

SCIENCE

EDITORIAL COMMITTEE : S. NEWCOMB, Mathematics ; R. S. WOODWARD, Mechanics ; E. C. PICKERING, Astronomy ; T. C. MENDENHALL, Physics ; R. H. THURSTON, Engineering ; IRA REMSEN, Chemistry ; JOSEPH LE CONTE, Geology ; W. M. DAVIS, Physiography ; HENRY F. OSBORN, Paleontology ; W. K. BROOKS, C. HART MERRIAM, Zoology ; S. H. SCUDDER, Entomology ; C. E. BESSEY, N. L. BRITTON, Botany ; C. S. MINOT, Embryology, Histology ; H. P. BOWDITCH, Physiology ; J. S. BILLINGS, Hygiene ; WILLIAM H. WELCH, Pathology ; J. McKEEN CATTELL, Psychology ; J. W. POWELL, Anthropology.

FRIDAY, NOVEMBER 23, 1900.

CONTENTS :

<i>The Association of American Agricultural Colleges and Experiment Stations</i> : DR. A. C. TRUE	817
<i>Recent Work on Mollusks</i> : DR. WM. H. DALL.....	822
<i>Richter and the Periodic System</i> : PRESIDENT F. P. VENABLE	825
<i>Vertebral Formula of Diplodocus (Marsh)</i> : DR. J. B. HATCHER.....	828
<i>Plant Geography of North America, III. :—</i> <i>The Lower Austral Element in the Flora of the Southern Appalachian Region</i> : THOS. H. KEARNEY, JR	830
<i>Scientific Books :—</i> <i>Gauss and the non-Euclidean Geometry</i> : PROFESSOR GEORGE BRUCE HALSTED.....	842
<i>Scientific Journals and Articles</i>	846
<i>Societies and Academies :—</i> <i>The National Academy of Sciences. New York Section of the American Chemical Society</i> : DR. DURAND WOODMAN. <i>Section of Astronomy, Physics and Chemistry of the New York Academy of Sciences</i> : DR. WILLIAM S. DAY.....	848
<i>Discussion and Correspondence :—</i> <i>A Disclaimer</i> : PROFESSOR J. MARK BALDWIN AND OTHERS.....	850
<i>Current Notes on Meteorology :—</i> <i>A Recent Study of Eclipse Meteorology, National Geographic Magazine ; The Cape Horn Passage ; Underground Temperatures during a Hot Wave in South Australia</i> : PROFESSOR R. DEC. WARD... ..	850
<i>Botanical Notes :—</i> <i>The Powdery Mildews ; Plant Breeding ; The Butternut Family ; Red Cedar Diseases</i> ; PROFESSOR CHARLES E. BESSEY.....	852
<i>Scientific Notes and News</i>	854
<i>University and Educational News</i>	855

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson, N. Y.

THE ASSOCIATION OF AMERICAN AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.

THE fourteenth annual convention of the Association of American Agricultural Colleges and Experiment Stations was held at New Haven and Middletown, Connecticut, November 13th–15th. Most of the sessions were held in the assembly room of the Sheffield Scientific School of Yale University, where the delegates had the pleasure of meeting President Hadley, who delivered a short address. Professor W. H. Brewer, of the Sheffield Scientific School, and Dr. E. H. Jenkins, of the Connecticut Experiment Station, actively promoted the comfort of the delegates and the business of the convention. The Association went to Connecticut this year especially to celebrate the twenty-fifth anniversary of the founding of the Connecticut State Agricultural Experiment Station. The colleges and stations of all sections of the country were represented.

The report of the Executive Committee pointed out that Congress had recognized the importance of the land-grant colleges to the country in a notable way during the past year by providing that when the proceeds of the sale of public lands were insufficient to meet the annual appropriations for these institutions, the deficiency should be met by direct appropriations from the National Treasury.

President J. E. Stubbs, of the University of Nevada, presided at the general sessions and delivered the president's annual address. He took strong ground regarding the fundamental necessity for the direct and indirect teaching of sound moral principles in our public educational institutions of all grades. "It is character and not intelligence that determines the historical development of nations. It is character and not intelligence that distinguishes one individual from another and contributes to social well-being. The morality of the race, together with its strength and vigor, must be the principal object of education; all else is secondary."

A carefully prepared and eloquent address on the career of the late Senator Justin S. Morrill, of Vermont, was delivered by President G. W. Atherton, of the Pennsylvania State College. President Atherton's close association with Senator Morrill for many years and his intimate familiarity with the history of the movement for the establishment of colleges and agricultural experiment stations under national auspices enabled him to treat this subject in a very thorough and satisfactory manner, so that his address will have a permanent historical value.

Dr. Bernard Dyer, of London, England, as the representative of the Lawes Agricultural Trust, delivered the biennial course of lectures provided for in that Trust. In these he gave a *résumé* of the investigations at the Rothamsted Experiment Station during the past fifty years with different kinds of fertilizers on wheat, pointing out especially the effects of different systems of manuring on the amount and availability of the fertilizing constituents in the soils experimented with. It is expected that a detailed account of this work will be published later by the Department of Agriculture. Besides resolutions of thanks to Dr. Dyer, the Association adopted a memorial showing its

high appreciation of the life and work of Sir John Bennet Lawes and his associates at the Rothamsted Station.

One day was spent at Middletown, where the Association was most cordially received and hospitably entertained by Wesleyan University. The delegates were also given a reception at the residence of Professor W. O. Atwater and had the opportunity of seeing the Atwater-Rosa respiration calorimeter in operation. At a meeting held in the University chapel, Dr. W. H. Jordan, Director of the New York State Experiment Station, gave a historical address on the American Agricultural Experiment Stations. Besides reviewing the rapid growth of this great enterprise from its beginning at Middletown twenty-five years ago and pointing out the great scientific and practical results which it has already achieved, Dr. Jordan strongly urged that the stations should use every effort to put their work more fully on a high scientific level and devote themselves very largely to original investigations.

He was followed by Professor W. O. Atwater, who gave a number of interesting details regarding the establishment of the Connecticut Station as the first State Station in this country and showed that the influence of this station had been very great in shaping the organization and work of other stations. He also pointed out that a relatively large number of men, now prominently identified with the experiment station enterprise in this country, had been trained at Yale University, Wesleyan University, and in connection with the work of the Connecticut Experiment Stations.

In the Section of Agriculture and Chemistry much attention was naturally given to discussions of investigations on tobacco, the Connecticut State Station being engaged in important work in this line. Dr. E. H. Jenkins, Director of the Connecticut State Station, read a carefully prepared paper

on methods of experimenting with cigar-wrapper leaf tobacco, in which he showed that one important result of the experiments of the Connecticut Station has been the confirmation of the results obtained by the investigations under direction of Professor Milton Whitney, Chief of the Division of Soils of the Department of Agriculture, indicating that the character of the tobacco leaf is in a great degree dependent on the physical character of the soil in which the plant is grown. Professor M. A. Scovell, Director of the Kentucky Station, read a paper on the methods of growing and curing white Burley tobacco. In discussing these papers Professor Whitney brought out the interesting fact that, with scientific management of the crop, tobacco almost identical with that grown in Sumatra can be produced in the Connecticut Valley. Among other papers read in this section were those on tests in feeding dairy herds, by Professor C. S. Phelps, of the Connecticut Storrs Station; cooperative field experiments, by Director E. B. Voorhees, of the New Jersey Stations; on the raising of sugar beets as a new and profitable industry in this country, by Director I. P. Roberts, of the Cornell University Experiment Station; and on available energy in foods, by Professor W. O. Atwater.

The report of the section on Horticulture and Botany, presented by Professor S. A. Beach, of the New York State Station, showed that there had recently been a great growth of interest in the subject of plant breeding and that studies in this direction were being undertaken by both botanists and horticulturists. There is a marked tendency to devote relatively less time to systematic botany and give much more consideration than formerly to problems in plant physiology. The testing of varieties still occupies a large place in the work of the stations, but it is being supplemented by investigations conducted on

a more scientific basis. Among the papers read in this section were the following:

'Plant Physiology in its Relation to Agriculture and Horticulture,' by F. Woods, Chief, Division of Vegetable Physiology and Pathology, Department of Agriculture; 'Grasses and Forage Plant Investigation in Experiment Stations and the Division of Agrostology,' by T. A. Williams, Division of Agrostology; 'Laboratory and Field Work for Students in Horticulture,' by E. S. Goff of Wisconsin; 'The Educational Status of Horticulture,' by F. W. Card of Rhode Island; 'What Our Experiment Stations have done in Originating Varieties of Plants by Crossing and Selection,' by B. D. Halsted of New Jersey; 'The Relation of the Section of Seed and Plant Introduction to Experiment Stations,' by Jared G. Smith, of the Department of Agriculture; 'Vegetation House arranged for Pot Experiments,' by W. E. Britton of Connecticut.

The section on Entomology had a larger attendance than usual, and there was a full program, which brought out much interesting discussion. Among the papers read were the following:

'Observations on the Banding of Trees to Prevent Injury by the Fall Canker-worm,' by W. E. Britton of Connecticut; 'Suggestions towards Greater Uniformity in Nursery Inspection Laws and Rulings,' by E. P. Felt of New York; 'Nursery Inspection and Orchard Insecticide Treatment in Illinois,' by S. A. Forbes of Illinois; 'Entomology in the Southern States,' by H. Garman of Kentucky; 'Economic Entomology in Florida,' by H. A. Gossard of Florida; 'Experiences in Nursery and Orchard Inspection' and 'Some Recent Results with Hydrocyanic Acid in Large Buildings for the Destruction of Insect Pests,' by W. G. Johnson of Maryland; 'Danger to American Horticulture from the Introduction of Scale Insects,' by Geo. B. King of Massachusetts; 'Entomological Ecology,' by C. W. Woodworth of California; 'Recent Progress in Cotton Spraying, and New Designs for Cotton Sprayers,' and 'Some Cotton Insects and Methods for Suppressing them,' by Fred W. Mally of Texas; 'Observations on *Artace punctistriga*,' by H. A. Morgan of Louisiana; 'A Little Known Asparagus Pest' and 'A Power Sprayer for Asparagus,' by F. A. Sirrine of New York; 'Notes on Crude Petroleum and its Effects upon Plants and Insects,' by John B. Smith of New Jersey; 'Nursery Inspection in a State free from San José Scale,' by H. E. Summers of Iowa.

For this section, Professor H. Garman,

of Kentucky, reported in the general session that much progress is being made in the specialization of the work of the station entomologists, in instruction in entomology in colleges, and in the improvement of facilities for research and instruction in this branch. There is a marked increase in recent years in the amount of inspection work required of station entomologists, and problems relating to the organization and management of this work require very careful thought and attention. Uniformity of inspection laws was advocated. It was shown that inspection had already caused much greater carefulness among nurserymen, thus removing one of the main causes of the dissemination of injurious pests.

In the section on college work, President J. K. Patterson, of the Kentucky Agricultural and Mechanical College, made a strong appeal for more instruction in mechanic arts in the land-grant colleges.

The Committee on the Collective Experiment Station Exhibit at the Paris Exposition made its final report through its chairman, Dr. H. P. Armsby, of Pennsylvania. This showed that the exhibit had been very successful in attracting the attention of investigators and government officials of different countries. The Association was awarded a grand prize for the exhibit as a whole, and collaborators were recognized by the award of a grand prize to Dr. A. C. True, Director of the Office of Experiment Stations; gold medals to Professors E. W. Hilgard, W. O. Atwater, C. F. Vanderford, T. B. Osborne, W. H. Jordan, W. H. Evans, L. G. Carpenter and W. A. Henry; and silver medals to Professors Elwood Mead, Milton Whitney, C. F. Curtiss, P. H. Mell and Paul Schweitzer. Dr. S. M. Babcock was also given a grand prize in recognition of his successful scientific work on behalf of dairy husbandry.

The Committee on Graduate Study at Washington made the following recommen-

dations which were adopted by the Association:

"In view of the improbability that the Smithsonian Institution will adopt the suggestions of this Association regarding the organization of a Bureau of Graduate Study, your committee recommends that the Association take no further action in this direction.

"The Committee also believes that for the present further advantage should be taken of the foundation already successfully laid by the Secretary of Agriculture, and it therefore recommends that the Association express its appreciation of the practical efforts which he has made on behalf of this movement, and ask him to consider the practicability of enlarging the present plan for graduate study in that department, and, if he deems it wise, to invite the cooperation of other departments of the Government, in order that wider opportunities may be open to the graduates of the institutions represented in this Association, as well as of other institutions, to engage in graduate study and research in connection with the work of the national Government."

One of the most important subjects on which the Association took action at this meeting was the report of the Committee on Cooperative Work between the Department of Agriculture and the Experiment Stations. This was carefully prepared by a thoroughly representative committee after consultation with the directors of the stations and was unanimously adopted by the Association. It commended the attitude of the present Secretary of Agriculture toward closer cooperation between the Department and the stations and pointed out the different ways in which the two institutions might aid each other. It also attempted to define the principles on which the joint work should be arranged and conducted and stated these in the following language:

"Your Committee would deem it desir-

able that both the Department and the stations should feel entirely free to propose joint experimentation or to decline a proposal for such work.

"It is very clear to the Committee that the autonomy of the stations should be preserved, and that the stations should in no sense become extensions of the divisions of the Department for purposes of experimental work. Not only is the autonomy of the stations necessary to the fulfillment of their function, but autonomy in scientific investigation is equally essential. Your Committee would therefore deem it desirable, where cooperative work would seem advisable, that the agreement take the shape of a formal contract between the station, as such, and the Department, as such, through the properly authorized channels of each. That is, that the high contracting parties be the station on the one hand and the Department on the other. Arrangements between individual officers in the two institutions are deemed inadvisable except under such contract.

"The cost of cooperation should be borne jointly by the station and by the Department, and the amounts to be expended should, as far as practicable, be definitely agreed upon and specified.

"While it is understood that an absolute guarantee of continuance cannot be given, yet there should be reasonable mutual assurance of a fixed policy, until the completion of the work undertaken.

"The results of the investigation should be available to both institutions, priority of publication being a matter of mutual agreement at the outset. In all cases publications should set forth that such work is the result of joint experimentation.

"Your Committee deems it very desirable that independent work be not undertaken in the several States by the Department without the knowledge of the station or consultation with the station, particu-

larly along lines of investigation in which the State station is engaged.

"Whenever cooperation with practical men in the States is desired by the department in investigations, it is suggested that the State station be the agency through which such cooperation is conducted. For example, if the department wishes to distribute seeds or plants for cooperative work, the knowledge both of men and physical conditions on the part of the station should be made available.

"Your Committee makes the above suggestions realizing that they are in no wise complete and that the subject is one requiring further inquiry and consideration."

The Association also passed a resolution pledging its support to the Secretary of Agriculture in his efforts to adjust the compensation of persons employed in the higher technical and scientific positions in the Department of Agriculture in such manner as to secure and retain the services of thoroughly competent officers.

The following officers of the Association for the ensuing year were elected:

President, A. W. Harris, of the University of Maine; Vice-Presidents, J. K. Patterson, of the Agricultural and Mechanical College of Kentucky; W. H. Jordan, of the New York State Experiment Station; R. H. Jesse, of the University of Missouri; L. G. Carpenter, of the State Agricultural College of Colorado; and E. A. Bryan, of the Washington Agricultural College and School of Science; Secretary-Treasurer, E. B. Voorhees, of the New Jersey Experiment Stations; Bibliographer, A. C. True, of the Department of Agriculture; Executive Committee, H. H. Goodell, of the Massachusetts Agricultural College; Alexis Cope, of the University of Ohio; G. W. Atherton, of the Pennsylvania State College, and H. C. White, of the Georgia State College of Agriculture and Mechanic Arts.

Officers of Sections: Agriculture and

Chemistry, C. D. Woods, of the University of Maine, chairman; College Work, J. H. Raymond, of the University of West Virginia, chairman; B. O. Aylesworth, of Colorado Agricultural College, secretary; Entomology, M. V. Slingerland, of Cornell University, chairman; H. A. Morgan, of Louisiana University, secretary; Mechanic Arts, H. W. Tyler, Massachusetts Institute of Technology, chairman; F. P. Anderson, of Kentucky Agricultural and Mechanical College, secretary; Horticulture and Botany, L. R. Jones, of the University of Vermont, chairman; W. J. Green, of Ohio Experiment Station, secretary.

A. C. TRUE.

RECENT WORK ON MOLLUSKS.

THE land shell fauna of the Hawaiian Islands has been discussed by E. R. Sykes, with intercalations on anatomy by Lieutenant-Colonel Godwin-Austen.* Mr. Sykes has worked upon museum material, especially that collected by Perkins and the rich stores of the British Museum and the Boston Society of Natural History. He finds the number of species much exaggerated, as every one familiar with the group was well aware. The fauna is considered to be Polynesian and to show hardly any trace of Asiatic or American influence. Oahu is the center of distribution and the most populous in Achatinellidæ. The list given is a useful one, but the monographic study of the Achatinellas from an evolutionary standpoint remains to be written.

A. S. Jensen, of Copenhagen, initiates what promises to be a series of 'Studier over Nordiske Mollusker,' by an investigation of the forms and distribution of the boreal Myas.† The paper is illustrated by some excellent figures.

* *Fauna Hawaiensis*, II., pp. 271-412, pl. 11, 12. 1900. 4to.

† *Vidensk. Meddel. nat. Foren i Kjobenhavn*, pp. 133-158. 1900.

F. C. Baker* discusses the gross anatomy of *Limnæa emarginata* Say, var. *Mighelsi*. There are six plates, two illustrating what the author believes to be the range of variation in the form of the shell, the others, which are rather diagrammatic, illustrating the anatomy. If carefully done, papers of this kind will have a permanent value.

M. Maurice Cossmann continues his phenomenal activity in the field of Tertiary mollusks, by a paper which is to be followed by others on the 'Mollusques Éocéniques de la Loire Inférieure.'† An interesting series of forms is figured, and it is curious to see how many of them recall parallel species from our own Claibornian horizon.

Mr. W. J. Fox in a recent number (306 p. 718) of this Journal refers to a shell named by Osbeck in his 'Reise nach ost Indien und China,' 1765, *Cunus chinensis*. The objectionable generic name was doubtless derived from Linnæus, who used it in the manuscript of the Museum Ludovicæ Ulricæ for the shell now known as *Venus dione*. It was not published by Linnæus, who substituted *Venus* in the tenth edition of the *Systema Naturæ* and afterward in the *Museum Catalogue* referred to. A very interesting account of the gradual evolution of the early Linnæan generic names, and of the binomial system itself, will be found in a paper by the late Professor Sven Lovén 'On the species of Echinoidea described by Linnæus,' in the *K. Svensk. vet. Akad. Handl.*, Bd. 13, IV., No. 5, 1887, pp. 3-60. Luckily Osbeck's application of the name referred to seems unidentifiable.

The great Baikal Lake of Eastern Siberia has long been regarded as having had connection with the sea at some previous epoch, and various opinions have been held

* *Bulletin Chicago Acad. Sci.*, II., No. 3, pp. 191-212. June, 1900.

† *Bull. Soc. Sci. Nat. Nantes*, I., pp. 307-336, pl. XXII.-XXVI. 1900.