. McGee, agriculturist.**Tennessee:***College:* T. C. Karns, professor of philosophy and pedagogics.*Station:* C. F. Vanderford, secretary.**Vermont:***College:* M. H. Buckham, president.*Station:* J. L. Hills, director.

Virginia:

College (Hampton): C. L. Goodrich, instructor in agriculture.

West Virginia:

College: F. W. Raue, professor of agriculture.

Station: J. A. Myers, director; R. De Roode, chemist.

Wisconsin:

College: N. D. Fratt, trustee.

Station: W. A. Henry, director.

Wyoming:

College: A. A. Johnson, president.

U. S. Department of Agriculture:

C. W. Dabney, jr., Assistant Secretary.

Office of Experiment Stations: A. C. True, director; E. W. Allen, assistant director; W. H. Beal, W. H. Evans, J. F. Duggar, F. C. Test.

Bureau of Animal Industry: D. E. Salmon, chief.

Division of Chemistry: H. W. Wiley, chief.

Division of Forestry: B. E. Fernow, chief.

Division of Agricultural Soils: M. Whitney, chief; C. C. Moore, jr., J. P. Alexander, jr.

Division of Pomology: W. A. Taylor.

Weather Bureau: A. McAdie.

W. P. Cutter, librarian.

Canada:

Ontario Agricultural College: J. Mills, president.

Visitors:

E. Willits, J. R. Dodge, H. W. Diederich, J. W. Hoyt, G. De Chalmot, J. Hamilton, W. Thompson, jr.

CALL FOR THE CONVENTION.

By authority of the executive committee, a delegate convention of this Association is hereby called to meet in the city of Washington, D. C., on Tuesday, November 13, 1894, at 10 o'clock a. m.

[Here follow extracts from the constitution relating to membership and finances.]

In accordance with the provisions of the constitution, the Section on Agriculture and Chemistry and the Section on Entomology have been designated "to present in general session a portion of the subjects coming before them."

Upon proper application, notice is hereby given of the organization of a Section on Station Work which will be assigned position in the programme for this convention.

Mr. Cavitt, from the State Agricultural and Mechanical College of Texas, offered at the last convention the following as a proposed amendment to the constitution, and the same will therefore be subject to action by the convention now called, viz: Change the article entitled "Name" so that the same shall read:

Name.—This Association shall be called The Association of American Agricultural and Mechanical Colleges and Experiment Stations.

The headquarters of the Association will be at the Ebbitt House.

The general programme, and programmes for the sections will be duly issued, together with a circular of information as to travel, hotel rates, and places of the meetings.

For the executive committee:

HENRY E. ALVORD,
Chairman.

M. A. SCOVELL,
Secretary.

PROGRAMME.

TUESDAY, NOVEMBER 13, 1894.

- 9 a. m.—Meeting of the executive committee at the Ebbitt House.
10 a. m.—General session. Reports of committees and chairmen of sections.
2 p. m.—General session. Reports from chairmen of sections.
4 p. m.—All sections meet for organization and preliminary business.
7.30 p. m.—General session. New and miscellaneous business.
Annual address by the President of the Association.
9 p. m.—Meetings of Sections on College Work, Horticulture and Botany, and Entomology.

WEDNESDAY, NOVEMBER 14, 1894.

- 9 a. m.—General session. General business.
Consideration of proposed amendment to constitution (see Proceedings of Convention of 1893, p. 63) and action thereon.
Address by Prof. J. W. Hoffman, Ph. D., Director of Agricultural Department, Tuskegee Institute, Ala., on The Colored Farmers of Alabama.
Address by Hon. William T. Harris, LL. D., Commissioner of Education, Department of the Interior.
2 p. m.—Meetings of the Sections on Agriculture and Chemistry, on Mechanic Arts, on Entomology, and (Provisional Section) on Station Work.
7.30 p. m.—General session. Reports on resolutions, appointment of committees, etc. Presentation of subjects from the Section on Agriculture and Chemistry.

THURSDAY, NOVEMBER 15, 1894.

- 9 a. m.—General session. Action on resolutions, committee reports, and business from sections. Election of officers.
Address by Inspector-General Breckinridge, United States Army.
Address by Hon. Charles W. Dabney, jr., LL. D., Assistant Secretary of Agriculture.
2 p. m.—Meetings of the Sections on College Work, on Horticulture and Botany, and on Entomology.
7.30 p. m.—General session. Nominations and other reports from the sections. Presentation of subjects from the Section on Entomology. Adjournment of the convention.
9.30 p. m.—Social gathering at the Ebbitt House. Reception tendered by the Association to the Secretary of War, the Secretary of the Interior, and the Secretary of Agriculture.

PROGRAMMES FOR THE SECTIONS.

I. SECTION ON AGRICULTURE AND CHEMISTRY.

1. The Scope of the Short Courses in our Agricultural Colleges. Discussion to be opened by H. H. Wing, of New York, and J. L. Hills, of Vermont.
2. Shall the Full Course in Agriculture be Specialized? H. J. Waters, of Pennsylvania, and C. C. Georgeson, of Kansas.
3. The Attitude of the Agricultural Colleges toward University Extension, W. C. Latta, of Indiana, and S. M. Emery, of Montana.
4. The Office of the Station Bulletin, H. H. Goodell, of Massachusetts, and M. A. Scovell, of Kentucky.
5. Cooperation of Experiment Stations in Field Experiments and Dairy Investigations, C. D. Woods, of Connecticut, and W. W. Cooke, of Colorado.
6. Cooperation of Stations with Farmers' Organizations in Experiment Work, E. H. Jenkins, of Connecticut, and F. E. Emery, of North Carolina.

NOTE.—The gentlemen assigned are not expected to prepare written papers, but merely to give form and character to the discussion of the topics named.

II. SECTION ON ENTOMOLOGY.

1. The Use of Arsenites on Tobacco, H. Garman, of Kentucky.
2. The Entomological Work of Experiment Stations, H. Osborn, of Iowa.
3. The Economic Value of Parasites, F. M. Webster, of Ohio.

III. SECTION ON HORTICULTURE AND BOTANY.

1. Two Fungus Diseases of Oats Prevalent in Maine, F. L. Harvey, of Maine.
2. Fertilization of Grape Flowers, S. A. Beach, of Geneva, N. Y.
3. Proper Position of Hybrids in the Classification of American Grapes, H. N. Starnes, of Georgia.
4. Effect of Change of Soils upon Growth of Wheat, H. L. Bolley, of North Dakota.
5. A Contribution to the Life History of *Gleosporium fructigenum*, Berkeley, and *Sphaeropsis malorum*, Peck., William B. Alwood, of Virginia.
6. What Shall Constitute a Variety from the Standpoint of the Horticulturist? G. W. McCluer, of Illinois.
7. Position of Greenhouse Benches for Experiment Work, and Construction of Greenhouse Benches for Subirrigation, W. J. Green, of Ohio.
8. Determination of Sex in *Shepherdia argentea* by Bud Characters, L. C. Corbett, of South Dakota.
9. Field Experiments with Fungicides, B. D. Halsted, of New Jersey.
10. Weed Migration in the State of Iowa, and Rot of Ruta-bagas, L. H. Pammel, of Iowa.
11. Plant Breeding at the Experiment Stations, E. S. Goff, of Wisconsin.

PROCEEDINGS.

MORNING SESSION, TUESDAY, NOVEMBER 13, 1894.

The convention was called to order at 10.30 a. m. in the hall of the Cosmos Club by Vice-President G. E. Morrow. The meeting was opened with prayer by President M. H. Buckham, of the University of Vermont.

The CHAIRMAN. We are deprived to-day of the presence of our president, General Lee. I need not say that we all regret this, or that he regrets it as much as we do. It is no lack of interest in the Association that keeps him away; it is the condition of his invalid wife, which makes it unsafe for him to leave her for even a day at a time. Very recently he decided that he would be unable to come, and he wished me to express his regret that this was the case and his best wishes for the Association, for its work, and for this meeting in particular. It becomes my duty, as best I can, to stand for a time in his place.

We will first listen to the report of the executive committee, H. E. Alvord, chairman.

REPORT OF THE EXECUTIVE COMMITTEE.

The committee chosen at the Chicago convention organized for the year 1893-94 by electing as chairman, Henry E. Alvord, of the District of Columbia, and as secretary, M. A. Scovell, of Kentucky.

The several subjects referred to the committee by the last convention have received due consideration and action. Reports upon some of them have been made by circular. The committee has performed its duty in preparing for the present convention, and submits for approval the programme as printed.

This convention being held in Washington, it has seemed desirable to make engagements for participating in the proceedings with officials representing the three Executive Departments of the Government with which the institutions composing the Association (in the main) have official relations. Invitations have therefore been extended to and accepted by those officers who have most direct connection with the colleges and stations, and are best informed as to their work.

The colleges or branch institutions for the instruction of colored youth in agriculture and the mechanic arts, all eligible to membership in this Association, have been represented at the annual conventions in two or three instances by one or two delegates, but have never participated in the proceedings or presented any of the results of their work. A similar institution in Alabama, not a beneficiary of the Mor-

ril acts, but entitled by courtesy to a seat in this convention, gave notice of its purpose to send a delegate to this meeting and this person has been assigned a place in the programme to describe some of the work done by the institution which he represents.

As so often before, the committee found it necessary to give close attention to the progress of legislation during the last session of Congress, to guard the various interests intrusted to the institutions composing this Association.

The Sayers bill, repealing all permanent appropriations from the Treasury—including, of course, the annuities under the Morrill Act of 1890—and substituting a system of annual appropriations for all purposes, was in a doubtful state for months. It has never been reported from the committee, but may yet appear at the coming session of Congress. The subject received careful attention, and your committee is confident that if the bill is reported, it will include several exceptions, and the college annuity will be among them.

During the early spring a proposition appeared very unexpectedly, incorporated in the Army appropriation bill, cutting off the commutation of quarters for officers on duty at colleges and requiring every college, before receiving such detail, to provide quarters free for the officer. This measure had the almost unanimous support of the Committee on Military Affairs, including some of the strongest men on both sides of the House of Representatives. For a time it seemed probable this provision would pass the House, but active measures secured the interest of members friendly to the colleges, and the objectional features were struck from the bill when in Committee of the Whole House. This was a short but spirited contest, and very satisfactory in showing once more the strength which this Association can command—in the halls of Congress—when necessary to sustain a good cause.

This movement, combined with other circumstances, made it inexpedient to do anything toward bringing forward the plan of having the War Department supply uniform clothing and camp equipage to the land-grant colleges the same as to the Army. This plan is favored by the Inspector-General of the Army, and would not be objected to by other high officers. But the present Quartermaster-General of the Army, whose Bureau would be affected by such a law, is unalterably opposed to the project. The increase in the number of officers on college and school duty, and correspondingly of the young men and boys by them instructed, would make the expense of uniforms very great, if supplied to all, and for that reason the proposition will be opposed by the Secretary of War. Altogether, your committee considers it unwise for the Association to agitate this subject further at present, beyond giving moral support to the officials of the War Department who may declare in its favor.

There are other points of interest in connection with the military departments of land-grant colleges which seem to need attention at the War Department. Army officers naturally favor those institutions which furnish the greatest number of persons for drill and which give special prominence to the military feature, by requiring uniforms to be worn at all times, keeping students under military regulations continually, and placing the entire subject of discipline in charge of the military professor. In the recently published report of the Adjutant-General of the Army, that officer recommends the detail of officers to largely attended city high schools rather than to land-grant colleges offering fewer students for drill, and proposes that the law be changed so that no officer shall be detailed to any institution having less than 150 students actually present and required to perform military duty. Already the Department has refused to detail officers to some of the smaller agricultural and mechanical colleges, on the ground that they had too few students in attendance, notwithstanding the legal obligation to teach military tactics at these colleges. In short, despite the phraseology of the existing law, the Department reserves the right to refuse a detail to any college for reasons sufficient to itself, and as mentioned, there are indications of a tendency to discriminate against land-grant colleges.

Since the last full conference between a representative committee of this Association and the War Department officials (in 1890), the latter have entirely changed in

personnel with the exception of the Inspector-General. It seems well, in view of these facts, for this convention to consider whether it would not be wise for the Association to provide for another formal conference on military matters with the Secretary of War and his assistants.

In accordance with the action of the Association, the attention of the Secretary of the Interior has been called to the inadequacy of the provisions in the Bureau of Education for maintaining suitable relations with the land-grant colleges and giving them such assistance as seems proper and practicable on the part of the Department. The Secretary has expressed himself as fully appreciating this subject, and although he has not found it expedient to take decided action as yet, he has declared his intention of doing so at an early date, somewhat on the line of the Office of Experiment Stations in the Department of Agriculture. It seems probable that this matter will receive the necessary attention without further effort on the part of this Association.

Based upon the action of the Association at its last convention, your committee proposed to the Committee on Agriculture of the House of Representatives an addition to the annual appropriation bill, giving to the Secretary of Agriculture supervisory powers in connection with the expenditure of experiment station funds under the Hatch Act. The Department of Agriculture concurred in this proposition and the new legislation was perfected as announced by Association circular. Subsequently the Department invited the cooperation of this committee, as representing the interest of the stations, in preparing the "Form of annual financial statement" to be "prescribed" by the Secretary with accompanying schedules and regulations. The committee consulted station treasurers, accountants, and other officers as far as time and circumstances permitted, and a special and prolonged meeting was held in this city in this connection. Various opinions were developed, as was to be expected, but a compromise conclusion was reached which, in the main, accorded with the views of nearly all, and this was substantially adopted by the Department. The perfected form of the papers and the model report and schedules are to be credited to the Office of Experiment Stations.

This legislation and the resulting form of report has been regarded as a matter of great importance by your committee, and it is hoped that the end attained will meet with general approbation. It could not be expected to satisfy the views of all in matters of detail. It seems to be a question not yet decided whether the Department should confine its supervision to a critical examination of the annual reports, rendered after the year has closed to which they refer, or should adopt other means to "ascertain whether the expenditures under the [Hatch Act] appropriation * * * are in accordance with the provisions of the said act," during the progress of the active operations of the station year. There is certainly grave doubt as to the sufficiency of the financial reports alone giving the Secretary of Agriculture the necessary information to enable him to do justice to the stations and their work in his required report to Congress thereon. It may be well for the representatives of the stations at this convention to give some expression to their views on this part of the subject.

The lectures of Sir Henry Gilbert, LL. D., F. R. S., etc., as special delegate from the Lawes Agricultural Trust for the year 1893, were commenced under the auspices of this Association at its last convention, and were concluded at the Massachusetts Agricultural College. These lectures comprise the only complete and authorized review of the famous investigations of Lawes and Gilbert at Rothamsted during a half century. The manuscript has been revised by Dr. Gilbert, and your committee is gratified to be able to announce that the Department of Agriculture has liberally and wisely decided to publish the lectures entire, as a special bulletin from the Office of Experiment Stations.

A very cordial letter has been received, through the Office of Experiment Stations, from Dr. P. Nobbe, president of the Association of Agricultural Experiment Stations

of the German Empire, inviting participation in the annual meeting of that body by any and all representatives of the stations in this country. The seventh general meeting of the German Association was held at Dresden in September last. It would be appropriate for this eighth convention of the American Association to reciprocate this courteous attention, and the suggestion is offered that this convention might inaugurate a system of international conference and cooperation through representative delegates.

During the past year the executive committee has issued five circulars of information in the interests of the Association. The last of these, dated November 1, 1894, relates to procuring busts of Senator Morrill for such colleges as want them. This circular is distributed at this convention with a view to having action taken here which will save the executive committee much correspondence and probably insure more satisfactory results than could be obtained by letters.

At the adjournment of the last convention there was a very small cash balance in the treasury of the Association and a debt of about \$1,000 existed, resulting from the work of the Association at the Columbian Exposition. The Chicago convention fixed the annual contribution at \$15 for the purpose of meeting this debt. Ninety-four institutions have responded to this call and your committee is pleased to announce that the Association is now free from debt, and the report of the treasurer will show enough cash on hand to meet all the expenses of the present convention and leave a balance larger than a year ago. It is believed that a contribution of \$10 from every college and every station eligible will be sufficient for the needs of the Association during the coming year.

Appended is a list of the institutions eligible to membership in this Association, but which, under the provisions of the constitution (title, "Finances"), are not entitled to representation in this convention.

Although the executive committee, after mature deliberation, deemed it unwise to hold the convention of 1894 during the summer months, it is of the opinion that the preference for a summer meeting, frequently expressed by many, should be regarded, and the time fixed accordingly for the convention of 1895. The chief difficulty will be found in combining with such a time the conditions which seem essential as to place. When not meeting at Washington, there is a very general wish to visit some associate institution which is in session, and at the same time ample hotel accommodation and good railroad facilities are prerequisites of a successful convention.

Since the programme for this convention was printed, President Lee has been compelled, by reason of illness in his family, and much to his regret, to deny himself the pleasure of attending this meeting. He sends fraternal greetings, and has joined his associates of the executive committee in requesting Vice-President Morrow to preside in his stead and deliver the annual address.

Respectfully submitted, for the executive committee.

HENRY E. ALVORD, *Chairman.*

WASHINGTON, D. C., *November 13, 1894.*

(Mr. Alvord then read a statement of a personal nature, setting forth his inability to continue as chairman of the executive committee.)

On motion of Mr. Johnson, of Wyoming, the report of the executive committee was adopted and ordered printed in the proceedings of the convention.

On motion of Mr. Armsby the programme of the executive committee and the rules of order were adopted by the convention.

The CHAIRMAN. The next business will be the report of the treasurer.

Mr. Scovell read the report, as follows:

REPORT OF THE TREASURER OF THE ASSOCIATION.

M. A. Scovell, treasurer, in account with Association of American Agricultural Colleges and Experiment Stations.

Balance on hand at last meeting.....	\$9.63
Moneys received since last meeting—dues, 1892-93.....	40.00
Dues, 1893-94.....	1,400.00
Total.....	1,449.63
Expenditures.....	1,367.33
Balance on hand.....	82.30

EXPENDITURES.

Stationery and printing.....	88.40
Dairy test committee.....	1,031.44
Subcommittee on "Form of report".....	111.74
Rental, room in Washington.....	78.00
Stenography (Washington).....	37.00
Sundries.....	20.75
Total, as above.....	1,367.33

ITEMIZED STATEMENT.

Receipts.

1893.		
Nov. 21.	Florida Experiment Station.....	\$10.00
1894.		
Jan. 4.	North Dakota Agricultural College.....	10.00
26.	South Dakota Agricultural College.....	10.00
Feb. 8.	Washington Experiment Station.....	10.00
Mar. 31.	Cornell University Experiment Station.....	15.00
31.	Agricultural and Mechanical College of Alabama.....	15.00
31.	Alabama Experiment Station.....	15.00
31.	Delaware College Agricultural Experiment Station.....	15.00
Apr. 4.	Hampton Normal and Agricultural Institute of Virginia.....	15.00
4.	North Carolina Experiment Station.....	15.00
4.	Massachusetts Agricultural Experiment Station.....	15.00
4.	Massachusetts Hatch Experiment Station.....	15.00
4.	Massachusetts Agricultural College.....	15.00
4.	Arkansas Agricultural Experiment Station.....	15.00
4.	Missouri Agricultural Experiment Station.....	15.00
4.	Connecticut Agricultural Experiment Station.....	15.00
4.	Virginia Agricultural and Mechanical College.....	15.00
4.	Virginia Agricultural Experiment Station.....	15.00
4.	West Virginia Agricultural Experiment Station.....	15.00
5.	University of Tennessee.....	15.00
6.	Mississippi Agricultural and Mechanical College.....	15.00
6.	Mississippi Experiment Station.....	15.00
7.	Georgia Experiment Station.....	15.00
9.	North Carolina College of Agriculture and Mechanic Arts.....	15.00

Receipts—Continued.

1894.		
Apr.	9. Louisiana State University and State Agricultural and Mechanical College.....	\$15.00
	9. Maryland Agricultural College.....	15.00
	9. State Agricultural College of Colorado.....	15.00
	10. Ohio Experiment Station.....	15.00
	11. University of Tennessee Agricultural Experiment Station.....	15.00
	11. Storrs Agricultural College Experiment Station....	15.00
	11. Delaware Agricultural College.....	15.00
	12. Iowa Agricultural Experiment Station.....	15.00
	12. Purdue University.....	15.00
	12. Cornell University.....	15.00
	12. Ohio State University.....	15.00
	12. Agricultural and Mechanical College of Kentucky..	15.00
	12. Pennsylvania State College.....	15.00
	12. Louisiana Experiment Station.....	15.00
	12. Pennsylvania Agricultural Experiment Station....	15.00
	18. Maine State College.....	15.00
	18. University State of Missouri Agricultural College ..	15.00
	18. Iowa Agricultural College.....	15.00
	18. Oregon State Agricultural College.....	15.00
	19. University of Minnesota Experiment Station.....	15.00
	21. Montana.....	15.00
	21. Maryland Agricultural Experiment Station.....	15.00
	21. Rhode Island Agricultural Experiment Station....	15.00
	21. Rhode Island Agricultural College.....	15.00
	23. Agricultural Experiment Station University of Arizona.....	15.00
	23. University of Arizona.....	15.00
	23. New Hampshire College of Agriculture and Mechanic Arts.....	15.00
	26. University of Minnesota.....	15.00
	28. Vermont Agricultural Experiment Station.....	15.00
	28. New Hampshire Agricultural Experiment Station...	15.00
	28. Kansas State Agricultural College.....	15.00
	28. Kansas Agricultural Experiment Station.....	15.00
	30. Purdue Experiment Station.....	15.00
	30. New Jersey State Agricultural Experiment Station..	15.00
May	2. Nevada State University.....	15.00
	2. Nevada Agricultural Experiment Station.....	15.00
	10. Sheffield Scientific School.....	15.00
	15. University of Vermont and State Agricultural College.....	15.00
	16. University of Wisconsin.....	15.00
	16. University of Wisconsin Agricultural Experiment Station.....	15.00
	17. Nebraska Agricultural Experiment Station.....	15.00
	17. Michigan Agricultural College.....	15.00
	17. Michigan Agricultural Experiment Station.....	15.00
	17. Kentucky Agricultural Experiment Station.....	15.00
	21. University of Nebraska.....	15.00
	26. New Mexico Agricultural and Mechanical College ..	15.00
	26. Agricultural Experiment Station of New Mexico....	15.00
	28. University of California.....	15.00

Receipts—Continued.

1894.			
June	4.	Georgia State College of Agriculture and Mechanic Arts.....	\$15. 00
	9.	Experiment Station University of Illinois.....	15. 00
	9.	Rutgers Scientific School, New Jersey College.....	15. 00
	9.	State Agricultural Experiment Station of Colorado.	15. 00
	30.	West Virginia University.....	15. 00
July	2.	University of Illinois.....	15. 00
	16.	New Jersey State Agricultural College Experiment Station	15. 00
	27.	Maine Experiment Station.....	15. 00
Aug.	8.	South Dakota Agricultural College.....	15. 00
	8.	South Dakota Agricultural Experiment Station.....	15. 00
	16.	Wyoming University	15. 00
	16.	Wyoming Experiment Station.....	15. 00
	30.	Washington Agricultural College Experiment Station, balance.....	5. 00
Sept.	13.	Utah Agricultural College and Experiment Station, in part payment.....	20. 00
	14.	North Dakota Agricultural College.....	15. 00
	14.	North Dakota Experiment Station	15. 00
	14.	North Dakota Station, dues 1892-93.....	10. 00
	19.	Oklahoma College	15. 00
Oct.	5.	Texas Agricultural and Mechanical College.....	15. 00
	8.	Clemson Agricultural College.....	15. 00
	8.	South Carolina Experiment Station.....	15. 00
	20.	Utah Agricultural College and Station, balance due.	10. 00
	22.	Oklahoma Experiment Station.....	15. 00
	29.	Massachusetts Institute of Technology.....	15. 00
July	11.	Florida College and Station, on dues 1893-94.....	20. 00
Nov.	12.	Southern University Louisiana.....	15. 00
		Total.....	1,440. 00

Expenditures.

1894.			
Apr.	21.	Sarah S. Johnson, rent of room at 932 New York avenue, Washington, for use of executive committee for three months.....	\$42. 00
	21.	Dr. H. P. Armsby, expenses dairy committee.....	142. 05
	21.	S. M. Babcock, expenses dairy committee.....	111. 31
	23.	I. P. Roberts, expenses dairy committee.....	156. 26
	28.	Judd & Detweiler, printing and stationery.....	30. 00
	28.	S. M. Babcock, expenses dairy test committee to October 1.....	69. 00
	28.	M. A. Scovell, expenses dairy test committee.....	183. 40
May	12.	Transportation Printing Company, printing letter-heads, bills, etc.....	10. 90
July	9.	H. P. Armsby, balance expenses dairy committee... ..	64. 70
	9.	S. M. Babcock, balance expenses dairy committee... ..	96. 00
	21.	I. P. Roberts, balance expenses dairy committee....	100. 00
	21.	M. A. Scovell, balance expenses.....	108. 72
	21.	Sarah S. Johnson, rent of room, Washington, for office executive committee from April 30 to June 30.....	36. 00
	21.	Ebbit House, board executive committee.....	28. 00

Expenditures—Continued.

1894.		
Sept. 29.	H. H. Goodell, expenses Washington committee on report.....	\$30.00
Oct. 5.	H. P. Armsby, expenses Washington committee on report.....	21.04
	5. M. A. Scovell, expenses Washington committee on report.....	32.70
	5. Express on programmes and circulars.....	.75
	18. M. E. Olcott, stenographic work.....	37.00
	18. Judd & Detweiler, printing.....	28.50
	Postage and stationery.....	6.75
Nov. 13.	Paid H. E. Alvord, sundry expenses.....	20.00
	13. Paid Judd & Detweiler, printing.....	12.25
	Total	1,367.33

On motion of Mr. Vanderford, the report was referred to an auditing committee of three, appointed by the chair, consisting of Messrs. Vanderford, Buckham, and Godfrey.

The CHAIRMAN. I will call now for the report of the Section on Agriculture and Chemistry, to be presented by Mr. Henry, of Wisconsin.

Mr. HENRY. The Section on Agriculture and Chemistry occupies so large a part of the proceedings of this body that I have no special report to make, believing that the time can be better occupied by the general session. There was no special work before the section.

There were no reports from the sections on College Work, Botany and Horticulture, and Entomology.

The CHAIRMAN. The remaining section is that on Mechanic Arts.

Mr. WASHBURN, of Rhode Island. I have no special report to make for the Section on Mechanic Arts. I do not know why this section was not included on the regular programme. I presume the report was not received in time, for which I am sorry. I did not know but that it was because a section on mechanic arts has no business in an association of American agricultural colleges, and I do not suppose that it has. I think it really ought to be an association of American agricultural and mechanical colleges. I will say, however, that we have a very good programme, and I invite all who are interested in the mechanic arts to attend our session.

The CHAIRMAN. This report will be received without formal motion. The reports have been surprisingly brief.

Mr. ARMSBY, of Pennsylvania. I dislike to appear in the rôle of a critic, but with your permission I wish to read a short section from the constitution on the duties of officers:

(3) The chairman of each section shall make, at the annual convention, a report to the Association in general session of the progress during the preceding year of the subject or subjects appertaining to his section, and such reports shall not occupy more than twenty minutes each.

The words I wish to say, Mr. President, are not dictated by any desire to criticise, but simply for the good of the Association. When this provision was adopted, it was adopted, as I understand it, with the thought that such reports of progress on what had been going on in the different departments during the past year would be of great value to the Association in helping to weld together the sections into which otherwise the Association would almost inevitably split up. It seems to me unfortunate, at least, that this idea, underlying this provision of the constitution, can not in the future be carried out. I repeat that I make this suggestion simply in the interests of the Association, and not from any desire to find fault.

The CHAIRMAN. I desire to add my word to what has been so well said. I heartily believe in the great value and wisdom of the course of the Association in dividing into sections, but I should also consider it a great misfortune if the failure to make these reports should tend to separate us, so that all our work except purely formal work in general session be done in sections.

Mr. ALVORD. I move that those portions of the report of the executive committee referring to military department matters and to the procuring of the Morrill bust be referred bodily to the Section on College Work for consideration.

Ordered.

Mr. ALVORD. I now move that the portions of the report of the executive committee relating to new legislation regarding station funds and to the invitation from the German Association of Experiment Stations be referred to the new provisional section on station work for its consideration.

Adopted.

Mr. ALVORD. For the executive committee, I now ask leave to read two paragraphs of the constitution, relating to membership:

(3) Delegates from other institutions engaged in educational or experimental work in the interest of agriculture or mechanic arts may, by a majority vote, be admitted to conventions of the Association, with all privileges except the right to vote.

(4) In like manner, any person engaged or directly interested in agriculture or mechanic arts who shall attend any convention of this Association may be admitted to similar privileges.

I am instructed to move that the chiefs of the several divisions and bureaus of the Department of Agriculture be admitted to the floor of this convention with all privileges under this provision of the constitution, and that all visitors who have registered and come under the fourth provision of membership be also admitted to the floor of this convention during its proceedings.

Adopted.

Mr. BUCKHAM. I move that the personal statement made to us by the chairman of the executive committee be referred to a committee of three, to be appointed by the chair, with instructions to report at a future meeting of this general session.

Adopted.

The CHAIRMAN. The chair will nominate the committee in a moment. Is there any further business?

Mr. BURRILL. It seems to me proper that we should send a greeting to our absent president, and, under the circumstances, a telegram of sympathy also. Therefore I move that the secretary be requested to send such a telegram to General Lee.

Ordered.

Mr. HARRIS. I understand that ex-Assistant Secretary of Agriculture Willits is in the city, and as he has been of such great service to this Association, I move that the secretary of this body be instructed to extend him an invitation to attend our meetings.

Ordered.

Mr. BUCKHAM. I am sure the Association will understand why I make this motion, which is, that the Association appoint a committee of three to wait upon Senator Morrill, who, I understand, is in town, and express to him the respect of this Association and invite him to attend our meetings.

Adopted.

The CHAIRMAN. Will the convention kindly designate this committee? There may be personal reasons for selecting certain members.

Mr. KOONS. I would name as chairman of the committee Mr. Buckham.

Mr. Harris named the chairman of the Association.

The CHAIRMAN. I will name Mr. Broun, of Alabama. The chair now announces as the committee on the personal statement made by the chairman of the executive committee, Mr. Buckham, of Vermont, who made the motion; Mr. Harris, of Maine, who is peculiarly fitted because of his intimate association with that work, and, that the other side of the Association may be represented, the chair will nominate Mr. Plumb, of Indiana.

Adjourned at 11.50 a. m.

EVENING SESSION, TUESDAY, NOVEMBER 13, 1894.

The convention was called to order at 7.45 p. m. by Vice-President Frear.

Mr. JOHNSON. I offer the following resolution:

Resolved, That the executive committee of this Association be requested to select Denver, Colo., as the place for the next annual meeting in 1895, if in harmony with the best interests of the Association, and that we suggest August 15 to October 1 as the most suitable season of the year.

If this resolution is seconded, I desire to present some very important matters from the city of Denver. (Mr. Johnson then read communications from the Denver Chamber of Commerce, the mayor of the city, the Mining Exchange, and the Manufacturers' Exchange, indorsing the invitation to meet at Denver in 1895. He vouched for the interest of Senators Teller and Wolcott in the work of the land-grant col-

leges, and set forth the advantages and attractions of Denver as a convention city.)

Referred to the executive committee.

Mr. HARRIS. There are reasons this year why we should give unusual attention to the selection of officers of the Association, and although this is a very early point in the convention, I think it wise to appoint a committee now to make nominations. I therefore move that the chair appoint a committee of three on nominations.

Mr. Alvord suggested that this committee had usually consisted of seven members.

Mr. Harris accepted the suggestion and the motion as amended was carried.

Mr. HAYS. I would like to say something regarding an invitation from Mr. Northrop for the Association to meet in Minnesota. We are ready and anxious to entertain you at Minneapolis. The invitation is given very heartily and comes from the two cities of St. Paul and Minneapolis. Regarding railroad rates, I am authorized to say by the representatives of the lines centering at Minneapolis that we shall be able to get for you rates of one or possibly one and one-half for the round trip.

Mr. SCOTT. I have no desire to enter Ohio in opposition to Colorado and Minnesota, but the Association has once or twice expressed a willingness to come to Ohio, and circumstances have intervened which made it desirable to meet elsewhere in both cases. We are ready to receive the Association whenever it desires to come, and will give it a cordial welcome.

Hon. Edwin Willits, ex-Assistant Secretary of Agriculture, who entered at this moment, was invited by the chair to address the convention. He responded very briefly, declining to make a speech, but expressing his pleasure at meeting the Association and wishing it continued growth.

The CHAIRMAN. I have a letter from the secretary of the Cosmos Club, stating that the privileges of the club are extended to the members of this Association during the present week.

A resolution was adopted that the Association accept with thanks the courtesy of the Cosmos Club.

Mr. Vanderford, chairman of the auditing committee, reported that the committee had examined the accounts of the treasurer and found them correct, with proper vouchers for each item of expenditure.

Report adopted.

The vice-president, G. E. Morrow, of Illinois, delivered the annual address as acting president of the Association.

PRESIDENT'S ADDRESS.

MR. CHAIRMAN, MEMBERS OF THE ASSOCIATION, LADIES AND GENTLEMEN: When at the meeting of the Association at Chicago last year the election of General Lee as president for the year was announced, it at once occurred to me that the choice

was a peculiarly fortunate one, in that the Association would have the help of a wise counselor, and especially that those of us who should be able to attend this convention would have the pleasure of hearing an address from one who has had long and remarkably successful experience in the management of an institution which has peculiar features and in which we all feel a deep interest. Very recently, to my entire surprise, and I need not say regret, I learned that he would not be here, for the sad reason given. Recognizing that the time was very short to do it in, I wrote urging that he would at least prepare an address. He replied that the same cause which prevented his being present would prevent him from preparing an address, and requested me to deliver an address in his stead. I therefore stand, as best I may, in his place, and will read you such words as I have been able to prepare.

"The test of national welfare is the intelligence and prosperity of the farmer." These words by the graceful essayist, thoughtful student, and friend of his country and his kind, George William Curtis, may well stand at the head of an address before this Association, which owes the possibility of its existence to the belief by the people, represented by Congress, that the institutions it represents would be helpful to the national welfare; and this by adding directly to the intelligence of the farmers of the country by giving them the best special education for their work, and thus aiding their prosperity, and by directly advancing their prosperity by communicating to them the results of research and investigation as to methods by which they can most profitably conduct their business.

We may not easily overestimate the extent and importance of the work this Association represents. No longer with boastfulness and exhilaration do thoughtful Americans speak of the vastness of our country and the problems that confront us. As a nation we have passed beyond the buoyancy of spirit and impulsive confidence of youth to the cares, anxieties, and thoughtfulness of maturity. And so, not boastfully nor flippantly—perhaps almost appalled, but rather, let us hope, stimulated to increased effort by the vastness and importance of the field of labor—we recognize the fact that the interest we represent is, by far, the chief material interest of this great nation; the one on which millions of our citizens directly depend for their livelihood, and the one the prosperity or adversity of which most quickly and most directly affects the welfare of all classes. Not more honorable than other needed industries, agriculture is the great basal industry of the world on which others peculiarly depend.

This great industry shares the depression which has affected all the working forces of our land. Aside from this, as we hope, temporary depression, American agriculture is in a transition stage, and none of us may with certainty predict the outcome in all directions. In a degree greater than ever before the American farmer is feeling the effects of direct competition with a vastly increased number of his fellows in his own land and of many millions in many other lands. In the sale of his products he is made aware of the fact that whether or not modern civilization has made all the world more akin in kindly feeling and mutual helpfulness, it has brought all people closer together in the competition of trade. He realizes that modern means of transportation have made the supply of an agricultural product almost anywhere in the world an appreciable factor in supplying the demand for that product almost anywhere else in the world. If he be thoughtful he must recognize the fact that in the future he must work on a narrower margin of possible profit than in the past. He sees that economical methods of production are the foundation essentials to success; and he is asking more earnestly than ever before how he may most wisely dispose of and distribute the products of his farm. He is beginning to ask not only for new or better methods of production, but whether there be not new crops he may wisely produce, or whether there be not new uses for old crops, and thus the stress of competition in supplying the old wants be lightened.

As we look over the field we see the commencement or the full progress of agricultural changes, the outcome of which we await with interest if not with anxiety.

We find the available public lands practically exhausted. Nowhere, in all the country, is there any considerable body of Government land now available for ordinary agricultural operations. Consequent upon the almost unparalleled drought of the year we are seeing a backward ebb of the tide of farmers that has steadily flowed westward, and the conviction on the part of many that there are large areas which have been settled by farmers but which must be abandoned by them unless irrigation can be made practicable. We have heard overmuch perhaps of the abandoned farms in the oldest settled portions of the country, but it is clearly true that over large areas prices for farm lands have been greatly lowered; that much land once regularly cultivated is now waste. Alongside this we see other large areas, with great natural fertility or exceptional artificial advantages, in which prices for farm lands have advanced until they seem to have reached a maximum under present conditions.

The extent and rapidity of the changes in our farming population may well give us concern. There are three great drainage systems carrying vast numbers of our people from farms. Two of these are inevitable, and if we are wise we will not fight the inevitable. We will not only submit, but adapt ourselves to it. The first of these drains is that from the country to the city. This will continue. The percentage of our farmers, as compared with those engaged in other callings, will become smaller. There is no lack of agricultural products. We produce much more than we consume. We feed our rapidly increasing population and have an increasing surplus for export. Often three-fourths of all the exports from our country in a year are those of agricultural products. The second of these drains is that from the farms of the older to those of the more newly settled portions of the country. This means no loss of productive power; only change of the place where it is exercised. This movement is inevitable and clearly wise in many cases. When the real or supposed advantages of different sections of the country are more nearly equalized, it will cease in large degree. The third of these drains is in full progress in my own State, and I witness it with regret, and protest that it is not, at least it ought not to be, inevitable. This is the removal of farmers when they have acquired a competence or have passed the prime of life from the farms to the country towns and villages. The results are often unfortunate for these farmers and their families; not always desirable to the communities to which they go, and very often deplorable to the communities they leave. In many cases there is not only the loss of wise, energetic, experienced men, but the advent of a tenantry distinctly inferior as citizens and farmers. In a multitude of farming communities there has been a marked retrogression during the last twenty years in the intellectual and moral tone, as well as in the appearance of and methods pursued on the farms.

An increase not only in the number but in the percentage of tenants on American farms seems inevitable, unless there is a recasting of our system of land tenure. Whether such increase of the tenantry is to be a great misfortune will depend on the character of the tenantry and the terms on which they hold the land. If the system be one of equitable partnerships between landowners and those who furnish not only labor but skill, there need be nothing of degradation or injustice to either party. If the system be one in which wealth and intelligence dictates terms to ignorance and poverty, which can furnish only labor without skill, the results will be bad for the tenants, bad for our agriculture, and bad for national welfare. Emerson has said: "That that is bad for the bee can not be good for the swarm."

There are great changes in our land ownership. In some parts of the country the process of subdivision of farms seems to be going on. It will be a great misfortune if this be carried to the extent that shall bring us a peasant proprietorship. In other sections there is a manifestation of "land hunger" by the rich. An instance comes to mind of a multimillionaire of the metropolis of the central west, largely interested in banks, in railways, in mines, in manufacturing enterprises; the coiner of the phrase "speculation is civilization," and steadily striving to prove his own advanced civilization by the extent of his speculative operations—this man is the owner of tens of thousands of acres of farm lands, and is quietly adding other

thousands to them year by year. This is but one of many cases of like character. What they may mean may well give us pause.

Much as the labor question has been in evidence one phase of it has received little attention. When a manufacturing establishment closes its doors and hundreds or thousands of workmen are thrown out of employment we properly regard it as a great misfortune. Many have not seriously considered the fact that, largely because of the nature of the work, but partly because of the peculiarities of our farming system, each year, on the approach of winter, not hundreds, not thousands, not scores of thousands, not hundreds of thousands, but literally millions of men and boys employed on the farms of the United States during summer are thrown into comparative or absolute idleness, so far as work on the farms is concerned. The unequal demand for labor at different seasons of the year is one of the weak places in our farming system. A thoughtful observer from France has recently called attention to this, and emphasized, as one cause of it, the absence of minor agricultural industries. We are lacking in farm manufacturing. This same observer was much impressed by and highly complimented the perfection of our farm machinery, as have multitudes of other intelligent students of our agriculture. This large use of machinery makes necessary both intelligent direction and intelligent workmen on our farms.

In many ways the ingenuity of the inventor and the skill of the mechanic are adding to the productive power of our farms. Not always have we been able to equally rapidly find markets for these products.

These are some of the conditions seen by thoughtful students of American agriculture, and each suggests great problems not fully solved.

If we look at special conditions of the year, we are confronted by the effects of the most disastrous drought ever known in our country, measured by the diminution of farm products. How far can irrigation be made practicable; what are the best methods of introducing the system where it is practicable; how can we best conserve the rainfall where this is deficient, and how best reduce evaporation during drought, are questions which ask themselves.

We see the end, we may hope, of the reduction in price of one of our great cereals, a reduction which has caused wheat to cease to be used almost exclusively as food for man and led to perhaps one-seventh of the crop for the year being fed to farm animals. It would seem that efforts to induce Europeans to use maize as food for man might be suspended for a time while we urge them to more largely use wheat.

To the agricultural colleges and experiment stations is given the duty and privilege of carefully considering and trying to solve the problems suggested by this hasty sketch—and others like them.

I closely associate the two classes of institutions here, as I always do in my thought. It is well they are linked together in the name of this Association, as they are by law. In exceptional cases it has been thought best to separate them, but I wish to emphasize my earnest conviction that, as a rule, an intimate union is best for both; that the teacher should investigate and the investigator teach. That there are difficulties in the proper adjustment of the work is freely admitted. Usually the attempt to make an equal division of time and thought between the two classes of work will be unwise. But for teacher, investigator, student, and the farming public, I believe there should be good opportunity and good use of the opportunity for each worker to observe, and for many of them to do work both as teacher and investigator.

We all admit something of disappointment in the results as yet reached by the agricultural colleges in giving direct education along agricultural lines. They have done good work and are doing more and better than ever before; but at the best they reach directly only a very small percentage of the farming population. In the discussions at former meetings of this Association many reasons have been given for this condition. Perhaps a chief reason for our disappointment is that many of us had too high hopes. It was hardly reasonable to expect that any large percent-

age of the working farmers or mechanics of the country should have a full collegiate education.

The indirect influence of these institutions has been most important and beneficial. They have had large effect in modifying and improving methods in higher education. They have exalted the study of nature and have given stimulus and honor to the study of useful applications of science. If the time ever was when the scientist whose work was in the direction of seeking to make discovered truth directly useful to mankind felt that he was on a lower plane than was his fellow engaged in the study of "pure science" that time has gone forever, and men in this Association, in this room, have helped banish it.

While this Association has principally concerned itself with the agricultural side of the colleges, I am heartily glad a section has been established devoted to the mechanic arts side. Not grudgingly, but most gladly, we whose work has to do chiefly or wholly with the agricultural side recognize the remarkable development and success of the departments of mechanic arts in many of the land-grant colleges and universities. We may not forget if we would, and we ought not if we could, that by the very terms of the law providing for the establishment of these institutions, as well as by any fair estimate of what will be best for the national welfare, mechanic arts are placed alongside and on a level with agriculture. Local conditions and present emergencies modify the plans of institutions; some wisely give more attention to the one, others to the other side, but neither has exclusive right to the provision designed to aid in the education, not of any one branch of the workers of the nation, but of "the industrial classes."

And may I, whose work has been so exclusively along severely practical lines, express the earnest hope that never shall members of this Association give either sneer or ridicule to the plea that the colleges it represents shall do what they may in giving that education which tends to develop what we call culture. Alongside the word "practical" as descriptive of the education to be given by these institutions the law places the word "liberal." In even the most extended college courses we can do little more than give starting points along a few lines. There must be wise selection, and our charter laws clearly indicate what must be the leading lines of study. But we make a grave mistake if we needlessly strike out of the curriculum anything that directly tends to liberal culture.

It is interesting to note the fact that only one specific requirement is made by law as to what shall be taught. There is express direction that these institutions shall teach military tactics. It is pitiful if student or officer ever allow himself to feel that this was an unreasonable requirement to accompany a munificent endowment by the nation. Does it not rather suggest that it is the high privilege of these institutions, not only to teach young men so they may be better fitted to pursue useful callings, and better fitted to defend their country by force of arms if ever the sad need be, but also to fit them for the best possible discharge of all the duties of the citizen?

The keynote of all I am trying to say is that the advancement of the national welfare is the one chief and sufficient reason for the establishment of these colleges and stations. And this is to be done not alone by helping young men and women to be better farmers, machinists, housekeepers, scientists, but also by helping them to be better citizens, better men and women.

The work of the experiment stations has been highly successful; in view of all the circumstances phenomenally so. They were necessarily hastily organized. The mass of the workers were inexperienced; some proved to be incompetent. There have been too many changes. Boards of management and workers alike have often not sufficiently appreciated the loss that comes from frequent changes of workers or lines of work. There have been mistakes made in choosing lines of investigation and more serious ones in changing the lines when once chosen. Important interests have been partly neglected. There has been some needless duplication of work. The ideal cooperation between stations has not been reached. There have been cases

of hasty generalization from insufficient data. In other words, station directors and workers have been human beings working along comparatively unfamiliar lines.

Granting all this and much more, the good already accomplished is very great. There has been accumulation of a great mass of useful facts, and the clear formulation of many important principles. These have been widely distributed. They have affected our agricultural literature. The subjects discussed and, still more, the method of discussing these subjects in agricultural papers has been modified. A few days since I examined a recent work on a practical agricultural subject by a practical farmer. Every chapter, almost every page, contains references to or quotations from the bulletins of experiment stations as worthy of highest respect. Already agricultural practice is being affected, and for good.

The successes of the past stimulate us for the future. The mistakes and failures of the past must never be an excuse or a reason for lessened effort. They may warn us to change our methods, but can not be a reason for lessened effort to accomplish a work laid upon us. Some day, somehow, somewhere, the problem of fully popularizing agricultural education is to be solved, and solved for America.

I plead, then, for persistent, hopeful work in both college and station, and along two lines of work in each. In the colleges let us strengthen the agricultural courses. Let there be shorter, more elementary courses also, but in each agricultural college, whether there be few or many who seek it, let there be facilities for education and training in agriculture the full equal of the facilities for an education along any other line. Let there be more, not less, of science; more, not less, of culture, if time permit; but in an agricultural college let us magnify the teaching of agriculture.

There are great difficulties. In these colleges we are seeking to give two educations in four years—sometimes starting with only the education gained in the public schools—a general and a professional one. A supposed or superficial familiarity with agricultural subjects tends to lessen interest in their study. There has been a lack of definition of what the teacher of agriculture may properly teach. On the one hand he has often felt obliged to teach a wider range of subjects than anyone could thoroughly master. On the other hand he has sometimes felt warned off from a full discussion of almost any part of agriculture, on the ground that he is trenching fields belonging to the "scientist." He has sometimes been expected to impart only details of practice.

And, as one who has given years to this work, I may be permitted to name as one chief difficulty in the way of successful, popular teaching of agriculture, the lack of knowledge of how best to teach it. I can think of no greater help to the cause of distinctive agricultural education than may be expected to come from systematic, perhaps long-continued, study, by some of the best men in the work, of methods of teaching agriculture—in the broad meaning of the word—and the devising of apparatus for use in such teaching. Some of us have paid far too little attention to the study of methods of teaching in general. Most of us know almost nothing of methods of teaching agriculture, except what we learned from the practice of our own teachers or from our own experience.

Aside from the value of a study of agriculture as a help to more successfully practicing it, I believe it can be so taught as to be not only as interesting but have as much disciplinary value as almost any other study, but this can only be done by those who know how.

An appreciation of the importance of better systematized methods of teaching agriculture is not new with me. Years before this Association was organized I had the honor of suggesting and aiding in the organization of a modest society of teachers of agriculture and horticulture, the chief object of which, in my own mind, was to help its members to better teach their specialties. The society met annually for several years. We enjoyed much; we learned much; but little directly along this special line.

I am sure that all engaged in the work feel the need of which I have spoken. A letter recently received from Professor Hunt, of the Ohio State University, whose

unusual success as a teacher of technical agriculture might lead us to suppose he would feel this need less than many others, so well expresses my thought that I quote a part:

"One line of thought has been forcibly presented to my attention. It is better methods of instruction in technical agriculture and the difficulty in successfully teaching the knowledge we possess because our information is not systematized along any pedagogic lines. Subjects like mathematics, English, and some other sciences are now so thoroughly systematized and graded that a student not only comprehends the subject much more speedily, but gets a much better training at the same time. Methods that are appropriate in language or mathematics would not be appropriate in teaching technical agriculture. New methods must be worked out and these methods must be systematized and printed for common use before any great success in teaching can be obtained. I am thoroughly convinced that a small proportion, but fairly large aggregate of students will study agriculture when they can learn as much in a given time and get as much thorough scholastic training in the study as they now do when they study Greek, Latin, and mathematics.

"We must confess our deficiencies in this matter and try and overcome them. To overcome them some men must devote a considerable part of their time to the development of proper methods, and when these methods are developed there ought to be some method of publication and coordination of the methods so that each worker in the line can profit by the work of the different individuals. We have at the present time a most admirable experiment station system by which every station worker profits by the work of every other station worker. The matter is published and widely distributed free of charge and then is summarized and systematized in the Office of Experiment Stations at Washington. In this matter of instruction, however, we have no system whatever. Every instructor is a law unto himself, which is no law whatever, and there is absolutely no method by which others may profit by any good ideas which he develops. I know this to be a matter about which you have thought a great deal for many years and you appreciate the situation, I am sure, quite as fully as I do.

"Could there not be some system by which the United States Department of Agriculture could help to systematize and coordinate the work of technical instruction in agriculture?"

Whether or not the means suggested by which this work can be best done prove practicable or most desirable, I earnestly commend the subject to the Association and especially to those directly charged with the duty of giving instruction in agriculture.

There need be no shame in making this full acknowledgment of the need of a well-defined system of teaching agriculture. Have not the methods of teaching almost all sciences, even of teaching language and mathematics, been greatly modified within recent years? Have there not been revolutions not only in methods of teaching but also in the whole mass of illustrative material used in teaching some sciences? Does not the valuable report of "the committee of ten" seem to show that we have little idea of proper order and proportion in our teaching in the public schools?

Alongside this thorough, higher, full-course teaching of agriculture which I have been advocating, I would have shorter, simpler, purely "practical" courses—the longer the better. I would have these courses extend through two years where this is practicable; one year, if this be all that seems possible; three months, where no more can be done. I would teach in these courses the beginnings of science and the primer of its agricultural applications if need be, as well as have courses designed to give training in specific branches of farm work.

Such short courses can not give a well-rounded education, and there will always be need for care lest those attending them fall into error on this point. But they may do much good. I would have such courses absolutely free if need be. I would grant special scholarships for them if this is necessary.

I hope there may be a much more extended trial than we have yet had of a modification of the university extension lecture system as a means by which instruction may be given in agriculture to those who can not come to the colleges. It is more difficult for residents of farming communities to come together regularly than for those who live in towns and villages. It is probable it may be best, in many cases, to have the lectures for agricultural communities given in close succession rather than at intervals. The instruction given at farmers' institutes is valuable, but generally is fragmentary in character. Gratifying results have come from trials of the plan of having professors from the colleges give one or more courses of lectures in connection with the institutes, or at meetings arranged for the purpose.

A fair measure of success has come from some efforts to make use of the Chautauqua system of reading circles in teaching agriculture. With due regard to their chief work, I would have college professors and station workers avail themselves of every opportunity to give instruction in the way of lectures, articles in the agricultural papers, discussions at farmers' meetings, etc., not only because such work is abundantly worth doing in itself, but also because it is one of the most effective methods of arousing or increasing interest in better and fuller agricultural education.

I may not weary your patience with more than a brief reference to station work. I would have more of research and experiment along purely scientific lines, not restricting such work to that which gives large promise of immediate and direct practical applications, not stopping it even if good men are unable to see its utility. Alongside this I urge the continuance of the plain, "practical" lines of experiment.

Not many striking discoveries will be made, but that which seems unimportant in itself may be of vast importance in aggregate results. If experiments by station workers should enable the farmers of the country to increase the average yield of corn one peck per acre, the value of this increased yield would be far above the cost of all the stations.

I name only two of many important lines of work—the introduction of new crops to secure greater variety of agricultural products, and the finding of new uses for the crops we already produce. There may be great possibilities in this direction. The definition of a weed as a plant the virtues of which we have not yet discovered suggests that there may be most important uses in plants now little regarded. The large range of uses to which cotton seed and its products are now put suggests that we may have been content with very partial utilization of other products of our farms.

As firmly as ever do I believe there should be more of cooperation between stations working along the same lines, and that there should be more of differentiation of work between stations. But more clearly than formerly do I see difficulty in securing these things. It is hard to resist the pressure for trial of experiments admittedly important. The wise rule seems to be that each station should have a very few main lines of work, with possibly a number of minor and incidental ones. But the fact that one station has done most excellent work along one line and received deserved credit for it, is often made an argument why the station in an adjacent State should do the same work. There is difference of opinion even among station officers as to what constitutes a too narrow or a too wide range for work. In discussing the work of one of the stations, the director of another gave it praise but thought the attempt had been made to investigate too many problems. The director of the station in an adjoining State also praised the work, but thought the station at fault in having neglected important fields of experimentation.

Much as has been accomplished in making the results of the work done available to farmers, I believe much more is desirable. The bulletins of the stations reach only a small minority of the farmers. Many of these bulletins are more valuable to station workers and to those with a fair education in science than to farmers generally. Valuable as is the aid given by some agricultural papers in disseminating the results of station experiments, these usually give only partial results.

I would be remiss in a duty and deny myself a pleasure if I did not bear hearty testimony to the admirable work done in this direction by the Office of Experiment

Stations. Its Record is invaluable and its Handbook is the best ready-reference work we have. But these aids are chiefly used by station workers. I believe the time has come when there should be much compilation of results already obtained, and that these compilations, in form and matter, should be adapted to popular use. Making such compilations is not showy work; it will not bring fame to those who do it, but I doubt if there is a more useful work awaiting some of the best trained station investigators. The plan of having two classes of bulletins, one giving processes and results, the other giving conclusions based on these results, has much to commend it. The station worker may care much more for a detailed record of what we saw or did than for what we think these things teach. Many farmers care little for the means by which conclusions are reached, as they assume these were wisely chosen and accurately used, but will read with interest what we think we have proven.

In a peculiar degree the success of both agricultural colleges and experiment stations depends on their being kept in close touch with the people. Endowed by the General and State Governments, dependent for their full success on additional endowments, it is peculiarly fitting and necessary they should, as nearly as possible, be working in line with the popular thought. The relations of all connected with them and the public should be frank and cordial. Especially would I impress the importance of keeping the colleges in close relationship with the public school systems of the States. But the choice of the most desirable lines of work and of methods of doing that work must finally be decided by those directly charged with the conduct of these institutions. Trustees, boards of control, presidents, faculties, directors, and station workers can not escape the responsibilities resting upon them. The general policy must be decided by the boards of control, subject to the plain provisions of law. The carrying out of this policy, the choice of methods, and all details will wisely be left to those who are to do the work.

It is one of the most pleasant and valuable characteristics of this Association that its membership is not confined to any one class of workers in this great field, but includes trustees, college presidents, station directors, members of the college faculties, and station staffs. It is a cause for congratulation that each of these classes is so well represented at this meeting, especially that there are so many members of boards of control, and that almost all sections of the country are represented. It has been wisely provided that much of the work of the Association shall be done in meetings of the several sections, but I urge that we make much of the opportunities for meeting together, of seeing questions from different standpoints, that each may be better prepared for doing his own part. It is a great work, with many divisions. No one can work in all or know very much of all, but each will do his own share best if he have a clear apprehension of the whole.

I close with the repeated thought that the institutions this Association represents were established and are maintained not for us, not primarily for those who attend them or are directly aided by them, but as means for advancing the welfare of the nation, and this by increasing the intelligence and prosperity—in the widest meanings of the words—of the great industrial classes of the nation. We will come, do our little part, and go; but the work will go on with increasing efficiency, increasing appreciation by and value to the nation and the States to the wise liberality of whose statesmen it owes its inception and the possibility of its continuance on so broad a scale.

MORNING SESSION, WEDNESDAY, NOVEMBER 14, 1894.

The Association was called to order at 9.45 a. m. by Chairman Morrow.

Mr. HARRIS. The Section on College Work has two matters to report to the Association. The executive committee called attention to the plan for the purchase of a bust of Senator Morrill. The Section

on College Work passed the following resolution, which it submits for your approval:

Resolved, That the executive committee be authorized to take subscriptions, order casts, and to obtain the marble bust proposed, and keep it in a suitable place in Washington for subsequent use.

Adopted.

Mr. Alvord stated that the executive committee would receive subscriptions for the plaster casts of this bust until the new executive committee was appointed. The cost was \$50, which might be reduced by further subscriptions to \$45 or \$40.

Mr. HARRIS. The attention of the Section on College Work was called to the fact that the entrance requirements and courses of study in the various colleges, including not only the agricultural but other departments, vary very greatly. Attention was also called to the fact that high school preparatory courses were not only very different in different States, but in different parts of the same State. A committee was appointed to report immediately upon what action might with profit be taken by the Association to remedy this. The committee reported as follows:

That a committee of five be appointed by the Association, which committee shall report at the next annual meeting, and that the executive committee be asked to defray all expenses of the committee.

That the committee be authorized to confer with the New England Association of Colleges, the Committee of Ten, the National Educational Association, and such other bodies or associations as may be, and to embody the results of such conferences in its report to this Association.

I move the adoption of that recommendation.

Seconded.

Mr. TYLER, of Massachusetts. I have been very much interested, personally and officially, in this matter of entrance requirements, and am in full sympathy with the motion proposed. I should be personally glad if, among the societies specifically named in the resolution, were included the Society for the Promotion of Engineering Education. This society was organized at Chicago last year, and had its second meeting last August in Brooklyn. The matter of college entrance requirements was very carefully treated in a paper by Professor Craven, of the University of Kansas, and aroused considerable discussion. At the close of the discussion it was voted that a committee of five be appointed by the Association to consider entrance requirements and report at the next annual meeting of the Association. The field to be covered is of course not identical with that represented in the present Association, but certainly on the mechanical side of this Association the work is very much common to the two. I think the result would be very satisfactory on both sides if there were the best possible cooperation between the two committees.

Mr. HARRIS. While the field is of course not identical with the field we represent here, it is entirely included within it, and the last clause

of this resolution was intended to include associations of this sort. It seems to me, however, that the Association for the Promotion of Engineering Education should be mentioned by name, and I therefore second the amendment of Mr. Tyler.

The amendment was carried. The report of the College Section was then voted upon and adopted.

The CHAIRMAN. This carries with it the appointment of a committee of five. I call attention to the fact that this is a very important committee.

On motion the chair was directed to appoint the committee.

The chair announced the following gentlemen as the committee on nominations: Messrs. A. W. Harris, A. A. Johnson, W. L. Broun, W. A. Henry, C. W. Garfield, C. F. Vanderford, and A. C. True.

Mr. Scovell (secretary) stated that while he had been unwilling to decline to serve as secretary while the Association was in debt, he now felt, as the burden was removed, that he must decline a reelection to the office of secretary.

Mr. SCOVELL. I would state that there are 65 institutions represented here, and 37 States; 105 members and visitors are present.

The CHAIRMAN. If there is no further business of a general character, we will proceed to the consideration of the proposed amendment to the constitution. (See proceedings of the convention for 1893, p. 64.)

Mr. Cavitt offered the following resolution in regard to the name of the Association:

Resolved, That the name of this Association shall be so changed as to hereafter read as follows: "American Association of Agricultural and Mechanical Colleges and Experiment Stations."

May I ask Mr. Alvord if the executive committee has made any report on this proposed change of name?

Mr. Alvord stated that the executive committee had incorporated it in the programme, which brought it before the Association.

The CHAIRMAN. I understand, then, that we have before us a proposal to change the name of this Association so that it shall read "American Association of Agricultural and Mechanical Colleges and Experiment Stations."

Mr. HARRIS. I move to amend by striking out "American Association of Agricultural and Mechanical Colleges and Experiment Stations," and substituting therefor "Association of American State Colleges."

Mr. BROUN. The objection to the present name was that it is too long and not sufficiently comprehensive to include the mechanical branch of the colleges. I move, if we change the name, to call it the "Association of Morrill Land Grant Colleges." This is brief and comprehensive and commemorates the name of Senator Morrill.

Mr. Holladay seconded Mr. Broun's amendment.

Mr. PLUMB. How does that affect Canadian institutions?

The CHAIRMAN. Do I understand Mr. Broun to desire or not desire to make any reference to experiment stations?

Mr. BROWN. It is proposed to include experiment stations.

Mr. PATTERSON. I think that whatever nomenclature be adopted, it ought to be in conformity with the organic act of 1862, and with the acts of the several States accepting the trust implied in that act. The act of 1862 knows nothing of the suggestion made by Mr. Broun. It is not designated the Morrill Act, but an act for the endowment of agricultural and mechanical colleges in the several States of the Union, and whatever legislation has been had by Congress recognizes the fact that this supplementary legislation is designed to supplement and complete the organization of the colleges under the original act. The same objection applies to the change moved by Mr. Harris. There are State colleges which have neither part nor lot in this endowment. Now, whatever change be adopted, it ought to be in conformity with Federal and State legislation. These ends will be accomplished by the amendment introduced by Mr. Cavitt last year, and all the requirements of those who desire a change in the designation of this Association will be met by the insertion in the present name of the words "and mechanical." I do not believe in any cumbrous nomenclature; the shorter the name the better, so that it expresses adequately what we want to express by the name of the Association. It was argued at New Orleans that the mechanical side of these colleges ought to obtain recognition in this Association. There is a general disposition to recognize that. This disposition is shown on the part of those connected with mechanical training in these colleges to bring their part of the institutions up to the level which has been obtained by the other sections represented here. I think we can not evade the responsibility attaching to the development of the mechanical side of these institutions of learning. It is important that we should educate the agriculturists; it was truly said that they are the backbone of American industry, but there are mechanical industries that will be second in importance only to the agricultural interests of the country. It is important that we educate our mechanics, our laboring classes, and do as much for them as for the agriculturists. You are well aware that there is a constant tendency of the agricultural population to move from the rural districts to the towns. When you bring that fact into connection with another important fact, namely, that practically all the wealth of the country is in the cities, you bring together the two explosive elements that endanger this country. I argue that education for the artisan is as important as for the agriculturist, and Congress in its farsightedness foresaw in 1862 that that would be the case. From these points of view it seems to me we can not neglect this duty to further the development of the mechanical side as largely and liberally as the other side. The other side is well established; the mechanical side is unfortunately not so. In a great many institutions established under the land-grant act, mechanical training is still in its infancy. What I want this Association to encourage by its official act is to give it the

recognition it deserves. Let Congress and the several States see that we are in earnest about this matter, and that, while we are not going to neglect the one, we are equally willing to foster the other.

Mr. SCOTT. It gives me great pleasure to second the speech of Mr. Patterson as I did at New Orleans two years ago. It seems to me he has hit the right nail on the head. We must adhere closely to the national purpose as expressed in the organic act of 1862. The act says, "colleges for the benefit of agriculture and the mechanic arts;" the two are there associated and we shall be safe if we keep close to that original and organic act. I have debated in my mind some time for a substitute that should be comprehensive and at the same time descriptive, and I have come to the conclusion that we can know no better name than that proposed in this amendment. I do not like such adjectives, but for the present I think this amendment should prevail, and that the colleges should be known as the agricultural and mechanical colleges. I would that it might be colleges for the benefit of agriculture and the mechanic arts, but that seems cumbrous. Therefore I support the amendment proposing that this Association shall be the "Association of American Agricultural and Mechanical Colleges and Experiment Stations." It seems quite necessary to include the experiment stations, not only because we have college experiment stations which are in the act designated departments of colleges, but because we have State experiment stations associated with us as well. Therefore they should be included in the title of the Association.

Mr. CLUTE. I agree heartily with the speeches that have been made in regard to our name, but I think we ought to avoid a long and cumbrous title and am inclined to believe that we can find a name that shall adequately describe the colleges and stations and that shall be brief. It seems that we all desire to honor Mr. Morrill, from whom we have our first and second grants, and we should all like to honor Mr. Hatch, who introduced the bill. We want to include colleges and stations in all their departments in the name. It seems to me, therefore, that if we call our Association the "Morrill-Hatch Educational Association," we shall have a short, yet comprehensive, name.

Mr. HARRIS. There seem to be two objections to the proposed name. It is too long, and for that reason I favor leaving out the experiment stations. It does not seem to me necessary to mention in the name all the institutions that are entitled to membership. The second objection to calling this an association of agricultural and mechanical colleges and agricultural experiment stations seems to me more important. It tends to confine the Association to those colleges here represented. The time is coming when every college in the land will be willing to be in fact, if not in name, an agricultural and mechanical college. Already there exist many good agricultural colleges in the United States which do not call themselves such. I see here my good friend, Mr. Atwater, and if I counted the men who have received inspira-

tion from him and the men who have received instruction in that old classical college, I think you would agree with me that at Middletown, Conn., there is a first-class agricultural college—a better one than we find in many of our States to-day. There is a representative here from the Institute of Technology, and in the Institute of Technology there exists now an admirable course in agriculture; they do not call it agriculture, but that is what it really is. For that reason I think it important that we should stamp out, if we can, the word “agricultural college.” Any college with the word “agriculture” in its name seems to the public something less than other colleges. If there is such a thing as an agricultural college, it is first a college, and afterwards agricultural. Now, what shall the name be? It is proposed that we shall follow the organic acts, but you will find no name there. Does not the Pennsylvania State College conform to the organic act as well as the agricultural and mechanical college of some State or other? Does not the University of Wisconsin conform to the act better than some other institutions? What, then, shall we select? Some one out of many characteristics must receive emphasis. I believe that the most important idea we represent is not agricultural education, nor the wider industrial education, but *State education*—the assertion that the State owes it to every boy and every girl to give, not the meanest education it can get off with, but the very best education, which shall take him from his A B C’s until he receives his diploma from the State university. For these reasons I am in favor of my own amendment, and I should call the Association the “Association of American State Colleges,” and include all the arts, the old-fashioned liberal arts among them, when you can.

Mr. HENRY. We have been quarreling about what the baby’s name shall be ever since it was born. To-day it is said that the mechanical section of this Association is already leading the agricultural. They seem to be doing very well; why not let them alone? I learn that 37 States are represented in this convention; I learn that adjectives do not represent them, and yet we propose to add another adjective. If the mechanical section is doing its work so well, why not let it go on? Our name is good enough, and I move that the proposed amendment lie on the table.

Seconded.

The yeas and nays were called for, with the result that 33 yeas and 16 nays were recorded, as follows:

Yeas—Messrs. A. L. Emigh, C. S. Plumb, A. W. Harris, H. H. Goodell, W. M. Hays, W. C. Welborn, W. P. Headden, C. D. Woods, R. H. Miller, S. M. Tracy, S. P. McCrear, I. P. Roberts, J. B. Power, W. H. Scott, H. E. Alvord, T. C. Karns, M. H. Buckham, C. L. Goodrich, F. W. Rane, N. D. Fratt, A. A. Johnson, A. C. True, A. E. Blount, H. H. Wing, E. F. Ladd, W. J. Green, H. P. Armsby, C. O. Flagg, W. L. McGee, C. F. Vanderford, J. L. Hills, J. A. Myers, W. A. Henry.

Nays—Messrs. W. L. Broun, A. N. Raub, O. Clute, J. K. Patterson, W. W. Tyler, R. H. Jesse, P. H. Mell, M. A. Scovell, C. S. Murkland, A. Scott, A. Q. Holladay, J. H. Washburn, E. B. Craighead, E. B. Voorhees, F. E. Emery, V. L. Roy.

The chairman then introduced Mr. J. W. Hoffman, who delivered an interesting address on "How Tuskegee Assists the Colored Farmers of Alabama."

Mr. Broun spoke in indorsement of the Tuskegee Institute, and commended its exhibit at Montgomery. He spoke of the excellent moral training given, and stated that its students became good citizens. In industrial education, he thought, lay the best hope for the colored race.

The chairman expressed the pleasure the Association had had in listening to Mr. Hoffman's address, and then introduced Director True, of the Office of Experiment Stations, who delivered the following address:

THE WORK OF THE OFFICE OF EXPERIMENT STATIONS.

The agricultural experiment stations have three agencies for promoting their general interests. One is this Association, and I may say that the Department of Agriculture has recently given an official opinion that such an association is an essential feature of a great system of experiment stations like our own, and is therefore entitled to the support of all the stations. A second agency is the journal called "Agricultural Science," so ably conducted by Dr. Frear, of Pennsylvania. This offers an opportunity for a freer and wider discussion of station methods and results than is appropriate in Government publications, and is, or may be, virtually the continuation of the discussions of this Association at monthly intervals throughout the year.

The third agency is the Office of Experiment Stations, which, whatever its functions as a branch of the Department of Agriculture, is primarily established to render the stations such assistance as will best promote the objects for which they were organized. The office desires above everything else to keep in close touch with the stations, to have their hearty support in its undertakings, and to receive their intelligent criticism of its mistakes.

As a delegate of that office to this convention I desire very briefly to speak of some of the ways in which the office has sought to promote the interests of the stations, and I may add of the colleges likewise, during the past year.

There are many evidences that the work of our stations is better appreciated not only in this country but in those lands where the experiment stations have been longest established. One pleasing evidence of this is the cordial invitation received this year from Dr. Nobbe, president of the Association of German Experiment Stations, to representatives of American stations to attend the annual meeting of that association.

While there is now, as probably there always will be, room for improvement in the management and work of the stations, there is no doubt that these institutions are firmly entrenched in the favor and support of the great agricultural public. They have proved their usefulness by their good works, and as a rule they are pursuing the object for which they were established with greater earnestness, intelligence, and success than ever before. The world-wide system of which the American stations are but an important part is extending and growing stronger every year. Within the past few days a message has come from a portion of the Orient, where agriculture has scarcely made any progress since the pyramids were built, asking for the aid of this country in an effort to establish the experiment station there.

Certainly we have every incentive to do our best work, each in his appropriate place and way, to promote the great interests of agricultural science and education, which are so vitally related to the welfare of our fellow-men of every nation.

In the time allotted me I can not, perhaps, do better than to briefly review the work of the Office of Experiment Stations during the past year and point out some of the ways in which the office has sought to promote the general interests of the agricultural colleges and experiment stations. In doing this I shall anticipate some

things which will probably appear in the Annual Report of the Department, but it may be that the oral statement of them will be more intelligible than the written, and will open the way for questions and suggestions from members of this convention either at this time or in informal conversations or otherwise hereafter.

During the fiscal year ending June 30, 1894, the office issued 24 documents, aggregating 2,089 pages. These include 12 numbers of the Experiment Station Record with index, 6 bulletins, 2 farmers' bulletins, and 4 circulars. In these publications, with one or two exceptions, the work of the individual experiment stations was compiled for distribution throughout this country and the rest of the civilized world. The fifth volume of the Experiment Station Record comprises 1,196 pages and contains abstracts of 267 bulletins and 43 annual reports of 55 experiment stations in the United States, and 67 publications of the Department of Agriculture. The total number of pages in these publications is 17,161. There are also 227 abstracts of reports of foreign investigations. The total number of titles abstracted is 973, classified as follows: Chemistry, 46; botany, 42; bacteriology, 4; zoology, 6; mineralogy, 1; meteorology, 36; water and soils, 36; fertilizers, 72; field crops, 155; horticulture, 84; forestry, 10; seeds, 16; weeds, 8; diseases of plants, 66; entomology, 74; foods and animal production, 119; veterinary science, 18; dairying, 89; agricultural engineering, 18; technology, 4; and statistics, 69. Classified lists of titles of foreign articles not abstracted are also given in each number. The aggregate number of titles thus reported is 1,514. Special articles contributed by eminent foreign workers in agricultural science were translated in the office and published in the Record.

A notable feature of the fifth volume of the Record is a review of recent work in dairying, prepared by Dr. Allen, assistant director, which serves to show how large and important a feature of experiment station work investigations on dairying are. In the preparation of the Record constant effort has been made to condense the abstracts as far as practicable, and as a result they have become increasingly technical as regards their language and form of statement. In spite of this the demand for the Record from intelligent farmers has steadily increased, and the number of commendations which it has received from persons without scientific knowledge has been surprisingly large. An edition of 8,000 copies is now required to meet the regular demand for this publication. When the cards were recently sent out asking the persons on the mailing list whether they wished to receive the next volume of the Record, almost all of them returned an affirmative answer. Of course no such cards were sent to college and station officers. The Record is now regularly sent to a large number of the foreign experiment stations and other institutions engaged in agricultural investigations. In the sixth volume of the Record all the abstracts have been arranged under one series of topics. This enables us to make a more thorough classification of our material and to get more in the same space. We have at the same time enlarged the scope of the Record by securing the cooperation of the scientific bureaus and divisions of the Department, and the abstract committee of the Association of Official Agricultural Chemists. It is hoped that by this means we shall be able to present a comprehensive summary of the investigations in agricultural science throughout the world.

The Handbook of Experiment Station Work, in which the work of all the stations in this country for about twenty years was summarized, has proved to be a popular document, the demand for it having greatly outrun the ability of the Department to meet it. We still hope that Congress may be induced to issue a large edition for general distribution. This publication has, it is believed, helped to impress Congress and the country that the experiment stations have accomplished much work that is useful to farmers in all parts of the Union and are institutions which should be generously supported by States and nation.

A general view of our system of agricultural education and research has been presented in the bulletin entitled "Organization Lists," and in the annual report of the office. I am aware that the preparation of these bulletins has involved considerable labor on the part of the station and college officers who had to collate the

statistics for their respective institutions, but I believe that this labor is amply repaid in the general effect of the publication of complete and accurate statistics regarding these institutions. My experience leads me to believe that there is a wide demand for such information. I appreciate the difficulty of making a satisfactory presentation of an agricultural department as distinguished from other branches of the colleges, but I believe that as far as this can be done, with some definiteness, it helps the cause. We are about to send out our circulars for annual statistics, and I would urge their careful attention and prompt return. I would be glad to receive suggestions regarding particular inquiries which ought to be made. As it is intended to include in the annual report this year some historical statements regarding the colleges and stations, a few inquiries along this line will be made in our statistical circulars.

The card index of station literature has steadily progressed during the year. The office still has on hand a considerable number of sets which may be purchased by individuals or institutions, and members of this convention may render a service by helping to place these sets where they will do the most good.

As many of you know, the office has undertaken an index of articles by station workers, and all station workers who have not so far contributed to this index are earnestly requested to do so, that it may be made as complete as possible. Card indexes of other literature on agricultural science are being prepared in the office. When college or station men are writing up any subject relating to agricultural science, the office will be glad to render them assistance by furnishing them lists of references as far as practicable. Correspondence in this direction will at least help the office by suggesting bibliographies which it should compile.

The office occupies a portion of its time in preparing bulletins for the series of Farmers' Bulletins of the Department of Agriculture. While it does not confine itself to compilations of the work of the American stations, yet it refers to their work so frequently in these bulletins that this constitutes an important means of disseminating the results of station work to the farmers of the country. A good many persons seem to think that the Farmers' Bulletins all emanate from this office, perhaps from the fact that the office began the series which was afterwards adopted by the Department. This office is responsible only for those bulletins which contain the letter of transmittal of its director.

The lectures on the investigations at Rothamsted, England, for the past fifty years, delivered in this country last year by Sir Henry Gilbert, have been transmitted by him to your Association and transferred through your executive committee to the Department for publication. It will be issued as a bulletin of the Office of Experiment Stations, and after careful examination of the manuscript, I am prepared to say that they will constitute an exceedingly interesting and important contribution to the literature of agricultural science.

The office is also engaged in the preparation of a bulletin on cotton culture. This is being prepared with the aid of experts in the stations and outside. We aim to show the state of our knowledge regarding this plant and what further experiments and investigations are needed to promote the interests of the great cotton industry.

Congress has this year given the Department \$10,000 for investigations on the nutritive value of human foods. The supervision of this work has been assigned to this office, and Professor Atwater has been appointed special agent in charge. In expectation of such an appropriation the office has prepared a bulletin containing a resumé of investigations on this subject and suggestions for further work. This will, in a measure, be a handbook for workers in this line. It is proposed this year to carry on work in several directions, to make analyses of food materials as far as this may be necessary, to study dietaries of different classes of people in different parts of the country, to look into the relations of food supply and consumption, to consider how cooking affects the digestibility and economy of food, and especially to make inquiries with a view to improvement in methods of investigation. A

portion of this work will be done under Professor Atwater's charge at Middletown, Conn., but a good deal of it will be carried on at different points in the country. It is hoped that some of the agricultural colleges and experiment stations will be able to take up work in this line, and their cooperation will be sought in so far as seems desirable in view of their facilities for this kind of research and the demands of the work in which they are already engaged.

The schedules for the financial reports of the stations for the present fiscal year, as required by Congress, have been prepared and distributed. An effort has been made to make a schedule which would show how the money has been expended and which would at the same time accommodate itself to ordinary methods of book-keeping and not impose unnecessary labor on station accountants. The schedules for this year are in a sense tentative, and it is hoped that the station officers will be free to make suggestions for their improvement. It is expected that the financial reports will be accompanied with clear and detailed statements of the work of the station for the same period. It is believed that a clear presentation of expenditures and work will greatly strengthen the position of the stations before Congress and the country.

The experience and correspondence of the Office of Experiment Stations bring out certain criticisms of station management to which it may be profitable for me to briefly advert, provided it is clearly understood that I am not finding fault, but seeking to help the cause. Perhaps one of the most frequent and serious criticisms of station management which is brought to the attention of the Department is that in the conduct of college and station there is a mingling of college and station funds to the undue advantage of either the college or the station. It is easy to see how this idea may be causelessly entertained, owing to the intimate relations which must necessarily exist between the college and the station. At the same time, the criticism serves to emphasize the desirability of making as broad a distinction as practicable between the work of the college and the station, so that it will be clear to all fair-minded observers that each institution is doing its own work without trenching upon the province of the other.

Another vexed point is the question of inserting in station publications what are practically advertisements of private concerns. This has been most often done by the use of pictures bearing the trade-mark or names of manufacturers. This is usually justified on the ground that the station is thus enabled to give the farmer useful information without which the investigations of the station in certain directions would not be practically effective. This practice has, however, excited serious criticism, and it is very doubtful whether the information thus given is of sufficient importance to compensate for the risk growing out of charges of partiality to private interests.

Another matter which perhaps deserves more consideration than it has received relates to unity in the management of the station considered as a public institution. In the conduct of station business and in the issuing of publications it has sometimes appeared that the person doing the work or the author of the bulletin was for the most part individually responsible for what he did, and that in case of mistake or mismanagement the director, or even the board of control, did not have or feel any particular responsibility in the matter. It is believed that this lack of unity is a weakness in station management. One way in which this is illustrated is in the form and general make-up of station publications; that is, in certain of these publications it would appear that different officers had each contributed their part and that no one felt called upon to do any editing or had considered how the publication as a whole would impress the reader. It is believed that the highest interests of the stations will be promoted by making the public feel that they are permanent and solid public institutions, working steadily and consistently for the benefit of agriculture. The workers may change, but the institution itself should pursue its proper course without interruption or deviation.

Mr. Alvord stated that the question whether it was a legitimate application of the Hatch fund to pay the expenses of a delegate to these conventions and to pay the annual contribution of the stations to the funds of the Association had been exhaustively considered by the Department of Agriculture, and the decision was that these disbursements were perfectly legitimate. The Treasury Department has sustained the decision of the Department of Agriculture.

The CHAIRMAN. Mr. Harris this morning emphasized the truth that the institutions we represent are first of all colleges, and that our work is for education. This being so, we are not only connected with the Department of Agriculture, but with all educational work, particularly as represented by national officers. I count it a great privilege to listen to one who not only by personal qualifications, but by long personal experience, is so well entitled to our most earnest attention. I take great pleasure in introducing Hon. W. T. Harris, Commissioner of Education.

THE TEACHING OF AGRICULTURE.

I thank you, Mr. President, for your kind allusions to me personally. In the few remarks which I have to make I propose to call attention to the twofold relation which the agricultural college bears, namely, on the one hand to the Department of Agriculture, and on the other hand to the Bureau of Education. The Department of Agriculture assists it by making wise and useful experiments in regard to plants and animals, the selection of the best methods of training and cultivating, the modes of adaptation to climate and soil. We in other Departments of the Government here in Washington are proud of what the Department of Agriculture does in these and in other lines. But my Bureau wishes to be kept in mind by the managers of agricultural colleges for its interest in methods of teaching and school management. I shall speak at length of the method of teaching agriculture as a branch of study. The agricultural population in any country is the most conservative class of all its people. They follow the methods of their predecessors; they are patriarchal in their ways; you have dealt with them and do not need assurances from me. You could read us a lesson on this subject. But I was born on a farm, and had the education of a farmer and know something about the prejudices and conceits that he harbors. The farmer believes his vocation to be the one which secures the most personal independence of all employments, because he raises what he eats and often the raw material for clothing; he thinks of an ideal civilization in some far distant future which shall have no cities but only farms. I could make a long story of the development of my own ideas in this regard. I could tell how I changed my former ideas and came to see that farming is the most dependent of the employments, and that instead of farm life, urban life is the life of the future and of the highest civilization. Farming will in that period become market gardening and be as profitable as manufacturing and commerce are. I began by supposing that the farmer produced most of the wealth of the country, but when I investigated the questions of political economy I learned that it is the manufacturer and commercial vocations which add most to the value of our productions. The raw material furnished by the farmer constitutes one-fourth or one-fifth of the wealth of the country, and the three-fourths or four-fifths which includes the other wealth of the country is furnished by the manufacturer and trader and the one who transports the goods. Looking into the problem of the education of the farmer one meets first these curious facts. He finds the farmer the most conservative person and the person who is the most ignorant of the true basis of modern civilization, which rests on productive industry and the application of machinery to the performance of the drudgery of the world. All this points directly to the significance of the agricultural and mechanical college.

It shows its great power and usefulness. The agricultural college takes a boy from this place and another from that place, educates him, teaches him what his gifted fellow-men have been doing in the way of inventing new methods of creating wealth, increasing the production of farms, aiding human labor by machinery; it sends him back to his community charged with information and with a spirit of inquiry. The college may profitably set its students to reporting upon the condition of their local communities; discussing the methods in vogue, and especially making note of the enterprising citizens of their localities. This suggests what we call "university extension," now creating so much interest in this country and England. University extension seems to be the very field of greatest usefulness open to the agricultural college. I defer to your better wisdom in this matter. It seems to me that such extension of higher education and of secondary education promises to enable us to take account of two kinds of youth in the community. One kind of youth we have provided for. He is the boy who wants the old-fashioned education and his parents can afford to pay for it.

We make him pass strict examinations in the elementary work, and promote him step after step when he has completed the course prescribed. Hitherto we have excluded the other kind of boy, the boy who has great talent in some particular direction, but has not a taste for the old-fashioned education and will not pass through a course of study extended through many years. The secondary school and the college lose their hold of this class of youth. But a great many of our successful men come from this class. Perhaps they would have taken a regular course of education in the schools if their parents had furnished the money for it. A great many of our millionaires are not college bred; many of our inventors are not college bred; they have nevertheless become giants in their special provinces. They have been gifted in special powers. It would be interesting could we trace in every case the history of these men back through their infancy, and study their heredity also. We should see how the brain, nerves, and energy of the family worked to develop a man who has a faculty of secreting wealth as the adipose tissue is secreted in the body. It is a matter of congratulation that the agricultural college is about to take hold of this work and look after the sporadic individual who is good in some particular line, but has no activity for general studies, or at least no taste for them. His whole soul goes out in activity on some particular line. It may be entomology, or astronomy, or meteorology, or botany, or archæology, or it may be a much narrower province, such as the cultivation of the potato, the improvement of the beet root for the table or for sugar-making purposes. We shall agree that the schools ought to get hold of such men. I believe it is one of the important functions of the agricultural college to look out for the youth who do not come to school, but who show eminent capacity in particular lines relating to the industries, or especially agriculture. My neighbor, Mr. Bull, in Concord, Mass., invented the Concord grape by a long series of experiments on the native grapes of his region.

I do not mention this function of the agricultural college as seeming to offer advice to you who are present, for I well know that you are the most competent men in the United States to understand the work of the agricultural colleges, and I believe that you have found out or are in the process of finding out the lines in which to best direct their work. This annual conference of agricultural college presidents is itself sufficient evidence that what each discovers in the course of the year is brought to the attention of all his fellows. There is a constant process of reinforcing each agricultural college by the experience of all similar institutions.

While I, as an outsider, am not competent to suggest new lines of work, I claim to know enough about the subject to arouse in me the desire to get brief reports on the progress made by the faculties of your institutions in reducing agriculture and kindred branches of industry to a pedagogical form. The branches of instruction in the old colleges have long since been reduced to such a form. The studies of Latin and Greek, mathematics, history, geography, grammar, have been so arranged that the lesson that lies nearest to the pupil's mind is placed at the beginning. It is

followed by a second lesson, which presupposes the first lesson and builds upon it, a third lesson, a fourth lesson, and all the rest follow; each one building on what has gone before it and adding some new matter of consideration that is important and useful. It is essential to the pedagogical form that the first lesson shall be useful and good if no other lesson follows it. It is essential that if you cut off the series of lessons at any point that all shall be useful and valuable up to that point. It is bad pedagogical form to oblige the pupil to learn a series of lessons which are nothing in themselves but the mere scaffolding to an important idea by and by to be developed.

In your branches of mechanical industry you find that much has been done to reduce these to a pedagogical form. In the public schools of many cities, especially in Massachusetts, cooking is taught in a series of progressive lessons. Its pedagogic form has been fully developed. I take it that in the study of agriculture whatever branches are taught as preliminary discipline should have practical illustrations drawn from soils, plants, and animals at every step. As in all other branches, we must get hold of the interest of a pupil, both hereditary and acquired, and fasten one by one our studies to this interest. I desire to get from each agricultural college brief reports of progress made in reducing the various features of this field of study to a pedagogical form, being confident that when this reduction is complete, instruction in agriculture will not only be well managed in your institutions, but also will find its way into the elementary schools of the farming districts.

I read some time ago in Thorold Rodgers, in his book entitled "Six Hundred Years of Wages," Chapter XVI, the following: "We owe the improvements in English agriculture to Holland. From this country we borrowed, at the beginning of the seventeenth century, the cultivation of winter roots, and at that of the eighteenth century the artificial grasses. The Dutch had practiced agriculture with the patient and minute industry of market gardeners. They had tried successfully to cultivate everything to the uttermost which could be used for human food or could give innocent gratification to a refined taste. They taught agriculture and they taught gardening. They were the first people to surround their homesteads with flower beds, with groves, with trim parterres, with the finest turf, to improve fruit trees, to seek out and perfect edible roots and herbs, at once for man and cattle. We owe to the Dutch that scurvy and leprosy have been banished from England, that continuous crops have taken the place of barren fallows, that the true rotation of crops has been discovered and perfected, that the population of these islands has been increased, and that the cattle and sheep in England are ten times what they were in numbers and three times what they were in size and quality. Even now the ancient agricultural skill of the Hollander is not extinct. The gardeners of Haarlem still purvey roots and bulbs of flowers for the civilized world, and there is much which the English agriculturist of the present day could learn with advantage from the industry, patience, and skill of the Dutch farmer, and perhaps will learn, when England is relieved from the curse of her present land system and her tenant farmers till the land under the same guarantees as the Dutchman does." It would seem from this quotation that England changed her agriculture from the old-fashioned style of raising staple crops to the more lucrative and highly-developed farming known by us as "market gardening." I think that it is one of the most important subjects connected with the study of agriculture, this matter of market gardening. I can see that it is very important to detail intelligent students or committees of students from each class to study the methods of the market gardeners who live in the suburbs of the nearest large cities. The States remote from cities show a much less profitable farming than those States whose farmers reside in the neighborhood of the great cities. Some years ago I found that the farmers of Maine averaged about \$300 a family, counting their total productions at market prices, while the farmers of Connecticut averaged only a little less than \$600 a year because of their nearness to New York and its densely-populated suburbs. What an interesting seminarium or college conference could be held with a class of agricultural students who discussed in a

round-table style the report of a committee of their classmates who had been inquiring into the market gardens and ascertaining what crops are raised and in what order of succession; how many in the year; how the gardeners meet the first demands of the market in the spring; how they use forcing houses; how they handle transportation; how they get to market; how they live—that is to say, how they sleep and eat while on the way to the city and while there. All these little practical items become interesting and suggestive when discussed in this way. The uneducated person lives and acts, but does not think about the method of his living and acting. School education sets the individual at once to considering the method in which things are done. What an interesting thing it would be to compare the methods of market gardeners in New Orleans, Cincinnati, Boston, New York, Chicago, St. Louis, Baltimore, etc. Set to study these processes, the students of the agricultural college become centers of information and directive power for their neighborhoods when they return as graduates to their homes.

It has been found that university extension stands in need of endowment much more than the regular teaching work of the colleges of the country. There should be fellowships founded by wealthy men interested in agriculture so that young men of genius may repair to the college on these fellowships and have their necessary expenses all provided for. This is the one country of the world for endowment of educational institutions by private munificence. I presume that each college president knows of certain persons who would be glad to erect monuments for their families in the shape of scholarships in the State university, if they were sure that the money would increase the practical acumen of students who seek higher education. I believe that in this direction large endowments may be expected in the near future and that a proper account of the practical work done by agricultural students when published in the Annual Report of the Commissioner of Education will be found the best means of attracting from men of wealth numerous endowments for the purpose of founding fellowships in agriculture. Many of the wealthy men of this country look askance at the liberal education furnished in our colleges and universities. Many have devoted large sums to establish nondescript institutes with the hope that they would better fit young men for industry and the practical demands of life. They want something, but they do not know how to obtain what they want. I believe that it is in the future of these land-grant colleges founded for agricultural and mechanical instruction to solve this problem and to hold up for the would-be practical philanthropists a kind of education which makes the most of the talents of the youth and to stimulate him to original investigation and to lead him onward into the abstruse and highly technical studies which are necessary in order to endow him with power to solve the highest problems. I have ventured to make these remarks in order to show more clearly what kind of contributions I should like from the presidents and professors of agricultural colleges who will kindly undertake to record for me these items of progress in the development of the pedagogical form for the new branches of instruction.

EVENING SESSION, WEDNESDAY, NOVEMBER 14, 1894.

The Association was called to order by Chairman Morrow, at 7.30 p. m.

Mr. ALVORD. I call attention to the fact that the constitution, while it names the number of vice-presidents, does not indicate any difference in their relative rank. It has been thought best to dispose of any possible complications by the following resolution, which is recommended by the executive committee:

Resolved, That the nominating committee be instructed to designate the vice-presidents in numerical order when making their report to the convention.

Adopted.

Mr. ARMSBY. The provisional section on station work desires to present the following resolution, relating to the letter received from the German Association of Experiment Stations:

Resolved, That the representatives of the agricultural colleges and experiment stations of the United States have received with great pleasure the communication of Prof. Dr. Nobbe and deeply appreciate the evidence of the regard and fraternal feeling of the Association of Agricultural Experiment Stations of the German Empire.

Resolved, That the secretary of this Association be instructed to convey to Prof. Dr. Nobbe our greeting and grateful acknowledgment of his courtesy and to assure him that we shall always welcome in the meetings of this Association the presence and participation of any gentlemen connected with the German stations.

Adopted.

Mr. ARMSBY. I am instructed also by the same section to present for the action of the Association the following resolution:

Resolved, That this Association heartily approves recent legislation by Congress giving to the Secretary of Agriculture a measure of supervision over the expenditure of the stations.

Resolved further, That this Association indorses the scheme of financial statement adopted by the Secretary of Agriculture, and will approve and welcome the closest scrutiny of the work of the stations by the Department of Agriculture, either by personal visitations of an agent of the Department, or such other method as the Secretary of Agriculture may deem most efficient.

Adopted.

The chair then introduced the Hon. J. Sterling Morton, who made the following address:

GENTLEMEN: I experience much pleasure in learning, through the resolution which you have just passed, that the agricultural experiment stations and agricultural colleges are in perfect accord with the Department of Agriculture as to the manner in which the public funds appropriated for their support shall be accounted for. It was my misfortune, perhaps (or my lack of ability to state a proposition clearly), to suggest in a former report that these \$750,000 annually appropriated for the maintenance of these stations and colleges were the only moneys ever appropriated out of the Treasury of the United States for which no accounting had ever been required by an officer or through an office of the United States Government. There was no auditing, and no Auditor or Comptroller ever saw the results of these appropriations itemized and put before him or filed in a department of the Government. It seemed to me that it was in the interest of every real, sincere lover of this work that these accounts should be made plain and put in the archives of the Government, so that those who came after us might see precisely what was accomplished by every dollar expended, so far as possible. It was said that that report antagonized all the agricultural experiment stations and colleges; yet any one reading it could see that it not only did not antagonize the existence of these valuable aids to the science of agriculture, but prescribed further duties for them. You may remember that, in treating of the gratuitous and promiscuous distribution of seeds at Government expense the report said then, what I reiterate now, that if there ever had been good reason for this promiscuous distribution of seeds, that reason had been obliterated when the experiment stations were established, and that, in my judgment, it would be far better for the country in practical results if all seeds were sent directly to the experiment stations, which were in charge of scientific men and could test each variety as to its adaptability to their particular soil and climate and their environment. Now, we have distributed this last year, in round numbers, 9,000,000 packages of seeds throughout the

United States, through the agency of Congressmen, the county reporters for the Division of Statistics, and the Department. To show how sincerely this dissemination is appreciated, remember that each person receiving these seeds is requested to experiment therewith and to report results. The records of the Department show that these 9,000,000 of packages reached more than 1,500,000 addresses, and we have heard, out of that million and a half of citizens, from 1,500 of them, in round numbers. In no case has there been any report by which the value of these seeds, or the things which grew from them, can be ascertained. In nearly every case where a report has been made, it has been like that of *Oliver Twist* on soup—they have asked for more! I shall recommend that this appropriation, which has amounted to \$160,000 annually, be utterly abolished, and that in its stead there shall be an additional appropriation made to each experiment station in each State and Territory of the United States, which shall be for the purchase of seeds by the station director, himself authorized to get those things which may be adapted to his soil, climate, and environment. Then we shall really have experiments with new and improved varieties. This last year, at the suggestion of Dr. Dabney, Assistant Secretary of Agriculture, an appropriation was put in, as a sort of amelioration to Congressmen, who disliked to give up this cheap method of electioneering through packages of seed, so that \$30,000 should be used for the publication of plain, practical bulletins for the farmers upon such topics as might be deemed important at the time. And now the question to be determined by this coming Congress is, Which shall do the most good to the agriculture of the United States, the distribution of unfertile turnip seeds or the dissemination of live thoughts among the farmers of the country? A bulletin will convey thoughts with very much more certainty of doing good, it seems to me, than seed packets will convey seed. The results of this seed appropriation in late years have not been at all satisfactory. Besides their cost, they have loaded down the postal service. Last year's seeds weighed, when packed and put into the mails of the United States, more than 305 tons; and you may well imagine that that much dead matter assists materially in increasing the deficiency in the postal service. Now, it seems to me that this distribution of bulletins should meet with your approval; and certainly that a direct appropriation made for each station for the purpose of the purchase of new and improved varieties of seeds will also meet with your approbation.

A word more, and that is to say that, while the seeds are generally annuals, there is another planting that may be taught in experiment stations which will produce things of far greater duration. I refer now particularly to forestry. In this country the extent of denudation of hillsides in every State of the Union is illustrating every day what vast waste comes to the lands in the valleys. In many portions of Pennsylvania, where the hillsides and mountains have been deforested, the sweeping torrents have poured down with such force as to wash away all the surface soils of the valleys. In the State of Ohio to-day there are 1,000,000 acres of land, which a few years ago were fertile and productive, which are to-day absolutely untillable, because from the erosion of the water pouring down the hillsides the soil has been washed away. In view of this denudation and its results here, as well as in the presence of the vast waste that has occurred in European countries from this same cause, it seems to me that every agricultural experiment station and college should have at least a kindergarten school in forestry. We are using in this country now 30,000 acres of timber every twenty-four hours. To-night, because of its consumption by railroads and manufacturers, there are 30,000 acres less of timber than there was this morning. We have only 460,000,000 of acres in the entire Union of States and Territories, and it is not a difficult problem to solve, nor does it take a very profound mathematician to see that in a few generations this country will be as denuded of timber as the Orient is to-day. And remembering that nothing lives so long as a tree and the truth, I commend this question of forestry to you for your most thorough consideration.

The chair expressed the gratification and interest of the Association in the address they had listened to.

The Section on Agriculture and Chemistry then called up the third of its topics, "The Attitude of the Agricultural Colleges toward University Extension." In the absence of Messrs. Latta, of Indiana, and Emery, of Montana, Mr. Voorhees, of New Jersey, presented the subject:

MR. VOORHEES. I come before you unprepared to give any special information in reference to the attitude of the agricultural colleges toward university extension, but rather to give you some results of our experience in New Jersey with agricultural extension work. It began with us in 1891 and has continued with increasing usefulness up to the present time, the courses for the present winter not having been yet determined. In a general way the work is regarded as extremely successful, meeting a class of agricultural workers who are anxious for information on certain topics that can not be reached by the college in any other way. The chief difficulty we find in presenting extension work is to get it in such a form as to meet specific requirements on the part of farmers. It was recognized at first that agricultural instruction in extension methods must differ materially from instruction in college. At the same time it was felt that there were certain specific principles in the work which could be presented in such a way as to have important practical results. In teaching agriculture we divided the work into sections, or courses, of lectures covering specific points. We gave first lectures on soils and crops which would give the farmers in any one community sufficient information of the character of soils as to enable them to benefit in dollars and cents from the information. The main idea in every lecture was to bring the farmer or young man to see the relation of that principle to the dollars he expected to get into his pocket. That, of course, was a little different from the method we might use in college, yet the work was presented in just as scientific a manner as we present it to students in college.

The second course was on feeding plants, with specific reference to fertilizing materials and fertilizers, exhibiting the methods of using and buying matters of that kind, and the whole question was covered, so far as we could do it in six lectures, so that the farmer, after hearing the six lectures, would be enabled not only to purchase intelligently but to use intelligently.

The third course included animal nutrition, with especial reference to the preparation of rations, the economical use of farm products, and the handling of dairy products. These lectures covered the whole ground, so far as we could in lectures of that sort, without going into details.

As to the result, of course farmers were given the option of taking any one of the three courses of six lectures each, intimating in any case that they should be taken in the order in which they were prepared, as, first, soil and crop, then fertilizer, then utilization of the crop; and in most cases the lectures were taken in that order, though in many cases they were directly interested in the question of plant food and could see more clearly the principles which governed in that direction than in any other direction.

The lectures were presented all the time with the idea that this work meant money to them. At the same time it was intended that they should be educated. If they began right, the result would be to greatly increase their interest in matters purely of an educative character. The lecture hour was given up entirely to the lecture, but students had an opportunity of asking questions as to what was not entirely clear. The lecturer had his specimens and his illustrative material, and made just as clear as he could the principles he was trying to get before them. The second hour was given up to a quiz, in which the students had an opportunity of asking questions of the lecturer and the lecturer had an opportunity of finding out from the students whether they saw the point and whether they were following in a logi-

cal manner the points brought forward. In a large number of cases we saw that our hearers did not understand the reasoning brought forward very well; they were not students in the strict sense of the term. Occasionally, however, we did find a person who took hold of the right idea and saw that one thing hatched on to another, and at the end of the course we saw that there was really some very important work done. I have some figures here which will give some idea of the proportion of those we lectured to who really took it up as a matter of education, in addition to the matter of making it apply to the farming business.

Agricultural courses of lectures have been given in seven different sections of the State. The average attendance at each lecture was 60, ranging from 109 to 26. These were regular attendants. Out of that 60, 22 took the regular work in connection with it—that is, in addition to attending the lecture, they remained during the second hour and were willing to be quizzed upon the work and to carry on the work required during the week, such as essays and the reading of agricultural works. At the end of the six weeks we examined and gave credit for the work of the 22, and that, practically, was the whole work.

I found that those who took the first course—that is, began with the course on soils and crops—were the ones who were most likely to go through and study the work. That is, if we could get them started right, we generally carried them through better. It was noticeable that out of a large number very few, after they had arrived at the age of 25 years, seemed to care for any more than simply to hear the lecture and pick up such information as might be of use in regular work. We could not get them to study between lectures or give an account of themselves so far as study was concerned. But the most useful course was given at Newton. It was inspiring to have these young men as students, every one a young man who had not gotten far enough along to get into a rut, and still believed that there might be something a little better than had been taught him by his father. As to the practical result: A young man of 23, who took hold of it in a bright way, took up the question of fertilizers. He raised early potatoes, and the whole question with him was, How can I get my potatoes into market a day or two earlier than my neighbor? If you can give us a formula that will do that it will be dollars to us. Of course the only thing to do was to give him principles and tell him how to apply these principles in the application of the formula. He says to himself, If this professor is right, I must get a crop if I do thus and so; hence I will buy the best potato manure in the market, and I will put it on, making the formula according to theory, and see where I come out. He did put it on, and told me the other day in great glee that he thought there really was something in it. He took the principles of science and applied them to practice. His neighbors asked him how he knew it. He says he attended the extension lectures.

The only fear we have is that we shall not be able to meet the demands made upon us to carry on the work. However, I believe the indirect effect will be of great value to our institutions in stirring up interest and bringing men to us for the long course. So far as my experience goes, I consider this one of the most useful lines of work we have ever taken up in New Jersey.

The CHAIRMAN. We will proceed at once to the topic "The Cooperation of Stations with Farmers' Organizations in Experiment Work."

Mr. JENKINS. The special resources and equipment of the different institutions and the character of the education given, as well as the special needs of the great farming interests in the different States, make it a very dangerous work for anyone who has spent his whole life in a single State to dogmatize with regard to a question like this, and I shall offer only one or two brief notes.

Of course a plan which may be useful in Connecticut might not be useful in Texas, and a method which will work in New York may not work in Colorado. The conditions under which we work in different States are very dissimilar. This results in decided embarrassment in discussing questions like this.

It is the makeshift work of agricultural stations which takes the soonest, which excites the most interest and is most appreciated at first by the farming population in my country, and I presume the same is true throughout the whole country. The examination of fertilizers, the testing of seeds and soils, the analysis of milk—all that sort of work, which is very useful in its way, but still I call it makeshift work. But it is more difficult to get sympathy and appreciation and interest in more strictly scientific work, which is in the end more practical—the investigation of the great principles which underlie our agriculture. Yet the station is, it seems to me, under an obligation to undertake and carry on, to some extent, and an increasing extent, work of this kind, which does not so readily meet with appreciation from farmers; and if it is to be a successful station, it must educate its constituency up to work of that kind. When an opportunity offers for cooperation with any farmers' club or society or a grange, it should be heartily welcomed by the experiment station, as affording an opportunity to enlist the sympathy and interest of the farmers and extend the sphere of influence of the institution, also to accomplish, if possible, some work which shall be of scientific value and which will stand. But the station should not undertake a line of work at the invitation of any farmers' organization which it is not able to carry through satisfactorily and completely. There is always a tendency to multiply the lines of our work and divide our forces and to weaken ourselves by so dividing. We are apt to be always in a haste, when a long pull and a strong pull at some one thing would accomplish more in the end. Now, if a line of work suggested is such that a station can not undertake it, it ought frankly to say so. Assuming, however, that a station has the time and resources and the personnel to carry through a work, I should say, by all means undertake it; undertake it at some risk and great inconvenience, if necessary; undertake it for the sake of presenting an object lesson of what a thoroughgoing scientific piece of work should be, and enlist the sympathy and attention of the farming community. There are none of us, I think, who will not acknowledge that we are in need of bringing the station into closer sympathy with the farming constituency. I should be willing to sacrifice work I had planned or even begun if it were necessary in order cordially to accept any offer of cooperation with a farmers' organization in carrying on one of these experiments.

I have one word more to say about a danger I have met with in my experience in undertaking work of this kind. There is always the danger of sacrificing accuracy to the prejudices of those who are associated in the work, and to save those who are working in it from inconvenience and extra trouble. A farmer or an association puts land at the disposition of the station, or offers men, or tools, or money, without full appreciation of the pains and labor involved in carrying through experiments thoroughly, as they ought to be carried through. We all know that an experiment generally calls for a good deal larger outlay of time, money, and pains than we anticipated at first, and there is always this danger of sacrificing something of accuracy to those who are cooperating in the experiment. It is a mistake. It is especially essential in such cases that the work which is carried on with farmers' organizations should be a model of exactness. It should be an object lesson to the farmers of strict accuracy of work and strict accuracy in the interpretation of results obtained. We have had a little experience in our station in work of this sort, and I must say I consider it the most useful work the station has done; and it is not devoid of scientific value, but has a distinct and permanent value. But above all, it has been of use to the farmers, and the value of any station is in the usefulness of its work to the everyday farmer. George Eliot has said that the object and aim of any rightly constituted man is use; it is for use he exists. The same may be said of the experiment station.

Mr. EMERY. This subject has been one of considerable thought with me. In 1889 there was quite an extensive series of experiments performed by citizens of different parts of the State of North Carolina and the matter collected has been published in a bulletin. The experiments were in the nature of soil tests and variety

tests of leading crops, cotton and corn being the chief ones. The second series was very much reduced in numbers, seven stations being carried forward in different sections of the State—in the east-central portion, the Piedmont section, and in the mountains. These stations were conducted by men of intelligence, who took great pains with the work. They spent a great deal of time, and for the season of 1891 we paid them \$20 for their time and the use of the land, they of course keeping the crop. We recognized the necessity for moving these stations round and not keeping them in the same section if we would carry them forward for any considerable time. Men conducting experiments of this kind get tired after a while and the interest does not continue so much as during the first season. The first season there was quite a considerable interest manifested by the people in the neighborhood, but they rather tired of it. The difficulty of securing in their places trustworthy assistance without the close supervision which it needed caused us to give up the work. It requires a great deal of painstaking care, and with the distances we have and the expense of traveling we did not feel that we got results of sufficient value to warrant us in carrying on the work. As I said to the section this afternoon, we attempted then to meet the farmers' alliances. We got into correspondence with a considerable number of the alliances and an agricultural committee was appointed to receive our circulars and to delegate one of their members or some member of the alliance to conduct experiments. In this way we got a considerable number of experiments on new crops and soil tests started in different parts of the State. Some we carried through were quite successful, though the percentage we received reports from was so small we did not consider the results worth publishing. The interest of the alliances dwindled out apparently as their interest in politics developed. Perhaps if we had been in a position to visit these alliances occasionally during the season we might have held their interest, but that was impossible. Later we have distributed seeds of desirable varieties of plants and have followed these up at the end of the season with a series of questions in circular form, and by that means we have got a considerable number of favorable replies as to the growth of crimson clover. We have no doubt that we shall get a considerable number of farmers to growing crimson clover as a result of that, but so far as substation work is concerned we do not think the results obtained are worth the time that has been expended on them, though as a matter of education it is probable that enough has been done on the whole to warrant the work having been undertaken and carried forward.

Mr. Mills spoke of very successful cooperation with farmers in the Province of Ontario. His experimenters were largely ex-pupils of the Ontario College.

The Section on Agriculture and Chemistry here took the floor with a discussion on tuberculosis.

On motion it was resolved to strictly enforce the five-minute rule, and to recognize no speaker a second time until all who desired had spoken.

MR. HENRY. In order that we may understand each other upon a subject which is crowding upon some of us and in which all are interested, I would like to get a few statistical data. I would ask all colleges and stations represented here how many stations have directly used the tuberculin test? Seventeen responded.

Now, how many have used it on the station herd and found the herd infected? Twelve.

How many have used it on the station herd and found no infection in the herd? One responded (Storrs College).

How many cattle were tested? (Mr. Koons was not able to say. The herd consisted of 20, and the veterinarian made tests on those suspected.)

Mr. HENRY. We have had an idea that this thing is pretty general already. Are there any other questions we should ask?

Mr. ALVORD. In how many cases have animals been tested a first time and have responded on a second test? Five.

In how many cases was the second test verified by post-mortem? Four.

The CHAIRMAN. Will the five gentlemen who report above state how long a time intervened between the tests?

Mr. HARRIS. Six months.

Mr. HUNT. About two years.

Mr. MYERS. About two months.

Mr. MILLS. About a month and a half.

Mr. HENRY. In how many cases have stations taken charge of, or assisted with, other people's herds? Ten.

Mr. PLUMB. How many persons here have injected cows and received no response, yet the cows were afterwards found to be diseased? Three.

Mr. Hills, in something like 1,200 cases, had found 2 cases where tuberculin did not react.

Mr. ARMSBY. How many who have had experience with tuberculin have observed injurious effects of any sort upon animals not reacting to the test?

Mr. PLUMB. We had a case of abortion, but it was not certainly from this cause. It occurred two or three months afterwards.

Mr. HILLS. Out of 1,200 cases there was 1 case of erysipelas, starting at the point of injection.

Mr. EMERY. In North Carolina we had one animal which responded very slightly, but it was a cow which a month or two afterwards died from abortion, and upon examination we found the lungs very badly affected with foreign matter. We doubted very much whether the animal had tuberculosis, though one or two of the examiners thought it had. I believe there was no tuberculosis in the animal.

Mr. MYERS. I would like to ask whether any animals were allowed to live, when found infected, and were afterwards found to be free?

Mr. HILLS. Our veterinarian had an opportunity to test the herd of the Pratt Institute, at Brooklyn, and through the courtesy of Mr. Pratt three manifestly tuberculous cows were isolated. One has been injected eight or nine times at intervals, and seems to be getting better. The others have been killed, after injection two or three times.

Mr. ARMSBY. I wish to add to what Mr. Hills has said that I am told by a competent veterinarian that he has some reason to believe that tuberculin has some effect in curing cases of tuberculosis.

Mr. HAYS. In Minnesota we have tested eight cattle. Some showed a low, some a high reaction. We are trying doses of different size and

at different seasons. Are there any other stations keeping animals under such conditions?

Mr. HENRY. In how many cases have tubercle germs been found in the milk of animals infected? Three.

How many have made tests along this line and failed to find them where the milk was from cows that had the disease? None.

At the Wisconsin station a cow had one-quarter of the udder greatly enlarged, and in the last stages of her sickness from consumption her milk from that quarter became like whey. We had it injected into a rabbit, which died in fifty-five days with its lungs gone entirely. The milk was fed to five calves which were killed five months after using this milk, and we found a few tubercles along the alimentary tract. Of course this is in the direction of the danger to humans in using this milk.

Mr. BECKWITH. We have tested milk at our station and found bacilli frequently.

Mr. MILLER. I was going to substantiate what Mr. Henry has said, by a case I know of in my vicinity. A cow had a bad case of tuberculosis, and the veterinarian having charge of her made a test with a pig which he fed for three weeks or a month on her milk. The pig being then evidently affected, he killed it and found it badly diseased. I had a steer about a year ago which was drooping, but did not have a test made, as it was evident he was affected, and was found to be so when killed. About a month after the steer was killed some hogs which had followed him in the field were badly affected, and eleven were found more or less diseased. I cremated the whole lot, but was interested to find that after keeping hogs away for about two months in midwinter and thoroughly disinfecting about the spot, a subsequent lot were not affected at all. The examinations were made by a veterinary surgeon.

Mr. POWER. Among the animals affected or killed, how many were high bred and how many commoner grades?

Mr. HARRIS. According to our experience tuberculosis is no respecter of persons as to breeds or families of animals.

Mr. PLUMB. I would like to ask how many stations here represented have had their veterinarians make inspection of slaughterhouses in their immediate vicinity? Two.

Mr. HENRY. In how many States are there laws now relative to tuberculosis? Five.

How many States are contemplating legislation in this direction? Thirteen.

Mr. ARMSBY. In how many States having laws on this subject is provision made for compensating owners of animals killed? Four.

Mr. FLAGG. In Rhode Island the State Board of Agriculture has had an appropriation of \$15,000 which has been mainly used for work with tuberculosis. Perhaps more than \$10,000 has been used for that purpose. We have a cattle inspector in each county, an appraiser at

large, and a veterinarian. If the animal is condemned and found tuberculous, one-half the appraisement is paid to the owner; if found sound after being killed the full appraisement is paid. A limit is fixed of \$50 for a grade animal and \$100 for a pure bred.

Mr. VOORHEES. We have a dairy commission in our State, and the control is in the hands of the State Board of Agriculture. They, however, can not examine any animal except upon request of the owner or the State Dairy Commission. This commission, however, has power to make its own rules, and they are the law, and it can pay for an animal according to its judgment, not to exceed \$60 for a registered animal.

Mr. ARMSBY. We practically have in our State a system of examination and payment for animals, although it is not directed at tuberculosis. It relates generally to the health of animals. The maximum price paid is \$20. There is in contemplation this winter legislative action upon the subject of tuberculosis, and while it does not emanate from the station, doubtless the station will have a hand in it.

Mr. JOHNSON. Has any conclusion been reached as to locality? Does a low or a high altitude have any effect upon the disease? So far as I am able to say, I do not now know of the disease existing in Wyoming or Colorado.

Mr. HILLS. In the course of preparing our bulletin I corresponded with every veterinarian in the country. Those from the high plateaus of Wyoming and Colorado disclaimed the presence of the disease there.

Mr. DABNEY. I should like to hear something more about this important matter of paying for tuberculous stock. It appears from what gentlemen here have said that the disease is quite prevalent, affects all races of cows in this country, and has reached all parts of it. If this be true I do not think it is right to begin paying for worthless stock. If a man has animals of this sort they are more dangerous to him and his family than to anybody else. I think if legislation is to be so extensively started this winter it ought to be on right lines. I do not think it good policy to pay for this stock.

Mr. MILLS. It appears to me it would be entirely unjust to slaughter a man's stock, if it is proved that the stock is only slightly infected, unless you are prepared to say, in the first place, that the bacilli have been found in the milk of animals only slightly affected. Is there any instance of milk from such an animal furnishing tuberculous bacilli? In the second place, will an animal slightly affected in that way give the disease to another animal? It seems to me these two questions have to be answered before asking for legislation condemning a man's stock and then refusing to pay for it.

Mr. MYERS. There is another side to this question. We are in a fair way to get panicky, and there is no occasion for it. People are not going to die any faster than they have died simply because we have found that there are some tuberculous cattle, and it behooves this Association, in my judgment, to be extremely careful how it takes hold of

this matter. There is an association of veterinarians in this country, and politicians and others who would gladly avail themselves of any excitement that might be raised by scientific investigations, so let us be extremely careful what we say and do upon this matter.

Mr. DABNEY. With regard to this whole matter, we are simply to get at the facts, and the question I raised was for information only. It will be our business to furnish the legislatures with facts upon which to legislate. I want to say one more thing about paying for stock. Should we not shape our legislation so as to aid the hygiene of our cows? I think if we go on paying for tuberculous stock it will not promote the hygiene of the stock, to say nothing of the morals of the community. Stock will be kept just as it is now. On the other hand, if a man loses the value of his stock he will be moved to take better care of it. We know that in tuberculosis it is almost wholly a matter of hygiene. If we encourage hygiene among our dairy herds we shall stamp the disease out in time. I might suggest here that people will import tuberculous stock into States where they will be paid for it, or even, as they did with pleuro-pneumonia in certain States, infect them.

Mr. VOORHEES. In reference to the attitude of the stations toward the tuberculosis question, in aiding or directing legislation, I would state that in New Jersey we were forced into it by an unfortunate accident, perhaps, but inasmuch as we are in, we have taken it up with the idea of guiding legislation with reference to the extent of the disease and the reliability of the tuberculin test, whether animals that are diseased in a slight degree are liable to communicate the disease. We have but a small appropriation, and we have laid down the following plan, which is now being carried out: We have employed a biologist and a veterinarian. Every animal is examined by both the veterinarian and the biologist with the tuberculin test. Animals that are manifestly badly diseased are destroyed. Those not badly diseased are isolated and treated further, and those animals which we have killed in herds throughout the State we have not paid for because we have found that wherever farmers have diseased animals, so diseased as to show it, they are glad enough to let the pay go provided we say nothing about it. I think that by working along these lines we shall get as much valuable information as if we make a spread about it. In the work we are doing we have divided the State into three districts. One, where the hygienic conditions are manifestly bad, and we are taking the statistics of animals under these conditions. Then, animals that are high bred but are kept under conditions of food and management not supposed to be the best. The third and last, those which are under as good conditions as possibly could be, in reference to food and management and hygiene, and we test herds in that section and get statistics. In every case when an animal is killed we keep full records of temperature and the veterinarian's diagnosis before and after the animal is killed, and we have samples, not only of portions of the infected ani-

mal, but samples of the milk subjected to bacteriological tests, so that when the legislature meets this year we shall be able to present some facts which shall guide the State in making laws for the coming year. Some very curious results have been obtained, especially in reference to the tuberculin test. They may, however, not be verified. It seems to me that the station should take just this attitude at the present time; we should recognize the fact that the disease is one which should be exterminated, if possible; that we do not know everything in reference to the best way to exterminate it, and that we should proceed on lines which are scientific and will be helpful.

Mr. HENRY. The consumer of milk is, after all, the person most interested in this problem. When we issue these startling bulletins we are inflaming the people, and I early recognized that something must be done in the line of giving relief while we were fighting disease. We are working on the line of pasteurization in Wisconsin. We shall give lectures on pasteurization, and have one instructor this winter who teaches it. We are ready to send out young men to factories and places where milk is supplied. I want to say to you who are working in dairy schools, work fast. The pasteurization of milk is simple, but it takes a trained man to do it. We are supplying pasteurized cream to our citizens, and are delivering milk to families whose children need it. At present we only supply milk to families who bring a physician's certificate, charging 10 cents per quart. Our dairy schools ought to take hold of it this winter and give courses in pasteurization. The people want it. Do not let us scare the people and then give them no comfort. Let us tell them that when milk is heated to a certain degree it is perfectly safe and free from this dread disease. It is not scalded milk, but pasteurized milk.

Mr. ROBERTS. Do you consider milk that has been pasteurized safe milk always? Your method is good as far as it goes, but it does not go far enough. Pasteurized milk is no more fit to drink than tuberculous beef that has been cooked. They are both dangerous. It seems to me this recommending half measures is not what this Association wants to do. The only way to get sound milk is from a sound animal.

Mr. HAYS. How long do you propose to continue the sale of pasteurized milk?

Mr. HENRY. Being a station measure, we shall discontinue it at any time we get something better.

Mr. HAYS. Do dealers enter into competition with you in the sale of pasteurized milk?

Mr. HENRY. We are urging them to do so.

Mr. HAYS. What guaranty have you that the process will be properly followed?

Mr. HENRY. We have none.

Mr. ALVORD. I want to say a word from the standpoint of the breeder or dairyman, whom you gentlemen must meet, and in goodly numbers,

if you start a crusade in this country against tuberculosis based solely upon the tuberculin test. For seven years there have been very few days when I have not been so unfortunate as to have tuberculous cows under my observation. I have watched them, not from the standpoint of the veterinarian nor of the bacteriologist, and not much from the point of view of scientific observation, except in so far as close observation of any kind, with common-sense deductions therefrom, are entitled to come under that head; but I have watched them as an interested party, as touching my pocket. There are a good many things in this matter of tuberculosis that the breeder and dairyman must yet be convinced of before he will be satisfied to be raided on by the scientific men. I will not go into detail, but take the matter of heredity. I have been reading, observing, and studying and informing myself, as an owner of stock subject to this disease, as to all the facts about it. I am not convinced yet, by the evidence presented, that good, healthy animals, free from the disease, that will stand the tuberculin test, if you please, can not be bred from parents one or both of which have been tuberculous. I believe this is as true in the bovine as in the human race. I have not yet been satisfied that animals treated under the best hygienic conditions will easily communicate the disease when they are not themselves in an advanced stage of it. I have not yet been convinced that the milk the community is using to-day generally is any more dangerous than that which generations before us have used. I do believe that there are places in the country where there are greater percentages of unhealthy milk. I am not yet convinced that milk from tuberculous animals, that give no other evidence of their being infected than the tuberculin test, is dangerous to man or beast, be the animal young or old. In this line I have carefully watched the use of milk, which I was not willing to have come into my house, in the feeding of pigs, calves, and lambs, all of which have been slaughtered and examined as a butcher would examine them, not as a veterinarian or microscopist would. I want to say as a breeder that if there is any such thing as defending one's rights of property in this country, you have got to go further with your evidence than you have yet to take my stock and slaughter it, when the animals are performing all the functions we demand of healthy stock and show to the closest scrutiny of superficial observation that they are not diseased animals. Suppose that I have a cow that is a good feeder, a good breeder, a fine dairy animal, or in any other particular is a profitable animal in my estimation; I say that that cow is healthy if she performs all these functions, notwithstanding the fact that she may respond to the tuberculin test. Animals have been slaughtered as a result of this test which I do not believe can properly be called diseased animals. I believe, with the gentleman from Canada, that the owner of stock must be carefully protected.

Mr. Murkland spoke of a suggestion quoted with favor in a report of the Department of Agriculture to the effect that where the tuberculin test has been used with marked reaction, but where there is no other indication of disease, the animal need not be immediately slaughtered but kept and prepared for beef. He thought this a suggestion worth considering.

On motion the session adjourned at 10.07 p. m.

MORNING SESSION, THURSDAY, NOVEMBER 15, 1894.

The Association was called to order by Chairman Morrow at 9.30 a. m.

The secretary read a letter from the National Statistical Association, inviting the members of the Association to join with that organization and unite in their national work. On motion of Mr. Armsby the secretary was instructed to convey the thanks of the Association to the National Statistical Association and invite its members to attend the meetings of the Association.

The secretary read the following telegram which, in accordance with the instructions of the Association, he had sent to Gen. S. D. Lee:

President S. D. LEE: The Association of Agricultural Colleges and Experiment Stations in session sends greetings to its absent president and sympathy on account of the cause of his absence.

M. A. SCOVELL, *Secretary*.

Mr. Alvord presented the following resolution from the executive committee, with recommendation that it be adopted:

Resolved, That the executive committee be authorized to call upon every institution eligible to membership in this Association for a contribution of \$10 to defray the necessary expenses for the next year, the same to be payable as soon as practicable after the 1st of January, 1895.

Adopted.

Resolved, That the executive committee be authorized to edit and procure the publication of the proceedings of this convention in cooperation with the United States Department of Agriculture.

Adopted.

Mr. Goodell offered the following:

Whereas this Association has heard with pleasure the address of the Honorable Secretary of Agriculture, and especially his suggestion that Congress be requested to increase the appropriation to each station for the specific purpose of testing new varieties of seeds, bulbs, etc.; and believing that this will conduce to that system of cooperation which has long been desired, and to the realization of one of the chief benefits which the authors of the Hatch Act expected that the connection of the United States Department of Agriculture with the stations would confer; Therefore,

Resolved, That this Association request the Secretary of Agriculture, by correspondence or otherwise, to determine what additional appropriation will be needed to accomplish the purpose he has in view, and to include it in his estimate for the coming session of Congress.

On motion referred to the executive committee.

Mr. Buckham, from the committee appointed to take into consideration the personal statement made by the chairman of the executive committee, reported as follows:

Whereas President Henry E. Alvord has served with signal ability and fidelity as chairman of the executive committee of this Association of American Agricultural Colleges and Experiment Stations since the organization of this body; and

Whereas this Association learns with much regret that President Alvord will no longer consent to serve in this capacity, for which he is so eminently fitted: Therefore, be it

Resolved, That this Association, in general session assembled, hereby desires to express its grateful and hearty appreciation of the valuable services rendered to this Association by President Alvord, and directs that this resolution be spread upon the minutes of the Association and published in its proceedings.

At the suggestion of the chairman this resolution was unanimously adopted by a rising vote.

Mr. Holladay moved the appointment of a committee to draft resolutions of thanks for the various courtesies which the Association had received in Washington, the committee to report at the general session at night, November 15.

Adopted.

The chair subsequently appointed Messrs. Holladay and Emigh such committee.

Mr. Hays addressed the convention on the subject of a card index to agricultural literature relating to field crops and field management, live stock, and dairying. He and some voluntary associates, with the help of students, had made some 5,000 or 6,000 catalogue cards, arranged and catalogued under the system or key furnished by the Office of Experiment Stations, with additions along certain lines. He thought one or two thousand dollars would bring this work up to date, cataloguing such works as the Association would be especially interested in.

The CHAIRMAN. No formal recommendation has been made; you have the matter before you.

Mr. ALVORD. I am instructed by the committee on order of business to give an opportunity at this time for delegates to make motions testing the sense of this meeting as to time and place of the next annual convention.

Mr. JOHNSON. I call up the resolution I have already offered to select Denver, Colo., as the next place of meeting, and suggest August 15 to October 1 as the most suitable time.

Mr. Clute extended a cordial invitation to the convention to meet in Florida, suggesting a winter meeting as the most interesting and agreeable for Florida.

Mr. Johnson desired to divide his motion, the first half to relate to the place of meeting, the second to the time.

Mr. Emigh earnestly seconded Mr. Johnson's invitation to Denver, reminding the convention that it was invited not by the city alone, but by the whole State.

Mr. Roberts extended an invitation to the convention to meet at Ithaca, N. Y., and Mr. Hays repeated his invitation to Minneapolis.

On motion the roll of delegates was called, each delegate stating his preference as his name was called. The vote resulted:

Denver, 36; Florida, 11; Ithaca, 3; Columbus, 0.5; California, 1.

The chair declared that the sentiment of the convention favored Denver, Colo., as the next place of meeting.

The time of holding the next convention was then discussed. Mr. Raub announced that the National Educational Association would probably meet, as usual, the third week in July, at Denver, and on motion of Mr. Scott it was declared, by a vote of 30 to 4, that the sentiment of the Association was to hold its convention the week preceding that of the National Educational Association.

The CHAIRMAN. The executive committee will take note of this expression of opinion in favor of holding the meeting one week before the meeting of the National Educational Association. Are any of the sections now ready to report upon their officers?

Mr. Washburn, for the Section on Mechanic Arts, reported the names of Mr. Patterson, of Kentucky, for president, and Mr. Anderson, of Kentucky, for secretary. On motion these nominations were confirmed.

Mr. Voorhees, for the Section on Agriculture and Chemistry, reported the names of E. B. Voorhees for president, A. E. Blount, vice president, and C. C. Georgeson, of Kansas, secretary. On motion these nominations were confirmed.

Mr. Myers offered the following resolution, which was referred to the executive committee and immediately referred back to the convention for action:

Whereas close relations exist between the agricultural colleges and experiment stations of the United States and those of the Dominion of Canada: Therefore be it

Resolved, That this convention extends a most cordial invitation to all of the agricultural colleges and experiment stations of the Dominion of Canada and its several provinces to send representatives to the meetings of our Association; and we hereby extend to the same the full privileges of the Association permissible under our constitution.

Adopted.

Mr. Mills expressed the thanks of the Dominion experiment stations.

Mr. Plumb reported the following nominations for officers of the Section on College Work: Mr. Harris, of Maine, president; Mr. Connell, of Texas, vice-president; Mr. Wing, of New York, secretary.

On motion these were confirmed.

Mr. Harris, of the committee to nominate officers of the Association, presented the following report:

Your committee appointed to nominate officers of the Association for the ensuing year have the honor to present the following recommendations:

For President—Henry E. Alvord, of Oklahoma.

For Vice-Presidents—(1) A. A. Johnson, of Wyoming; (2) A. Q. Holladay, of North Carolina; (3) T. B. Comstock, of Arizona; (4) E. B. Craighhead, of South Carolina; (5) O. Clute, of Florida.

For Secretary and Treasurer—J. H. Washburn, of Rhode Island.

For Executive Committee—H. H. Goodell, of Massachusetts; H. C. White, of Georgia; M. A. Scovell, of Kentucky; H. P. Armsby, of Pennsylvania, and the ex officio members provided for by the constitution, S. D. Lee, of Mississippi, the retiring president; H. E. Alvord, of Oklahoma, the incoming president; and J. H. Washburn, of Rhode Island, the incoming secretary and treasurer.

Respectfully submitted.

A. W. HARRIS,
A. A. JOHNSON,
W. L. BROWN,
W. A. HENRY,
C. W. GARFIELD,
C. F. VANDERFORD,
A. C. TRUE,

Committee.

WASHINGTON, D. C., November 14, 1894.

On motion the report was adopted and the officers named declared duly elected.

Mr. Test presented, for the Section on Entomology, the names of C. P. Gillette, of Iowa, for chairman, and J. M. Aldrich, of Idaho, for secretary, which, upon motion, were confirmed.

Mr. Craighead presented the following resolution:

Resolved, That it is the sense of this Association that the executive committee continue its efforts to secure an appropriation for the purpose of furnishing, under proper restrictions, students in land-grant colleges with uniforms and such other equipment as may be necessary for their more complete instruction in military science and tactics.

On motion of Mr. Harris this was referred to the Section on College Work.

Mr. Silvester, followed later by Mr. Miller, extended a cordial invitation to the delegates to visit the Maryland station and college, at College Park, Md., 8 miles from Washington.

Mr. Alvord announced that General Breckinridge, having been ordered away from Washington, would not be able to address the convention.

Mr. Wing moved that a committee of three be appointed to examine into the proposition offered by Mr. Hays in regard to indexing agricultural literature, and to secure, if possible, the cooperation of the Department of Agriculture, Mr. Hays to be chairman of the committee, which was to report at the next meeting.

Adopted.

The chair appointed Messrs. Hays, Wing, and Plumb such committee.

Mr. HARRIS. By an error the committee on nominations overlooked the office of bibliographer. The committee recommends that the present incumbent, Mr. S. W. Johnson, of Connecticut, be reelected.

Adopted.

Mr. Scott offered the following resolution, which was seconded and referred to the executive committee:

Whereas this Association, sensible of the value of the present and possible functions of the Office of Experiment Stations in bringing the various stations into close

relations with the Government of the United States, and in serving as general clearing house for investigators and those seeking the results of their investigations: Therefore be it

Resolved, That the executive committee be instructed to communicate to the honorable Secretary of Agriculture the judgment of this Association that a similar channel of communication between the agricultural colleges and the Government is desirable, and to assure him of the readiness of the executive committee to cooperate, should it be desired, in perfecting a plan which may serve this purpose, either through the enlargement of the scope of the work of the Office of Experiment Stations or by such other means as may be judged wise.

Dr. Charles W. Dabney, jr., Assistant Secretary of Agriculture, was introduced and spoke as follows:

THE SCIENTIFIC WORK OF THE DEPARTMENT OF AGRICULTURE.

MR. PRESIDENT AND GENTLEMEN OF THE ASSOCIATION: I thank you very much for your kind invitation to meet you at this time, although I understand thoroughly that this invitation is more to the Department of Agriculture than to myself. It was my honor to receive from the honorable Secretary of Agriculture, on the first day I entered upon my duties at the Department, a commission to take general direction of some of the more purely scientific divisions of that Department; so I am permitted at this time to speak to you about that part of our work. Since you are the appointed representatives of agricultural science in America, it is very appropriate, I hope, for me to tell you something about the scientific work the Department of Agriculture is doing.

I address this morning the representatives of the agricultural colleges and experiment stations organized under a system of Federal laws for the investigation of science as applied to agriculture, and I feel, therefore, that the best way I can use the few moments allotted me is in telling you about some of the new things now being done for the advancement of the sciences to which you are devoted. You are all, I am happy to believe, already pretty familiar with the ordinary work of the Department of Agriculture. I shall not, therefore, talk about the old lines on which we have published bulletins and reports, but will confine myself to certain new subjects, chiefly for the purpose of exciting your interest and inviting your cooperation in working them out.

In pursuance of the resolution passed by you at the convention in Chicago, recommending that the Secretary of Agriculture be authorized by law to exercise supervision over the expenses of the stations, Congress has incorporated in the agricultural appropriation bill for 1895 the following words:

"And the Secretary of Agriculture shall prescribe the form of the annual financial statement required by section three of the said act of March second, eighteen hundred and eighty-seven; shall ascertain whether the expenditures under the appropriation hereby made are in accordance with the provisions of the said act, and shall make report thereon to Congress."

This is the only change in the laws regulating our relations. Since it was made at your request and with the approval of the Secretary we have reason to hope for perfect harmony in carrying it out.

In order that the stations might have the fullest opportunity to order their expenditures in accordance with the plan of the Department, schedules for these financial reports, to be made first at the end of the present fiscal year, were prepared and sent to you soon after the appropriation bill passed. This law, in connection with previous legislation, gives the Secretary of Agriculture authority to investigate and report upon the expenditures of the stations and to visit them for the purpose of securing detailed information in order to make his report to Congress. This examination and visitation, which you have said you will most "heartily welcome," will

be sure to increase the efficiency of both the stations and the office of the stations in the Department. I think, therefore, that we are to be congratulated upon this change, which brings us into still closer union, and that we may look forward to mutually profitable relations and more cooperative work in the future.

But I promised you to say a few words about some of the new lines of work which the Department has taken up. One of the Western newspapers made a remarkable announcement last March, to the effect that the Department of Agriculture had just "elected a professor of astrology." We have long known that the moon was supposed to have a great influence on some departments of agriculture, but we had never heard it suggested before that the stars had anything to do with crops. It did not take us long, however, to find out that the usually infallible editor referred to our new officer, the "agrostologist"—a title that the country newspapers have been struggling with ever since.

The Department of Agriculture has always recognized the importance of the investigation of our forage resources, and through its Division of Botany it has made many valuable contributions to our knowledge of them. In view of the growing importance of grasses and forage plants at the present time, when the methods and objects of farming in many sections of our country are undergoing a radical change, the honorable Secretary of Agriculture recently decided that this subject required more attention than the Department was able to give it with the present force of the Division of Botany. He therefore employed a special agent to prosecute investigations upon grasses and forage plants.

No country in the world possesses such vast forage resources as ours, and in none are the plants which compose that forage more various. Our botanist informs us that there are over 3,500 different kinds of grasses in the world, of which over 700 are known to grow within our territory. There are, besides, many useful forage plants—not grasses—such as the clovers and alfalfa. The annual hay crop of the country has an estimated value of \$600,000,000 and more than 14,000,000 head of cattle are supported upon our grazing lands. The maintenance and improvement of these resources is a matter of importance to every citizen of the United States, and of direct and vital interest to every American family. Upon it depend the vast meat and dairy interests, and to a great extent the more important methods of maintaining the fertility of our agricultural lands.

In our great territory, including lands of many different elevations and climates, much exploratory work yet remains to be done upon our native grasses, and by continued examinations it can not be doubted that useful species new to agriculture will from time to time be found. In the arid regions of the West and Southwest are nutritious grasses and other native forage plants whose introduction into culture, if carefully undertaken, could not fail to greatly benefit these sections. The importation of the native or improved forage plants of other countries has in some cases resulted in much benefit to our agriculture, and doubtless many other plants can be found and tested with regard to their adaptability to our climate and soils. The study of grasses for special purposes, as for example, for binding the drifting sands along our ocean and lake shores; for holding the embankments of our great rivers, which frequently overflow and sweep away farms, while they cover others with destructive debris, materially broadens the interest in grasses and makes this work of practical importance to many other classes of citizens.

Considerations like these have induced the Secretary of Agriculture to recommend to Congress the establishment of a separate Division of Agrostology for investigating grasses and forage plants, with special reference to their use in those sections of our country where they are at present little known. The establishment of such a division would demonstrate to the citizens of this and other countries that our National Government fully recognizes the primary importance of the grasses in the rural economy of the nation. It will be the function of the new division to instruct our people in the habits and uses of these plants; to examine their natural history and adaptability to our different soils and conditions; to import, test, and introduce

foreign kinds into cultivation; to identify the plants sent in by correspondents; and to prepare circulars, bulletins, and manuals for distribution. I am pleased to be able to tell you that we have reason to believe that Congress will give us the authority and the means with which to carry on this work.

The Division of Botany, which has been so prolific in giving birth to new divisions—the Division of Forestry and the Division of Vegetable Pathology, as well as Agrostology, are its children—has recently developed several other new lines of work. It has, for example, devoted a great deal of attention recently to a more systematic study of weeds. Among others, that czar of weeds, the Russian thistle, which some of our Congressmen think to be worth its million, has received much careful attention. The Department has done all that it could do in investigating the natural history and methods of distribution of this weed, and in publishing circulars and bulletins relative thereto. There are other weeds which are almost if not quite as dangerous as this, and they will all be studied as rapidly as the means available will permit.

A special expert has been engaged and a laboratory fitted up for the systematic study of seeds with reference to their purity, germinating power, etc. This is an important matter, especially in connection with our studies of grasses, forage plants, and weeds, since our grass seed and seed grain are always liable to be contaminated with the seed of weeds. It is our desire to establish standards of purity and of germinating power for all the chief American seeds, and in this way promote the trade in these seeds and especially the demand for them abroad. Our exports of clover seed are already very considerable, and many seeds of commerce demand the oversight of this Department.

I speak this morning to many agricultural chemists, so that I need not take time to explain the disappointments that we have all felt with regard to the results of the chemical analyses of soils. We must acknowledge now that we can not tell the practical farmer all that he wants to know by a single analysis of his soil; that it often requires many analyses to learn, even approximately, the chemical nature of the soil of a given section and that, even when we have made these, we are unable to explain why one soil is productive while another fails entirely. We all know cases where soils having almost identically the same chemical composition yet differ greatly in the uses to which they can be put. In short, the chemical analysis of the soil does not tell us the whole story. A great deal more is to be learned about it before we can tell the farmer how to make it productive or why he should put one particular crop upon it and not another. Our Department has decided, therefore, to attack this old problem from two different sides; first, from the physical side, by studying its relation to heat, moisture, etc.; and second, from the biological side, by studying its nitrifying organisms, etc. This we hope to do without neglecting the old lines of chemical investigation.

A new division has been created in the Department to be known as the "Division of Agricultural Soils" whose duty it will be to study the rainfall and temperature after they have entered the soil and to keep a continuous record of them in the most important types of soil in our country. Our Weather Bureau keeps a record of the temperature and of the moisture in the air and of the rainfall until it reaches the surface of the soil. It is proposed in this new division to continue the study of the rainfall after it enters the soil. The actual conditions of air, moisture, and temperature which soils are able to maintain largely determine what classes of plants are adapted to them. These things depend in turn upon the texture of the soil. Even with the same rainfall and exposure to heat it is well known that different soils maintain very different conditions. This difference in the meteorological conditions under the surface has an important bearing upon the adaptability of soils to crops, because of the influence on their development, yield, texture, quality, vitality, and time of ripening.

Soils adapted to early truck and small fruits, for example, are sandy, open, and warm, allowing the rain to pass through them very readily and maintaining only a

small amount of moisture. This dry condition gives them their peculiar value for forcing vegetation to an early maturity. The tobacco soils of Pennsylvania owe their peculiar value to their close texture and to the fact that they maintain an abundance of moisture for the crop. This produces a large, heavy type of wrapper which competes with the Cuban tobacco. The tobacco of the Connecticut Valley, on the other hand, is grown on a very light textured, sandy loam, and the soil being much drier the crop is much lighter in color and finer in texture. It competes with the Sumatra wrapper.

The work of this new division is to be confined to the study, principally, of the texture of the soils adapted to these different interests. It will be one of the purposes of this division to develop the methods of these investigations and to encourage an extensive study of the soils of the country by State stations and colleges. There is a pioneer work to be done here which you can scarcely be expected to do. This work is based upon geological formations which may cover a number of States and may be found in widely separated parts of the country. Samples from the same formation or the same class of agricultural soils must be collected from all over the country and carefully examined and compared. In many cases it will doubtless be necessary to get samples of soils from foreign countries for the purpose of comparing them with our own.

Congress has also been asked to provide, in connection with our Chemical Division, for the investigation of the chemical characteristics of the various typical soils of the United States, especially in relation to the nature of the nitrifying organisms contained therein and the best condition for the growth of the same. This work has already been begun and promises to be most interesting.

I am in danger, however, of using too much of your time, and must hasten to a conclusion. You will be interested to know that the Department of Agriculture, which is, in part, a great experiment station itself, is pushing its scientific work ahead of everything else. We have made a little table showing the actual expenditures of the Department during the years 1892, 1893, and 1894 for all of its different purposes, and have classified these expenditures so as to throw all money used in the strictly scientific work in one column and all that expended for administrative purposes, for publishing and distributing documents, for distributing seeds, for purely business or strictly educational work, in another column. I will not burden your proceedings with this table, but merely give you the results.

The Department of Agriculture expended for the fiscal year 1892 \$2,271,312.72, and 46.2 per cent of that sum was expended in scientific research. For the fiscal year 1893 the expenditures were \$2,354,809.56, and out of it 45.6 per cent was expended in the application of science to agriculture. For the year ending June 30, 1894, out of a total expenditure of \$1,990,530.70, the Department applied 51.8 per cent to scientific work and investigation. While economy has been practiced in the administration of the Department, this economy has not impaired its scientific work. Comparing the expenditures for the fiscal years 1893 and 1894, respectively, I note that the total expenditures for 1894 are, roughly, \$364,000 less than the total for 1893; but the per cent of the total amount paid out for scientific work, as distinguished from the administrative and general business, is 5.6 per cent more, in proportion to the total expenditures during the year 1894, than it was in 1892, and 6.2 per cent more than it was in 1893. It was during this same time that we commenced the new work in agricultural soils, agrostology, and seed investigations, and still further developed that in weeds and many other older scientific lines.

We feel that this report of our stewardship is due you as scientific men, and it is not made in a spirit of boasting. It is simply the natural and proper development of a Department that is, above everything else, a great agency of science. The Department of Agriculture is an agency for the promotion of economic production in our country, and, as such, it must use scientific methods and means.

While speaking of the progress of this Department, it is gratifying to learn from the reports of the colleges and stations, and from the discussions in this meeting,

that these numerous institutions are also advancing bravely and doing more each year for the promotion of science and for the education of our people for an enlightened citizenship. What a grand national organization for the advancement of agricultural science and education is this of ours! The system of agricultural colleges and stations in all of our States and Territories and our national Department of Agriculture forms an organization for the advancement of science applied to agriculture without an equal in the world. We may not yet be doing as thoroughly systematic work as corresponding institutions in Germany or other countries, but we believe our organization is more complete, and that in due time we will produce the work. Let us, therefore, take courage to go forward and do our work in the stations, in the colleges, and in the Department more faithfully and more accurately than ever before. The American people have intrusted great interests to us, and have provided us with liberal means. Let us be sure that we do not disappoint them, but strive bravely to give them a magnificent return for their generous confidence and their handsome endowment.

Mr. **ATHERTON**. I wish to offer a resolution which was suggested by the resolution offered by Mr. Scott and the remark made by Mr. Dabney. I am sorry he has gone, because I want to say in his presence that while I highly appreciate the benefit that comes from the cooperation between the Department and the experiment stations, yet I believe the resolution offered by Mr. Scott is fundamentally a mistake. I shall not discuss it at this time, because the question must come before the convention on the report of the executive committee, but I offer the following resolution to be referred to the executive committee to be considered with the other:

Whereas the act of Congress approved August 30, 1890, providing for the further endowment and support of the colleges established under the provisions of the act of July 2, 1862, expressly committed the administration of that act to the Secretary of the Interior; and

Whereas the Secretary of the Interior, in carrying out that provision, has intrusted the details of administration to the Commissioner of Education: Therefore be it

Resolved, That it is the conviction of this Association that the educational work of the institutions represented by it would be greatly promoted by the establishment in the Bureau of Education of a division or office similar in function to the Office of Experiment Stations in the Department of Agriculture; and

Resolved, That the executive committee be instructed to express their judgment to the Secretary of the Interior, and to offer all necessary cooperation to secure the end in view.

Mr. **ALVORD**. There are now two resolutions taking different grounds in the hands of the executive committee. It is apparent that there is no time now for the consideration of this important subject, but the Section on College Work has all the afternoon for its deliberation. I move that the two resolutions be referred to the Section on College Work for its consideration.

Ordered.

The convention adjourned at 11.40 a. m., to meet again at 7.30 p. m.

EVENING SESSION, THURSDAY, NOVEMBER 15, 1894.

The Association was called to order by Chairman Morrow at 7.45 p. m.

The chair announced as the committee on admission and courses of study and on correspondence with educational bodies the following:

Messrs. Atherton of Pennsylvania, Harris of Maine, Hunt of Ohio, McBryde of Virginia, Murkland of New Hampshire.

Mr. ALVORD. The committee on resolutions has instructed me to report back, in a modified form, the resolution offered by Mr. Hays on tuberculosis, as follows:

Resolved, That the Association recognizes the importance of controlling and preventing bovine tuberculosis and that it is the sense of this body that the officers of the various stations should use all legitimate means to increase and perfect provisions for further study and experiment in connection with this subject.

Adopted.

Mr. ALVORD. The committee also reports back, in a modified form, the resolution offered by Mr. Goodell regarding seed distribution, as follows:

Resolved, That this Association will approve and cordially cooperate in any plan which may be recommended by the Secretary of Agriculture and legalized by the Congress for improved methods of testing and introducing in the several States new, rare, and valuable seeds and plants.

Adopted.

Mr. TRACY. The Section on Botany and Horticulture reports the following nominations: Chairman, Mr. Tracy, of Mississippi; vice-chairman, Mr. Crandall, of Colorado; secretary, Mr. Lazenby, of Ohio.

The nominations were confirmed.

Mr. GORTON. Two resolutions (by Mr. Scott and Mr. Atherton), referred to the Section on College Work, are reported upon as follows:

Resolved, That this section deems it inadvisable at the present time for the Association to take action on the subject of the two resolutions submitted to the Association, respectively by Mr. Scott, of New Jersey, and Mr. Atherton, of Pennsylvania.

Adopted.

Mr. GORTON. The section also submits the following:

Resolved, That it is the sense of this Association that the executive committee continue their efforts to secure an appropriation for the purpose of furnishing, under proper restrictions, students in land-grant colleges with uniforms and such other equipment as may be necessary for more complete instruction in military science and tactics.

Adopted.

Mr. GORTON. The section further submits the following:

Resolved, That the Section on College Work recommends to the general session that a committee of five be appointed to confer with the War Department relative to the military work in land-grant colleges.

Adopted.

Mr. GORTON. The section further submits:

Resolved, That the executive committee be instructed to secure legislation which shall require one officer of the Army to be detailed to each college receiving the benefits of either of the so-called Morrill acts, which shall require it.

Mr. EMIGH. The committee appointed to draft resolutions of thanks for courtesies extended reports the following:

Resolved, That this convention returns its cordial thanks to the Cosmos Club for the comfortable quarters furnished for the meeting; to the officers of the Department of Agriculture, to the Office of Experiment Stations, and to the press of Washington for the courtesy and kindness received at their hands.

Adopted.

The secretary stated that he had just received from Idaho a letter containing proper remittances for both college and station, which thereby joined the Association.

The chair announced the following as the committee on military affairs to confer with the War Department: Messrs. Alvord, Holladay, Goodell, Fratt, and Silvester.

Mr. Goodell then read the following paper:

WHAT IS THE MISSION OF THE BULLETIN?

This is perhaps the most important question proposed for discussion in this convention, for it opens up the whole question of how best to bring before the public such results as have been secured by careful investigation. The work of college and station is not that of a close corporation, kept to itself and for itself alone. Far from it. The organic law of both demands the utmost publicity. The act of 1862 donating public lands to the States which should provide colleges for the benefit of agriculture and the mechanic arts expressly declares that "an annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with the cost and results, and such other matters, including State industrial and economical statistics as may be supposed useful." The act of 1887 establishing agricultural experiment stations in connection with the colleges reaffirms this declaration and requires "that bulletins or reports of progress should be published at least once in three months, a copy of which shall be sent to each newspaper * * * and to such individuals actually engaged in farming as may request the same, and as far as the means of the station will permit." What the catalogue or report is to the college, the bulletin and annual report is to the experiment stations. They are the official organs established by law for disseminating information. The organ being provided, there remains then to be considered only the kind of information required. This may be of a triple nature. Distinctly technical and addressed only to a scientific public; entirely popular and directed to the average reader; or a union of the two addressed to both classes. Which shall the bulletin be? Shall it be the technical, or popular, or techno-popular? To aid in arriving at a decision, I resolved to invoke the assistance of the farmers themselves, and accordingly wrote to three representative men in the State asking for their views. The one had been lecturer, teacher, and farmer for over forty years; the second a thorough, practical farmer, one of the kind of which the bone and sinew of New England is composed; and the third a graduate of the college, engaged in agricultural work. The replies were straight to the point and unique. I offer them for your consideration. The teacher and farmer first speaks:

"What is the mission of the bulletin of the experiment station? It is to convey to practical farmers facts which have been determined by scientific investigation and which may be guides to the best results in every department of farm operations. Second. It is to convey to practical farmers the methods by which facts are found or proved, and thus gradually to educate them to become acute observers of cause and effect, and to make their practice an intelligent one, and not a mere blind following of rules for which they know neither reason nor law. This touches the

technical, and there is no reason why it should be obscure or incomprehensible to any common mind, and an Agassiz would make it so plain that a 'fool need not err therein.'"

The farmer next takes up the discussion :

"To answer your question, one may write out a lengthy essay or small volume, or answer it in a few brief lines. The latter, I have no doubt, you prefer, and it is the only one I have the time or ability to use, for I must jot down my ideas as they happen to 'turn up.' First. To publish such information as may have been obtained at the station which may be of value to the public. Second. It may be its mission to obtain information beyond the technical limits of the station. Under my second clause of the first proposition, much may be said. I should make it very literal, every statement very clear and concise. Conclusions and summaries find much favor while the processes through or by which results are obtained are received with indifference. Let me illustrate this by calling attention to the condensed reports contained in the Experiment Station Record. And right here a 'culling out' of whatever is of special value in that Record to your constituency might make a valuable bulletin. Again, I would not spend much money once a month in publishing the fact of which way the wind blew thirty days previous, or once a month stating the analysis of fertilizers whose commercial value hardly varies in a year. Again, never use a technical term, or any term that is not, or will not, be understood by the common farmer. Such terms are probably necessary. An important mission—very, in my judgment—would be to issue a bulletin periodically that would explain in simple form, terms used to give results of analysis, such as 'protein,' 'cellulose,' 'crude cellulose,' 'crude fat,' 'nitrogen,' 'nitrogen-free extract,' and so on through the list, making a dictionary or text-book explaining these terms, that not one farmer in a thousand could explain to you or me, although by statements, we 'catch on' to some conclusions. Here is a mission of education to make your bulletins more valuable.

"Without treating my first further either negatively or otherwise, I refer to my second proposition. You are supposed to obtain information at your experiment station from your land, animals, and laboratory. It seems to me that no statute prohibits you from obtaining facts, information, or conclusions from whatever source you can obtain them. In my judgment, it may be a legitimate mission of your bulletin to have those of inquiry. Let me suppose you want evidence to form conclusions as to any line of farm industry—cattle, we will suppose. Take the assessor's report of any given town; at a moment's glance you will notice those most engaged in that line. Send your bulletin of inquiry to them. Your question, I think, is very legitimate, but I fear I have not enlightened you on the subject. The more I think of it, the more its importance appears."

Last of all, the student speaks :

"You ask, Should the bulletins be technical or popular, or both? I think they should be both. That is, there should be a popular form for farmers, and also a technical form in order to preserve the scientific work of the station and for limited distribution. The bulletins should be simple and yet instructive. There should be no use of technical terms when a plain one will express it much better; no use of Latin names to describe ordinary wheat, and a hog should be called a hog rather than by its Roman synonym. It may be well to use these scientific designations in a scientific report, and yet I think even in these simple language is preferable if it describes the subject in hand. To always use the Latin names and scientific phrases even in scientific works is an affectation and a sort of humbuggery belonging, if you please, to the mediæval times, when the monks and the alchemists used to hoodwink the plain people with phrases which they could not understand. I believe, however, in scientific statements of facts when we have facts to be recorded, but there should be no bulletins published, popular or scientific, until we have got something to say. This publishing a monthly bulletin is a lot of cheap business not worthy of a Massachusetts institution or honest men. I do not think our bulletins need necessarily be confined to the work which we do, but may embody the results, especially the pop-

ular ones, of work which has been done in other stations, so that we may have the benefit of all *good work* in all the different stations. It may be necessary to issue an annual report, but that report need not necessarily give the details of what has been done each year, because a good deal of what may have been done this year will be kicked over next by the results obtained in that year. My plan would be this: Publish a popular bulletin when you have got something to say either of work done at our own station, or some result obtained at some other station which would be applicable to the agriculture of our State. Publish an annual report stating briefly the finances of the station, what work was in progress, and a thorough digest of any important work which had been completed. This for scientific record for use of scientific men and for future reference. We can not lay down a hard and fast rule of what shall be published as popular and what as scientific; it must be left to the good sense of our station managers."

Gentlemen of the convention, you have listened to the opinions of these three men selected as types of the classes to which our bulletins are addressed. It seems to me there is great truth in what they say. If it is our mission to convey information, it must be conveyed in such terms and with such explanations as will make it intelligible to the average mind. We can not afford to overshoot the knowledge of those we are trying to benefit. So doing, we bring ourselves and our work into contempt and fail to secure the hearty cooperation of our constituents. The average reader does not want the processes of our scientific work. He wants results, and results are all he cares about or looks for. Lists of noxious weeds or useful plants, catalogues of insects, constituents of feeding stuffs set forth in chemical terminology, without explanations, he will have none of, for they do not appeal to his understanding nor do they increase his bread-winning capacity. And yet all these are proper, legitimate objects of investigation by the different stations, and the results should be communicated to all associated workers.

I am fast coming to the opinion that there should be two sets of bulletins; the one stripped of all scientific garb, setting forth in plain, unvarnished language such facts as have been ascertained and addressed to the laity at large, and the other, in limited edition, addressed only to the scientific worker and putting on record the processes by which results have been secured. We *do* err in not coming closer to the mind of the average man. I shall never forget the lesson taught me in the earlier days of my teaching. I had lectured for four days upon the Crusades. I had thrown myself into my subject and really believed that I had done a good thing. Fancy my astonishment when a few days later, happening to meet one of my class, he said, "You may think it a strange question, Professor, *but what is a Crusade anyway?*"

Mr. Scovell spoke upon station bulletins, indorsing Mr. Goodell's remark that there should be two classes of bulletins and emphasizing the necessity for using plain and simple language in publications intended for farmers.

The following paper from the Section on Mechanic Arts was then read by Mr. Drake:

WHAT MECHANICAL WORK SHALL WE GIVE TO THE STUDENTS OF OUR AGRICULTURAL COLLEGES?

In this paper I propose to confine myself to the agricultural side of the question. Courses of work for students of mechanical engineering have been so well marked out by teachers of long experience and keen realization of the needs of the pupils that it would be presumptuous on my part to suggest here this evening anything as original in that line.

From a collection of catalogues of our State colleges we notice that some of them have established mechanical courses of high grade, and we shall also find that the majority of these same colleges do *not* make any special effort to give to their agri-

cultural pupils the benefits arising from instruction in mechanical branches. Other colleges do not offer any mechanical instruction at all, but depend entirely upon the college farm to supply the necessary manual labor. It is certainly true that in many of our colleges manual instruction is regarded as of secondary importance. Thus it happens that the development of the young agriculturist along manual lines may have been neglected. The farmer needs all the skill of handiwork that he can acquire. He needs this work in school just as much if not more than the student of mechanics. If the farmer boy does not acquire manual skill in college he will, in most cases, never get it at all, for his lack of time will prevent him from attaining to any great degree of skill while performing ordinary farm labors. On the other hand the progressive mechanic from the very nature of his calling is constantly developing his powers of delicacy and skill. We may give the student of mechanics principles and theories, but he must get his experience out of school.

Education, someone has said, is the development of *power* in the pupil. This development may take place in various ways. It may be brought about by experience as one goes on in life and comes into contact with bright men of the world. The process may be hastened, however, by submitting the youth to a systematic and graded course of study.

One of the greatest needs of the average farmer to-day is this lesson of system. We know that there is a power in systematized action that can not be successfully opposed either by strength or numbers. If our students are to make the best use of their powers they must early learn the value of system. The college that he attends must be founded on system. He must be encouraged to carry on his college work in all lines according to some system. Class instruction must be given in an orderly and not haphazard manner. The teacher must at all times remember that his manner is influencing the pupils for good or for otherwise. The courses of shop work must be arranged in a regular step-by-step order, and if the arrangement is so well chosen that the pupil himself can recognize the sequence of the various operations as he studies them one by one, he will have a greater respect and confidence in the work at hand. He knows that he is moving forward and that the last step is more difficult than the one just before it.

On the college farm every hoe, shovel, rake, plow, chain, or tool of any kind must have its definitely assigned keeping place under cover, and when not in use should be found in its place. In the carpenter shop, the tools that the student uses commonly at the bench should be kept in a drawer, rack, closet, or other convenient space at the bench. Special tools should be kept in a tool room and may be borrowed by the students as occasion requires. If a tool is missing let the student who is responsible for it do nothing else until it has been recovered. Each tool should be sharpened as it becomes dulled. It is very bad practice to use all of the tools one after another till all become dulled or out of order.

The teacher has a grave responsibility in directing the pupil in his first efforts. With many the first few days means either success and a fondness for subsequent work, or failure and a general dislike for school work ever after. If a boy in learning the carpenter's trade is allowed to work at a bench that is untidy and the tools half buried with shavings and dirt, that boy learns his lesson of carelessness and disorder and becomes a poor carpenter. Teach the students that in order to do good work it is not necessary to chew tobacco, wear an old hat on the back of his head, nor to hold an old black pipe in his mouth, as we might reasonably infer if we were to visit the average shop in this country.

Do not allow the student, at first, to help himself to lumber and other supplies, as it tends to make him wasteful. Keep record and account books in all departments. If the student is engaged in any construction work require him to keep a record of all materials used, as well as his time spent upon it. In this way the student can acquire the ability to estimate, within reasonable limits, the cost of needed improvements at home. If you are supplied with steam power, keep a close account of the

amount of coal burned each day, and number of hours of running the engine. Note the boiler pressure every hour, and take the temperature of the feed water. If you use the electric light, record the hours during which the dynamo is used, and take a series of readings of the electrical indicating instruments. This material in itself is valuable for reference and also for historical purposes. Students in doing this record work become observant and quick to notice if anything is going wrong. Introduce a system where it is possible to do so, but never an unnecessary one. Weeks of training might be rendered useless to some pupils by requiring them to follow some purposeless system.

One more suggestion: If the students are given practice in the firing of the boiler and in engine running, offer a prize for the one who shall get along with the least amount of coal consumed, say, in one term. Three or four years of such an atmosphere of systematic work is sure to impress its everlasting mark upon the lives of our students. The farmer of the future must adopt such measures, and it shall be our privilege to equip and send out these new pioneers of this modern age.

The farmer boy comes to the agricultural college with a definite idea of getting such knowledge and training as will enable him to accomplish more work with less exertion. He wants to learn how to operate a farm with the least expense and the largest possible returns. In short, he desires to find out how he can improve his circumstances and at the same time to make life easier for himself and his family. This is not always best brought about by making the farmer more independent. Prosperity, in general, does not mean every man for himself alone, but it is sure to follow if we truly observe the sentiment in the saying "Live and let live." This is in a great measure the secret of business success. One man says to another, "You buy of me and I will buy your goods of you," and in the transaction each one makes a profit. Therefore I do not think it best to encourage the farmer to do by himself too much of his constructive work or repairs. Here and there one may be found who is capable of planning and building a new barn, but in most cases it will be cheaper in the end for the farmer to employ a builder, while he is giving his time to the more valuable operations, to him, of harvesting and marketing his crops.

This is one extreme case, but it serves to illustrate my thought. I do believe in giving the farmer such practical knowledge that he will take good care of his farm machinery and also make ordinary repairs. Let us name some of the various branches of manual work that may be given at college and note their value to one engaged in agricultural pursuits.

(1) Woodworking in all of its forms is of prime importance, and should precede all other mechanical work. A course of joinery at the bench should be followed till the student has acquired a fair degree of skill and accuracy. Then a course of constructive work may be taken up. Every college can afford a varied amount of work outside of the shops. Fences, poultry houses, granaries, and other improvements are constantly required, and a large class may be kept busily and profitably employed. Wood carving may be made elective for the boys, but should be required of all the girls. It is truly valuable, because it is refining in its influence and cultivates the student's interest in beautiful and artistic objects. Wood turning breaks up the monotony of the practically useful and gives a training to the eye for form that is only equaled by free-hand drawing.

(2) I would place forging or smithing second to woodworking in its usefulness on a farm. The pupils appreciate the value of this instruction perhaps better than all other kinds of work. In the forge shop of the Rhode Island State College of Agriculture and Mechanic Arts the agricultural students produce such shapes in iron as are commonly used about a farm. Staples, hooks, hitch rings, whiffletree irons, beetle rings, wagon ironwork, and chains of all sorts, are but a small list of the articles made. The principles of horseshoeing should be taught, but I am as yet uncertain as to the wisdom of encouraging the small farmer to attempt to shoe his own horses. His horse is a vital necessity to him, and a badly home-shod horse might be crippled and rendered useless for an indefinite period.

(3) Steam engineering is now a necessity to the majority of our farmers. Practice in engine running and firing of boilers can be given while our students are taking their wood turning. Agricultural engines should be studied by actual experience in their management, and every college ought to have such an engine, if for nothing more than just such use by the students.

(4) Pipe fitting is a very useful accomplishment and can easily be given to small classes of students at a small cost.

(5) Bricklaying and masonry construction are other lines of useful work, and our farmers might produce better results in that direction if they were acquainted with even the first principles of such work. The old dam that forms the ice pond may be made a permanent affair if constructed of stonework instead of old fence rails and sods, as is usually the case.

We propose to give the agricultural students at the Rhode Island State College some instruction in the mixing and testing of cements and mortars. Various proportions of cement and sand are used and tests for both tension and compression are made. Investigations as to the effect of the age of cement upon its strength will be carried on during the present winter.

Surveying is essential that a farmer may have a clear understanding of legal documents descriptive of real estate and of other matters, such as boundaries, acreage of fields, etc., for which he is usually dependent upon the word of strangers.

The ability to repair shoes and to solder leaky milk cans will often save a trip into town, and likewise save dollars and cents. I have often wished that a course might be produced involving the study of machine construction as applied to agricultural machinery. There may be such courses in existence, but I do not know of any at the present moment. A feature of the next convention may well be a paper upon the above subject.

The first cost of fitting up a woodworking department ranges from \$12 to \$25 for each bench and its complement of tools. A forge shop can be established for about \$25 to \$30 per forge and complete set of tools. The expense for materials used in instruction in these branches for a year should not exceed \$10, and may be limited to a much smaller figure. In my own experience students frequently wish to keep their own work, and they are allowed to do so by paying only the cost of the materials used.

Mechanical work of an exacting nature should be given to all students of an agricultural college, because it cultivates habits of order and neatness. It encourages original thoughts on the part of the student. It brings out a confidence in one's powers of doing and stating things accurately. It gives the student a greater respect for skilled labor, and puts the future farmer in sympathy and touch with those whose life occupations are the mechanical trades. Moreover, if this instruction is given in a proper manner and by teachers who are experienced and enthusiastic in their work, these results of mental and bodily cultivation must make their appearance. It is right and just that we give our time and put our thought and strength into the development of the mechanical courses of our colleges, but at the same time let us give the agricultural student all the assistance that lies in our power. Let us teach him how to make his life work pleasant and interesting. Let us so lead him in the development of his powers that he will return to the farm with a true realization of the fact that he is to follow one of the noblest callings in God's universe.

On motion of Mr. Murkland a vote of thanks was tendered the chairman for the signal ability and courtesy displayed by him in presiding over the convention.

On motion the convention then adjourned sine die. A social gathering at the Ebbitt House followed.

APPENDIX.

MINUTES OF SECTIONS.

THE SECTION ON AGRICULTURE AND CHEMISTRY.

In the section on agriculture and chemistry Mr. Wing opened the discussion on the scope of the short courses in agricultural colleges. This he considered largely a matter depending on the class of students in attendance. At Cornell University the best class of students in the short course were those from 18 to 25 years old, who were already fairly well trained in the manual work of the farm. With such students instruction should be directed largely toward inspiring them with a thirst for more complete information and inducing them to enter the regular college course. A less desirable class of students consisted of boys not familiar with farm life or with the best methods of farming. For these instruction by rules is necessary to a considerable extent. A short course of twelve weeks should not cover the whole ground of agriculture. The student should be made to realize how little he really knows at the completion of the short course.

Mr. Hills considered the scope of the short course a matter to be determined by local conditions. He believed there was a danger that the short course would divert young men from the regular four years' course. The ideal short course he considered to be one made up of studies taken out of the curriculum of the long course. In Vermont the only successful short course had been that in dairying.

Mr. Plumb stated that at Purdue University all of the dairy instruction had been cut out from the regular course of four years and put into a special course. At this institution there are five lines of agricultural instruction from which the student may choose.

Mr. Hunt believed that the short course should be concerned with a special subject. At the Ohio University the short course in agriculture occupies two years. The first year of this course contains no technical industrial study, unless agricultural chemistry should be so considered, and the studies of this year prepare the student, with unimportant exceptions, for entrance to the freshman class in the four years' course. In the second year of the special course the student gets a considerable portion of the technical industrial studies of the regular four years' course.

Mr. Hays emphasized the need of special courses as a means of attracting students, and mentioned as examples the popularity of instruction in the slaughtering of animals at the Minnesota School of Agriculture and of the agricultural course for girls at the same institution.

Another subject on the programme was cooperation between the experiment stations in field and feeding experiments, but this was widened to include cooperative field experiments by farmers. Mr. Woods, who opened the discussion, considered cooperative field experiments with farmers as of value chiefly from an educational point of view and not as furnishing safe data for scientific deductions. He maintained, however, that cooperation in feeding experiments, especially in the formulation of plans for the work, was exceedingly desirable.

Mr. Morrow spoke of the advantage of stations consulting each other as to minor details of parallel experiments, in order that the results of their work might be comparable. He also urged the importance of more careful study of the relation of water to soils and crops, and suggested the advisability of cooperation among the stations looking to the discountenancing of exaggerated claims made by seedsmen for new varieties of plants.

Mr. Flagg emphasized the importance of studying the water content and acidity of the soil of plats used in fertilizer experiments.

Mr. Hays referred to extensive rotation experiments which the Minnesota station proposed to undertake at three substations in the State.

Mr. Smith spoke of the advisability of station workers everywhere being supplied with diagrams of station farms on which experiments were conducted and with data as to the character of the soil, amount of rainfall, etc.

Mr. Frear suggested the need of cooperation among stations in investigations to determine the effect of climate on plants. Mr. Mills explained how in his Province satisfactory results had been secured in cooperative experiments with about 2,000 farmers, most of them ex-students of the agricultural college.

Mr. Henry stated that the past experience of the stations in the line of cooperation has not been encouraging. He believed that "private rather than public methods of affiliation would prove effective."

Mr. Armsby doubted the practicability of the formulation by a committee of plans of cooperation in feeding experiments.

Mr. Redding favored cooperation with neighboring stations.

A motion introduced by Mr. Woods that a request be made that one session of the convention in 1895 be devoted to the discussion of methods of feeding in experiments with dairy animals was carried.

Further details regarding matters presented to the convention by this section are incorporated in the general proceedings (see especially pp. 49, 50, and 52).

THE SECTION ON COLLEGE WORK.

The meeting was called to order by Chairman Harris. In the absence of the secretary Mr. Gorton, of Michigan, was chosen secretary.

Through some misunderstanding, no regular programme had been provided. It was moved and carried that matters referred to this Section by the General Session be then taken up. The subject of securing a bust of Senator Morrill was considered, and it was moved and carried that the Section recommend to the General Session that the subject be again referred to the executive committee, with authority to receive specifications and order casts, and to obtain the marble bust proposed and keep it in a suitable place in Washington for subsequent use. The following States expressed their intention to obtain a bust: Alabama; Wyoming, Maryland, Massachusetts, Minnesota, Michigan, South Carolina, Ohio, Pennsylvania, Mississippi, Rhode Island, Vermont, Delaware, Wisconsin, New York, Maine, Colorado, North Dakota, New Hampshire, and Connecticut.

The subject of the relation of the colleges to the War Department, referred to this Section, was next taken up. It was moved that this Section recommend to the General Session that a committee of five be appointed to confer with the War Department. Moved that the executive committee be instructed to secure legislation which shall require one army officer for each land-grant college. After considerable discussion it was moved that the whole matter lie on the table until Thursday, at 2 p. m. Carried.

It was moved and carried that a committee of three be appointed by the chair to consider the requirements for admission and courses of study in agricultural colleges, and report at 9 o'clock at night. The chair appointed as such committee Messrs. Murkland of New Hampshire, Craighead of South Carolina, and Scott of Ohio. Mr. W. H. Scott then read an admirable paper on the subject of "Faculty meetings." It was moved and carried that Mr. Scott's paper be recommended for publication in the proceedings of the General Session. A communication from the Cosmos Club, extending the privileges of their club to the members of the Association, was received. On motion the invitation was accepted, with thanks. Section adjourned to meet at 9 o'clock at night.

Mr. Murkland, at 9 p. m., reported as follows:

Your committee, to which was referred the matter of entrance examination and standard of scholarship, presents the following report:

In view of the varied standard maintained by the colleges represented in this Association, it is not possible to propose, at this meeting, any detailed system of requirements or any specified course of study.

On the other hand, the subject referred to this committee is so important that it should receive careful consideration at the hands of this Association.

We advise, therefore, that a recommendation from this Section be presented to the Association, to this effect:

That a committee of five be appointed by the Association, which committee shall report at the next annual meeting, and that the executive committee be asked to defray all expenses of the committee.

That the committee be authorized and instructed to confer with the "New England Association of Colleges," the "Committee of Ten," the "National Educational Association," the "Society for the Promotion of Engineering Education," and such other bodies or associations as may be, and to embody the results of such conferences in its report to this Association.

Adopted.

Moved and carried that the committee on programme for next year be instructed to place upon the programme one session of the Section on College Work, for the discussion of the methods of teaching agriculture. It was moved and carried that the chair appoint a committee of five on nomination. Adjourned, to meet at 2 p. m., November 15.

Moved that the two resolutions referred to this Section by the General Session be taken up. Carried.

It was resolved that this Section deems it unadvisable at the present time for the Association to take action on the subject of the two resolutions submitted to the Association, respectively, by Messrs. Scott of New Jersey and Atherton of Pennsylvania.

The following resolution was then considered:

Resolved, That it is the sense of this Association that the executive committee should continue their efforts to secure an appropriation for the purpose of furnishing, under proper restrictions, students in our land-grant colleges with uniforms and such other equipment as may be necessary for more complete instruction in military science and tactics.

Adopted.

It was moved and carried that the Section on College Work recommend to the General Session that a committee of five be appointed relative to the military work in land-grant colleges. It was moved and carried that the executive committee be instructed to secure legislation which shall require one officer of the Army to be detailed to each college receiving the benefits of either or both of the so-called Morrill Acts, which shall request it.

FACULTY MEETINGS.

By W. H. SCOTT.

The occasion for faculty meetings grows out of the conditions under which faculties exist. To teach and govern jointly requires a mutual understanding and an accepted basis of cooperation. To secure and maintain these, there must be an oppor-

tunity to review the situation together, to discuss opinions, to weigh suggestions, to remove objections, and to harmonize differences.

The possible uses of the faculty meeting are many and various. In this paper they will be considered in two general classes: First, those of business; and second, those of conference.

The scope of its business functions is limited by the object of the college as prescribed by its founder, by the general policy of the trustees, and by such restrictions as they may have fixed, either by defining the powers of the faculty or by legislating on special subjects or by vesting certain powers in the president or elsewhere. In most cases the faculty has almost unlimited control over matters of internal government. It adopts programmes, enacts rules, and enforces discipline. Within certain general limitations it frames, adopts, and modifies courses of study, announces times and methods of examination, and determines the methods of recording and preserving results.

In all colleges to some extent, and to a great extent in the larger ones, a number of practical difficulties arise.

The first one grows out of the volume of business. A multitude of details accumulates of which the college of forty years ago with its single course of study and its simple organization contained no prophesy. The administrative work of the college of the present day, with its new departments, its various courses, its elective studies, its large faculty, and its multitude of students, has become vast and complex and in some respects exceedingly difficult. If the faculty must take immediate charge of all the details of it, almost daily sessions would be necessary, and some of them would be very protracted and wearisome. Such a consumption of time and energy would seriously impair the teaching function of a college.

Another difficulty arises from the greater size of the faculty. A large body is almost certain to protract its deliberations and to reach unsatisfactory conclusions. There are many opinions to be presented, to be discussed, and to be reconciled. Some follow the debate languidly; some fail to catch important parts of the discussion; and hence much ground has to be gone over two or three times. And what faculty has not had its sessions prolonged, its interest destroyed, and its patience exhausted by the loquacity of one or two members who were heedless of the boundaries of both reason and courtesy? Happy the faculty whose members all possess the graces of point and brevity.

After all, the conclusion is seldom satisfactory. Corporate wisdom is less to be trusted than individual wisdom. Of any considerable number of persons only a few will investigate carefully the grounds for decision. The rest depend for their information, and even for their opinions, on those who are more immediately interested in the subject or who volunteer to do the talking; and all, even the most cautious and sober-minded, are liable to be swayed by the feelings of the moment. Feeling is stronger and more untrustworthy in a large body than in a small one. Again, it often happens that in order to reach an agreement, or merely to save time or to put an end to a discussion that might otherwise be interminable, modifications are accepted which greatly impair the result. It is endured with the salve, "it was the best we could do." Who wants the judgment of the many on a question of scholarship or diplomacy or a nice question of equity? There are questions that may safely be submitted to a popular vote; but there are others which must always be reserved for select men, chosen for their fitness to decide them. None will be more ready to admit the truth of this position than college professors themselves.

A large faculty is liable to vacillating and inconsistent action through variation in the attendance. At one meeting a question may be decided in the affirmative; at the next, by the absence of some members who were present on the former occasion and the presence of some who were absent before, a similar case may be decided in the negative. The effect is to lower the faculty in the respect of the students and sadly to demoralize the discipline of the college.

Another evil that sometimes besets the faculty meeting is that one aggressive member, or a few, usurp leadership and control business. If these were always the wisest, it would be an advantage; but they are more likely to be the hasty and impulsive, or those who have their own ends in view.

Heated discussions may occur. Severe remarks may be made which leave a sting. They may sometimes produce deep resentment, and even lead to open dissension.

Some of these difficulties may be avoided, and the chance of the occurrence of others may be greatly diminished in several ways.

It goes without saying that faculty meetings should be subject to parliamentary law. A good manual should be adopted as the standard of authority; and, though some latitude may be allowed on ordinary occasions, the remedy which it offers for parliamentary difficulties ought to be promptly applied whenever it may be necessary. A great deal of the business that is transacted in some faculty meetings had better be transferred to individuals. Much should be left to the professor. Let him rule his own department, subject to such general rules as may be necessary to secure a proper degree of uniformity in the administration of the several departments. Much more should be delegated, either by the trustees or by the faculty, either formally or by tacit consent, to the chief executive of the college. In the larger colleges the president should be nearly or entirely free from the duty of instruction, so that he can devote his attention to matters of administration. Power commensurate with such a position should be placed in his hands, and he should be held responsible for its exercise.

A great means of relief is a system of standing committees or subfaculties. Each of these committees should have jurisdiction over the studies of a certain section of students, the members of the committee being selected because they have charge of classes to which these students belong. The committee may have regular times for meeting, but it will usually be found more convenient to meet at the call of the chairman. These smaller bodies can meet oftener than the full faculty can be brought together, and thus business will suffer less delay. There being but few persons to be informed or to be brought to agreement, less time will be consumed in discussion and conclusions will be reached more rapidly. And as those present are already familiar with the students and the work under their special charge, their conclusions will be more intelligent and more just.

The general government of the institution, so far as it is not exercised by the president, might be committed to a small governing body, consisting of the president and a select number nominated by him. The same arguments of promptness and efficiency, economy of time, and sound conclusions which have been given to show the value of subfaculties apply here. The administration would also be more uniform, as the same persons, or nearly the same, would deal with all like cases. A line of well-defined precedents would be established, rendering the government settled, well understood, and easily managed.

While all these advantages of improved method and result would be obtained, there would be at the same time the removal of an unwelcome burden from the majority of the faculty, and the prevention of a great and needless loss of time. What good reason can be given why twenty or thirty or more men should leave their work, perhaps depriving ten times that number of students of instruction to which they are entitled, in order to decide what shall be done with some boy who has copied from his neighbor's paper during an examination?

Such a plan of organization would leave for the general faculty only those business affairs which are of the first importance. These would hardly include more than general legislation for the guidance of the subordinate bodies and the most serious cases of discipline. With this class of its duties so much reduced, it would have time for more frequent and careful consideration of the second kind that I named—those of conference.

There are many topics on which a free consultation together by members of a faculty may be fruitful of excellent results. Though less urgent from a lower point

of view than legislative and administrative matters, they are, from a higher point of view, even more urgent and of far greater consequence. They belong to a wide field. Almost any subject that pertains to the welfare of a college or to the relations of its members to it and to each other may on fit occasions be profitably considered by a college faculty. The needs, the defects, the hindrances, the possibilities of the institution; its relations to the public, plans for enlargement and improvement, the welfare of the students—these and many more ought to command the interest and cooperation of every member.

The direct benefits that are likely to flow from such conferences are perhaps sufficiently obvious, and I shall therefore reserve what time remains to me for emphasizing two or three indirect benefits, which to my mind are of even greater value.

One of these is that each professor may thus keep himself informed to some extent of the work of other departments of the college. He can hardly fail to do his own work more intelligently if he is acquainted with that of his fellow teachers. Both from their merits and from their defects he can improve his methods of instruction; and he can modify his requirements in kind and amount so as to afford and to receive the greatest help.

Better than information is stimulus; and no teacher who is alive to the demands of his profession can engage in such conferences without being filled with higher impulses. The methods, the suggestions, the spirit of his associates will sharpen his perceptions and deepen his interest.

But perhaps the highest benefit of the faculty meeting is the feeling of unity which it may foster, and which can hardly be maintained without it. The success of a college, like the success of an army, depends not merely on the faithful performance of individual duty by each member, but no less on the esprit de corps by which it is inspired. Many a college needs more than it needs anything else the cultivation of a catholic mind. There is a tendency to forget the general interest in one's zeal for his own department. If any great success is to be achieved, this disintegration must be arrested. Every man must learn to look not on his own things, but also on the things of others. There must be, and must be felt, a bond of unity. To create such a bond and to make and keep it a living bond, there is perhaps no agency that may be made more efficient than the faculty meeting. Here, if anywhere, a union of feeling may be awakened and a union of effort inaugurated. Here, if anywhere, the college may be converted from a congeries of departments, each confining itself within its own narrow circle, and perhaps jealous or even hostile toward all the others, into a compact and vital organization, each part supported and supporting, and all animated by a common soul.

This result will naturally accompany and follow the common pursuit of an objective end. When a body of men unite heartily to accomplish an object, each one of them spontaneously and almost unconsciously passes into a freer and more sympathetic atmosphere. Mental contact generates a fire that would have slept forever in the separate mind. The oxygen of one mind combines with the carbon of others to create a flame by which all are filled with light and heat. Or by proximity alone slumbering minds, like dying embers, may warm each other, first into a glow and then into a radiant fire. The professor alone in his library, or teaching his class, or surrounded by students in his laboratory, may not be distinctly conscious of this element of fellowship in his mental states and actions; but his thought is clearer and more consecutive, his speech is more limpid and illuminating, and his whole aspect and movement are freer and more effective because he has felt the prolonged touch and received the stimulating force of the men who study and teach around him. The intellectual potential of a college thus charged, compared with that of a single mind working in isolation, is as the enthusiasm of a mass meeting to the torpidity of a solitary plowman.

These, then, are the possible uses of the faculty meeting—the convenient transaction of business, a collective intelligence of the work of the several departments

and of the institution as a whole, the awakening of individual interest and power, and the inspiration of fellowship; and the greatest of these is inspiration.

The faculty meeting ought to be the center of strong intellectual and spiritual forces. It ought to develop and promulgate the ideas which form the texture of the academic life. Its spirit ought to be high and magnanimous, and its impress on the student body ought to be a royal impress, set so deep that it can never be effaced. That spirit ought to pervade the atmosphere of the place as a purifying and stimulating force reaching upward and downward from the office of the president to the room of the humblest and most sluggish student, and outward to the utmost boundaries of its sphere. The faculty meeting ought to be the fountain of life to the college—the warm and ample heart whose beat regulates the pulse of the whole body, and from whose outgoing tide the whole body, fitly joined together and compacted, may make increase unto the building up of itself both in love and in power.

When can such conferences be held? This must be determined according to circumstances. If the time of the faculty meetings is taken wholly or partly from regular programme hours, it would hardly be right to extend it for this purpose. But if the faculty meetings have an evening set apart for them once a week, or once a fortnight, or once a month, the latter part of the evening may very appropriately and profitably be devoted to such conferences as are here meant. It might be a still better plan, and one that would suit either case, to give one evening a month to this special object, and to have one or two short papers prepared as a basis for discussion. What is this meeting in which we are now engaged but a representative faculty meeting of the kind I have suggested? If it is worth while for us to come together, at great expense of money and time, from different colleges scattered over the whole country, to hold such conference meetings as this, surely it would repay the slight effort and inconvenience involved in holding meetings of a single faculty for a similar purpose.

THE SECTION ON ENTOMOLOGY.

The following papers were read before the Section:

"Entomological Work in Experiment Stations," by H. Osborn.

"The Economic Value of Parasites," by F. M. Webster.

"Special Insect Outbreaks of 1894 in Iowa," by H. Osborn.

"The use of Arsenites on Tobacco," by H. Garman.

ENTOMOLOGICAL WORK IN EXPERIMENT STATIONS.

By H. OSBORN.

It is the intent of this paper to discuss some of the practical details of entomological work in connection with the experiment stations and point out some of the necessities for such work, and to attempt to make plain the needs of better equipment and greater enlargement in this line of agricultural investigation. Those who have preceded me in this office have taken occasion to indicate the extent and nature of work being carried on in the stations and gathered statistics regarding station workers and the equipment with which they are fitted, and to point out also the necessities of greater facilities. It will be simply furthering this object to discuss some of the particular methods in which such enlargement is necessary.

The station entomologist must have two main objects in view: First, the thorough investigation of such insects as are the most abundant in his territory, and, second, the thorough dissemination of this knowledge and the adoption of whatever preventive and remedial measures are shown to be necessary by the cultivators of his State. It need hardly be said that the latter is the much more practical and difficult part of his duty. In the investigation of the insects of his particular locality the entomologist will naturally give his attention to those which are of particular economic importance, but the multiplicity of the injurious forms and their varying importance from year to year will often make it a difficult question to decide upon the particular species to receive attention. While, in a considerable degree, he should be controlled by the demands of the residents of his vicinity, it will not do to be entirely influenced by such demands, for he may discover that there are insects which attract little or no attention from the average observer, but which have a much greater economic importance than some of the more conspicuous ones, and he must not only undertake the study of such forms, but he must show their importance to the public.

A thorough knowledge of the complete history of the different species of insects of his locality is an essential foundation for economic work, and I believe we should not lose sight of the importance of detailed work in the life history of species. It is no doubt true that there are certain methods of treatment which are applicable to large groups of insects, and that the more thorough study of poisonous solutions and methods of application are promising in result, but there is the danger that too much reliance be placed upon such methods, and that the investigator neglect to inquire into the details of the habits of insects, and that there may be cases where

certain peculiarities of habit will render an insect proof against measures which at first sight appear to be entirely practicable. Methods of spraying and combinations of substances for this purpose have been tested and experimented with to a considerable extent by men who are not trained entomologists, and, in many cases, to very decided advantage in the production of mechanical devices for spraying and combinations of insecticidal substances, but in some cases the attempted application of such methods or combinations to certain kinds of insects would be recognized as useless by anyone acquainted with the fundamental structure of insects.

While we would encourage therefore every effort toward the perfection and adoption of spraying devices and spraying fluids, we would urge the importance of referring the application of these to various insects whose habits are not entirely known to trained entomologists who should be able to determine as to the possible value or usefulness of the effort and the direction of practicability for such measures. That the entomologist connected with an experiment station should devote himself to the investigation of the injurious insects in his territory would seem to require no argument, but there are cases in which we see entomologists in their capacity as station workers devoting themselves to studies which, to say the least, have but a very remote relation to the practical needs of their constituency. While a knowledge of the insect fauna of each particular State is a great desideratum and is ultimately of economic importance, it seems to me that to make this the leading subject of study to the exclusion of the study of the habits of the known destructive forms is a mistake. To take up the investigation of monographing of a group of insects, which, in their distribution and habits, have little relation to the industries of his State, is unwarranted. For the person engaged as an experiment station worker to engage in the monographing of a group of marine mollusca would be manifestly absurd, but instances not greatly different from this could be cited from the history of our experiment stations. It must be remembered, of course, that there are a number of instances in which the station entomologist is simply to devote part of his time to station work and part to other duties, and if such work is embraced among his other duties this remark would have no application. It should be understood thoroughly, however, that it is a matter of common honesty for an individual engaged for a certain kind of work to devote himself thoroughly to that particular work.

In the method of work which he investigates the entomologist should aim above all to secure thoroughness and accuracy, and for this purpose he needs a full equipment of apparatus, the particular character of which will depend upon his location and the subject of study, but in the provision of which he should not be stinted. For the full elaboration of life histories some form of insectary is almost essential, although, of course, much work may be done without the complete control of conditions which may be provided by such a building. Of breeding cages he should have a full supply, and these will be constructed in varying degrees of complexity, according to the results to be reached. He must not omit the study of minute details in structure or a careful determination of species and varieties, as this may happen to be an important factor in the determination of methods of work, danger of introduction and distribution of certain species, and other points of importance, all of which can not be exaggerated. A complete equipment for thorough microscopic work is therefore of absolute necessity, and no entomologist should consider his equipment complete, or even begun, without such an outfit. While a great number of insects which he is called upon to examine may be readily determined without the use of the microscope, there are many in which the microscopic characters are an absolute necessity. For instance, the necessity of such work occurs in the recent distribution of the San José scale, which has been of such immense importance in California, and which during the last two years has been recognized at a number of localities in the Eastern States. The extensive notices given to the distribution of this species naturally led to an examination of orchard trees all through the fruit-growing districts, and many specimens of the common native bark lice were sent to our experiment station for identification, and doubtless the same occurred in nearly

every State where the orchard is of any importance. The prompt distinction of the San José species from the common forms can readily be seen to have decided importance in relation to the distribution of nursery stock or scions from orchard trees. Another very essential feature of the equipment is an extensive collection carefully determined as a basis for recognition of the species that may be sent in for identification as well as for a knowledge of the local fauna. Such collections must necessarily be the work of time and thorough preparation and their careful identification a matter of much labor and expense, but this should by no means be neglected, for it is impossible to tell when there may be a demand for the identification of some obscure species, and naturally, if it is an insect attracting any attention, the determination must be prompt and certain. Whether the insect be injurious or not the parties noticing it and sending for information want to know what the nature of the insect may be, whether of possible danger or not, and whatever facts may be of importance regarding its appearance. It is an excellent plan also for each entomologist to take up some group of insects having economic importance as somewhat of a speciality, since it is impossible for one to be an expert in all lines, and then, by correspondence and exchanging with entomologists who have given attention to other groups, each may become possessed of collections which are authentic. The careful work on timber insects in the West Virginia station is an excellent example of the value of this plan. The work of Hopkins on *Scolytida*, Bruner on *Orthoptera*, and Smith on *Noctuidæ* is directly in line of such study. The enlargement of this feature of the station work upon the part of those in authority would seem to me very desirable.

I desire here to call attention to a phase of our work which I believe confronts the entomologist in all parts of the country and which seems likely to be a perplexing problem in the time to come. I refer to the various insecticides, good, bad, and indifferent, which are placed upon the market and more or less energetically brought to public notice by parties who have simply the commercial phase of the subject in view. It would be entirely out of place to make a general condemnation of these substances or of parties who are pushing their use. Some of them are undoubtedly valuable, and there can be no question that benefit arises from the adoption of these insecticides by parties who, from indifference and ignorance, would not adopt well-known standard preparations that might be used with much less expense. We must recognize the large advantage of the commercial advertiser in placing his wares before the public, and the fact that the average farmer is quite likely to adopt the remedy which is accessible at his nearest supply station when forced to adopt remedial measures by some outbreak of insect injury. An effort to secure the establishment of supply stations for standard apparatus and insecticides in the larger towns of each State might be of practical benefit. Such a movement has been undertaken in Idaho, where the distance from main supply depots renders such a provision particularly necessary. It is an important question whether we should go out of our way to expose fraudulent materials or to condemn those which, as placed on the market, are sold at many times their actual value. Some method of reaching this question is necessary for the protection of cultivators who ask such information and who have not the means of distinguishing the unscrupulous from the honest dealer; also for the protection of the man who gives an honest article for an honest price. We can doubtless gain wisdom from an examination of the history of fertilizer control.

There is, however, need of some uniform plan to be adopted by the entomologists of the various stations, and what seems to me a very excellent movement has been started by the Association of Economic Entomologists, whereby it is hoped that this question can be dealt with in a satisfactory manner. While it may seem unnecessary to test all the different insecticides which may be brought out and which are protected by trade-mark or patent, it is in many cases almost essential that the entomologist should be prepared to give an authoritative answer regarding the value of such substances. For each entomologist to attempt the testing of all such substances would be manifestly impracticable, but the testing of the different kinds

being divided among different stations and duplicated at three or more of them not only divides the labor and the responsibility, but makes the results much more authoritative. The same is true regarding the test of insecticide machinery. The various devices for spraying or for the mechanical destruction of insects which in some cases are so expensive that it is impracticable for each station to secure an outfit, while if they are taken as a gratuity from the manufacturers there is sufficient obligation on the part of the station to make the result of less value than where the test can be made with entire freedom from such obligation.

A phase of the station work which does not make any material show, but seems to me to be of as great importance as anything that we undertake, is the attention to correspondence regarding insects. Every letter of inquiry regarding injurious insects or asking the determination of any forms should receive most careful attention, and replies be written with the same care that would be devoted to an article for publication. In many cases such letters may pass from hand to hand to be used by the neighbor or different parties, and indeed where referring to insects of interest in a particular locality, they are very likely to be handed to some local paper and may thus get a much wider circulation than the writer anticipates. Moreover, a careful reply to one letter is very likely to encourage further correspondence, and in this way the entomologist will secure a correspondent who may be of very great service in keeping him informed as to the insects of importance in that locality and who would become a center of information for the neighborhood in which he lives. A personal letter is much more likely to be carefully read and its suggestions followed than a general note published in a general way, so that this personal correspondence may be more effective in bringing about active adoption of remedies than a wide distribution of information in published reports.

The question of what to publish and how to publish the results of investigations is often a very perplexing one. The great majority of the people whom we wish to serve have very meager knowledge of the structure and habits of insects, and great pains must be taken not to bury our information in articles written in language beyond their reach. On the other hand, we will fail in one great purpose of our work if we simplify to such an extent as to not present the evidences on which conclusions may be founded. The reader should be left with some more definite knowledge of the subject in hand than he possessed before, and if possible stimulated to observation, thought, and experiment for himself. The plan of writing plain, untechnical articles, but with every effort to secure accuracy and clearness of expression for the general bulletins, and of publishing more technical matter necessary for the use of station workers in such journals or bulletins as will reach especially the scientific workers, seems an excellent one. Aside from these methods, we must adopt all possible means, such as personal work in institutes, notes in agricultural papers, etc., to reach the greatest possible number.

Entomological work has made gratifying progress, but results so far gained are, I am confident, but a slight indication of what may be accomplished by persistent, faithful, and well-directed effort.

THE SECTION ON MECHANIC ARTS.

The first meeting of the Section on Mechanic Arts was held in the main parlor of the Ebbitt House, November 13.

The meeting was called to order by President J. H. Washburn, of Rhode Island, at 2 p. m.

On motion of Mr. Anderson, of Kentucky, seconded by Mr. Drake, of Rhode Island, a committee was appointed to take some steps to interest all American colleges to send representatives to take part in the meetings of the Section on Mechanic Arts. The committee named by the chair was Messrs. Anderson, Drake, and Tyler.

The secretary was instructed to request Mr. True to send a copy of the next annual report of the Association of American Agricultural Colleges and Experiment Stations to every instructor in mechanic arts in the colleges belonging to the Association.

On motion of Mr. James K. Patterson, of Kentucky, seconded by Mr. Tyler, of Massachusetts, a committee was appointed to define the scope of the work of the Section on Mechanic Arts. A committee composed of Messrs. Tyler, Drake, and Anderson was appointed.

On motion, the meeting proceeded to listen to the reading of the following papers:

“Shop Courses for Mechanical Engineering Students,” by J. J. Wilmore.

“What Mechanical Work Shall we Give the Students in our Agricultural Colleges?” by W. E. Drake.

MINUTES OF MEETING OF SECTION ON MECHANIC ARTS, NOVEMBER 14, 1894.

The meeting of the Section on Mechanic Arts was called to order by President J. H. Washburn at 2.20 p. m., November 14, in main parlor of Ebbitt House, Washington, D. C.

On motion of Mr. Tyler, seconded by Mr. Patterson, a vote of thanks was extended President Washburn for the efficient manner in which he had conducted the affairs of the Section on Mechanic Arts during the past year.

The committee appointed to define the scope of the work of the Section offered the following resolution:

Resolved, That the officers of the Section on Mechanic Arts be requested to arrange for the presentation, next year, of papers dealing mainly with those subjects which fall under the designation “Mechanic Arts” in their special relation to the work of colleges of agriculture and mechanic arts, and that they be further requested to secure the presentation of as many such papers as possible before the full Association.

A committee composed of Messrs. Anderson and Silvester was appointed for the purpose of having the papers, read this year before the Section, published in the general convention proceedings.

The following papers were presented :

“Some Problems of Manual Training in our Technical Schools,” by J. R. McColl.

“Belt Fastenings,” by Walter Flint.

THE SECTION ON HORTICULTURE AND BOTANY.

The chairman, Mr. Goff, of Wisconsin, and secretary, Mr. Pammel, of Iowa, did not attend the convention, and the Section organized by electing Mr. Tracy, of Mississippi, as chairman for the meeting and Mr. Halsted, of New Jersey, as secretary. The printed programme for the Section gave the titles of eleven papers by as many authors, but only two of these authors were present during the whole convention, and only one at the organization of the Section. A committee upon programme was therefore appointed, consisting of Messrs. Mell, of Alabama, Lazenby, of Ohio, and the acting secretary, to report at the next session of the Section.

The first paper read (by the secretary) was by H. N. Starnes, of Georgia, upon "The Proper Position of Hybrids in the Classification of American Grapes." A classification is proposed dividing all sorts of grapes into seven series or species, and all native subspecies are considered as varieties. The mother plant in all cases regulates the series into which the hybrid falls. The vineyard in charge of the writer, Mr. Redding stated, was arranged according to the classification offered. Mr. Lazenby stated that plums and other fruits needed a satisfactory plan of classification. Mr. Burrill suggested that more of botany and the methods of botanists should be used in horticulture.

Mr. Goff sent a paper upon "Plant Breeding at Experiment Stations," which was read by the secretary. The author made a strong plea for the origination of new varieties at the experiment stations, and stated that it was his firm conviction that grand results must come from plant breeding. A lengthy discussion followed, in which Messrs. Mell, Tracy, Burrill, and others took part.

A short session of the Section was held on Tuesday evening, at which there was a discussion upon the general question of how best to make the sectional meetings of greatest value. Methods of teaching horticulture were offered, as, for example, a winter garden under glass by Mr. Lazenby; greenhouse methods by Mr. Rané, of West Virginia. Short courses in horticulture it was thought by some would help to teach the instructor how to do his work. Mr. Waite, of the Department of Agriculture, outlined briefly his experiments with pears.

At the next session, Thursday afternoon, Mr. Green, of Ohio, having arrived, read two papers: (1) "The Position of Greenhouse Benches

for Experiment Work," and (2) "Construction of Greenhouse Benches for Subirrigation." Side benches are objectionable and therefore it was advocated to divide the greenhouse space so as to have two benches with an alley 30 inches between them in the middle of the house, and a narrow one running along each side wall. For subirrigation the tile is laid upon the bottom of the bench and the water runs out at the joints, wetting the soil uniformly. If the water runs out the lower end of the tile too freely it may be checked by using small sheets of tin placed between the joints of the tile at any point where more water is desired in the bed.

A plan of field experiments with fungicides was outlined by Mr. Halsted and some results mentioned that had been obtained during the present year. Spraying with Bordeaux mixture for the leaf spot of the beet was successful, and the anthracnose and blight of beans can be controlled. Bordeaux mixture in excess caused a dwarfing of the plants.

A paper by Mr. Pammel upon "Bacteriosis of Ruta-bagas" was read by the secretary. A fatal rot of ruta-bagas was found to be due to microorganisms, a new species of bacillus. Mr. Mell stated that he had met with a similar decay. Two other papers by Mr. Pammel were read by title, namely: (1) "On the Distribution of Some Weeds in the United States, especially *Iva xanthifolia*, *Lactuca scariola*, *Solanum rostratum*, and *S. carolinense*;" (2) "Notes on Diseases of Plants at Ames, Iowa, 1894."

Mr. Bolley's (North Dakota) paper upon "Effect of Change of Soil upon Growth of Wheat" was read by Mr. Lazenby. Among the conclusions arrived at from the experiments are: (a) "That the grain or fruit of wheat is much less subject to variation than its vegetative parts; (b) that true varieties under like soil and climatic conditions will approximate a like product without reference to the parent soil; and hence, (c) that in general the changing of seed wheats because of supposed advantages to be attained through change of soil is based upon a fallacious supposition."

Mr. Waldron's (North Dakota) paper upon "A New Macrosporium Disease of Squashes" was read by the secretary, as likewise one from Mr. Corbett (South Dakota) upon "Determination of Sex in *Shepherdia argentia* by Bud Characters."

Mr. Rane, of West Virginia, contributed some points upon "Surface Subirrigation." Ordinary tiles are used for conducting the water between the rows of plants. "It is simple, practical, and inexpensive."

PROVISIONAL SECTION ON STATION WORK.

Called to order at 4 o'clock p. m., November 14.

The secretary announced three topics for discussion:

(1) Touching the permanence of the Section, the present Section being provisional.

(2) Touching a communication from the Association of German Experiment Stations.

(3) Touching the classification and arrangement of station accounts.

Upon motion the topics were taken up in the above order.

(1) Mr. Smith moved that steps be taken looking to the formation of a permanent section on station work.

Opposed by Mr. Frear on the ground that too many sections would be undesirable; and by Mr. Johnson, Mr. Mell, and Mr. Myers on the ground that the questions likely to come up before a section on station work could be better discussed before the general body.

The motion was lost.

(2) The secretary presented a communication from Prof. Dr. Nobbe, of the German Association, stating that the participation of members of foreign experiment stations would always be welcome.

Mr. Jenkins read resolutions which he had prepared in response to this communication. It was moved and seconded that they be recommended to the General Session for passage.

Carried.

(3) In order to bring before the meeting the third topic (the supervision by the Secretary of Agriculture of the expenditure of station funds) Mr. Alvord offered the following resolution:

Resolved, That in the opinion of this Association it will be difficult for the Secretary of Agriculture to fully ascertain the facts as to the application of station funds, from the examination in Washington of a financial statement or report to be rendered after the close of the fiscal year, and that some further action by the Department of Agriculture is deemed expedient, such as visits to stations by suitable members of the Department.

Mr. Johnson opposed the motion on the ground that the form of report prepared by the committee in cooperation with the Secretary of Agriculture was quite satisfactory and would enable the Secretary to see clearly what was being done with the funds.

Mr. Plumb said that the new form would cause many changes in the system of accounts at Purdue. He thought it desirable for the Secretary of Agriculture to send on a representative to see just how the funds were expended.

Mr. Jenkins thought there would be great difficulty in classifying station expenditures under the proper heads. How were administrative expenses and those of the scientific staff to be separated? There were many things that could not be found out except by personal examination made by some one sent on for the purpose. He was heartily in favor of the Department authorities, before passing judgment on whether station funds had been properly expended, sending somebody to find out.

Mr. Craighead opposed the motion on the ground that it was a useless expense. Inspectors would be able to find out very little more than could be ascertained from the reports. If the Department was not satisfied that the funds of a station were being properly expended they could send out a man to investigate.

Mr. Goodell thought the stations ought to court the fullest investigation. If the Secretary of Agriculture wished to send around an inspector, the stations should not oppose it.

After some further discussion Mr. Alvord withdrew his resolution, and one offered by Mr. White as a substitute (see p. 47) was adopted and recommended to the Association.

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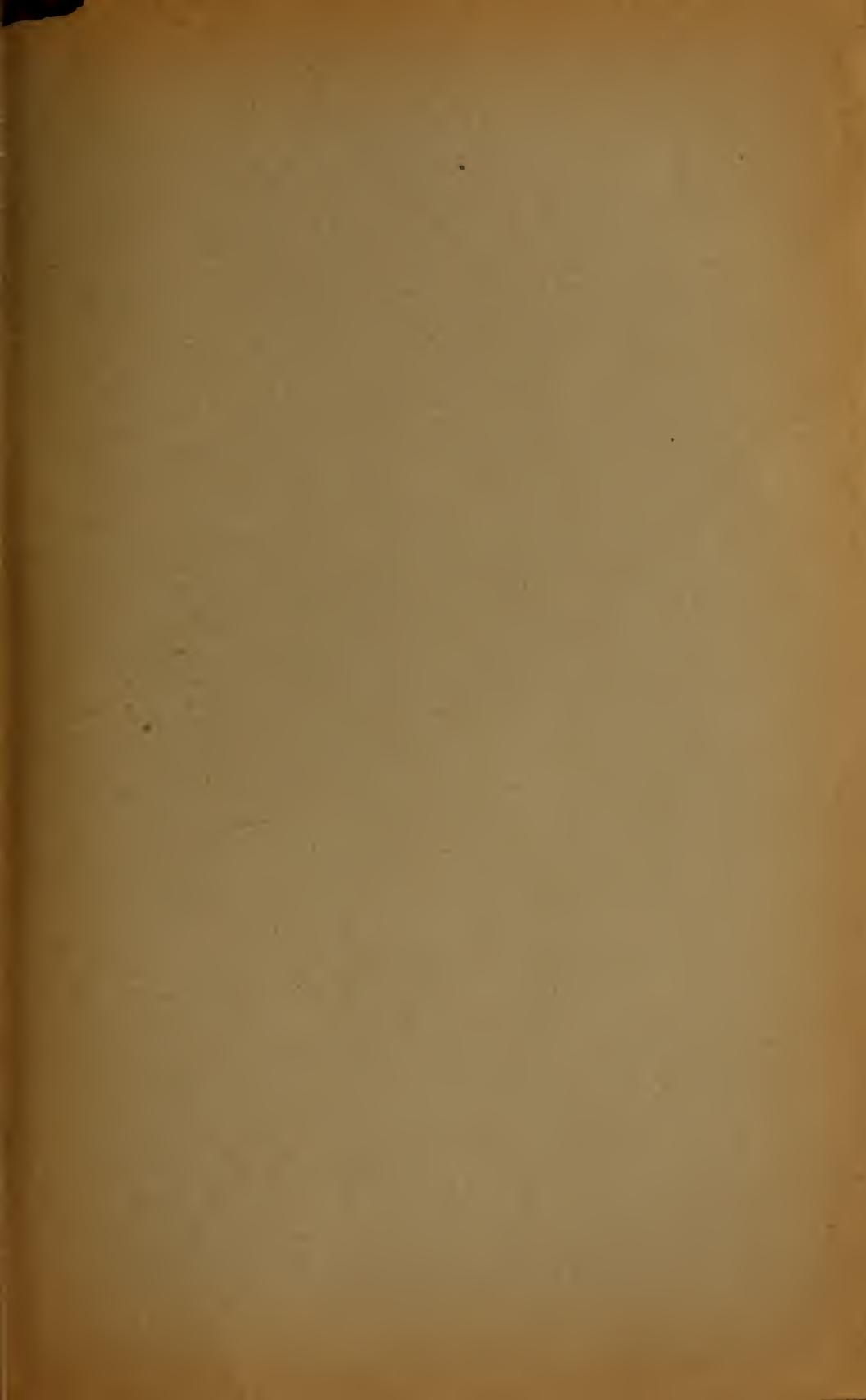
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