the transition of a clastic rock into a schist, and the loading of the schist with accessory minerals in the vicinity of the intruding eruptives, is identical with what can be seen in the Black Hills, and described for the same region by Van Hise [Bull. Geol. Soc. Am., Vol. I., pp. 209–211]. The metasomatic changes of the quartz clastics to crystalline schists in Minnesota is a process identical with what has been so fully discussed for the Penokee Range of Wisconsin [Van Hise, Amer. Jour. Sci., Vol. 131, pp. 453–459] and recognized in other localities too numerous to cite.

C. W. Hall.

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THE ASSOCIATION OF AMERICAN AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.

The thirteenth annual convention of the Association of American Agricultural Colleges and Experiment Stations was held at San Francisco, July 5th–7th, in conjunction with the Association of Official Agricultural Chemists. Delegates from 34 States and Territories were in attendance. The welcome of the city was voiced by Mayor Phelan, and many courtesies were extended the visitors by individuals and associations representing the State of California. Especial mention should be made of the untiring efforts of Professor M. E. Jaffa, of the University of California, to facilitate the business of the convention and secure the personal comfort of the delegates.

Dr. H. P. Armsby, director of the experiment station connected with the Pennsylvania State College, presided at the general sessions and delivered the President's annual address. This was a clear and forcible presentation of the central purpose of the experiment stations as institutions of higher education. By original research they are to increase our knowledge of the principles underlying the art of agriculture and show the farmer how these may be applied to the advantage of his practice. The station should be the source of knowledge and inspiration for the agricultural college—the cap-stone of agricultural education. As such it should be divorced as far as possible from the routine elementary instruction of the college. At its head should be a director who inspires rather than directs.

By appointment President M. H. Buckham, of the University of Vermont, pronounced a graceful and discriminating eulogy on Senator Justin S. Morrill and introduced memorial resolutions which were unanimously adopted. In discussing Senator Morrill's relation to the great educational measures with which his name will always be connected, President Buckham said that the central idea which the great statesman intended to embody in this legislation was that it was possible by a suitable form of higher education to lift the arts and industries to the plane hitherto occupied alone by the professions. This the speaker claimed was a unique American idea, and its practical crystallization in the Morrill Acts of 1862 and 1890 placed them among the epoch-making acts of the American Congress.

The fourth report of progress of the Committee on Methods of Teaching Agriculture was read by Director A. C. True, secretary of the committee. This report presented a syllabus of a course in zootechny which was limited to the theory and practice of the production of the normal useful animal. Zootechny was divided by the committee into three main branches: (1) types and breeds of useful animals; (2) feeding, and (3) hygiene and management. It was deemed most feasible that the teaching of the general principles under each one of these heads should be immediately followed by the application of the principles to practice as regards different kinds of ani-

mals. The committee, however, conceded that there were important pedagogical reasons favoring the teaching of the principles of zootechny as a whole before proceeding to discuss their practical application to the art of animal husbandry. Explanation was also made of the general considerations which had governed the committee in constructing its syllabi for both agronomy and zootechny. An interesting discussion followed this report, in which some of the difficulties in separating instruction in technical agriculture from that in agricultural chemistry, economic botany, soil physics and other related sciences were pointed out. The committee was continued, and hopes during the next year to complete its outline of the college course in agriculture, by making syllabi for the courses in agrotechny, rural engineering and rural economics.

The absorbing interest which the Association takes in questions relating to the improvement of courses and instruction in agriculture and mechanic arts was further shown by the relatively large number of papers on these subjects read and discussed at this meeting. Such were the papers on the principles which should underlie the formation of a course in agriculture, by Dr. C. E. Coates, Jr., of Louisiana; the short dairy course, by Professor W. J. Spillman, of Washington; horticultural education in Minnesota, by Director W. M. Liggett, of Minnesota; university extension in agriculture, by President J. H. Raymond, of West Virginia; the teaching of machine design, by J. T. Faig, of Kentucky; the agricultural engineer—the latest developed specialist, by W. T. Magruder, of Ohio; some objections to early differentiation of engineering courses by J. C. Nagle, of Texas; and teaching methods in the mechanic arts, by H. Gwinner, of Maryland.

The most largely attended section was that on Agriculture and Chemistry. This was due in large measure to the program, which included subjects of vital importance to the West. These in general related to alkali soils, irrigation, and the range feeding of cattle. In the absence of Professor Hilgard, Professor R. H. Loughridge, of California, discussed the alkali soils of the Pacific coast and their utilization, showing the nature of 'white' and 'black' alkali and the means adopted by the California Station for the reclamation of alkali lands. The problems related to similar lands in New Mexico, Montana and Wyoming were respectively described by Professors A. Goss, F. W. Traphagen and B. C. Buffum. Some interesting work of the Wyoming Station relating to the effects of alkali on the germination of seeds was described by Professor Buffum. Irrigation problems in the West were outlined by Professor L. G. Carpenter, of Colorado, who illustrated his remarks with interesting charts showing the economy and waste in the use of irrigation water in practice on different farms. The work in irrigation lately undertaken by the Department of Agriculture was explained by Director True and Professor Elwood Mead, the irrigation expert in charge of these investigations. Professor E. J. Wickson, of California, told some of the facts learned from practice in the use of irrigation for orchard fruits. He urged that irrigation showed beneficial results not only in the increased vigor and productiveness of the trees, but in the improved appearance and quality of the fruit.

On the range feeding of cattle papers were presented by Professors W. W. Cooke, of Colorado; C. D. Smith, of Michigan, and H. T. French, of Idaho. The latter contended that his experience indicated that range steers could be conveniently and profitably fattened for market by stall feeding following that on the range. Mr. V. K. Chesnut, of the Division of Botany, Department of Agriculture, aroused consider-

able interest by his paper on plants poisonous to stock, a subject which is receiving attention at several of the Western stations.

In the section on Horticulture and Botany Mr. Alexander Cran, quarantine officer of the California State Board of Horticulture, read a paper on the inspection of nursery stock and orchards, which was followed by considerable discussion of the methods used in this work. Professor A. J. McClatchie, of Arizona, described the methods of irrigation used in orchards. Papers on 'Seed Testing,' by A. J. Pieters, of the Division of Botany, Department of Agriculture, and the 'Climatology of Horticulture,' by Professor E. J. Wickson, were read before the general session of the Association on the recommendation of the section. The latter was a suggestive paper expressing a hope that the relation of climate to the production of horticultural plants might ere long receive serious attention in this country.

The increasing importance of cooperation between the Department of Agriculture and the experiment stations attracted the attention of the Association, and a committee was appointed to consider the basis and methods of such cooperation and report at the next meeting.

The Executive Committee was instructed to endeavor to secure some arrangement by which public documents might be more promptly and satisfactorily delivered to the libraries of the institutions entitled to receive them, and also to obtain a place on the program of the next meeting of the National Education Association for a paper on the mission of the land-grant colleges in our American system of education.

Much interest was manifested in the announcement of the arrangement recently made by the Secretary of Agriculture with the Civil Service Commission under which it is proposed to admit a limited number of the graduates of the land-grant colleges to the Department of Agriculture at a nominal salary as 'scientific aids.' Vacancies in the Committee on Graduate Study at Washington were filled, and it is expected that this committee will continue to promote the plans of the Association for the establishment of a bureau of graduate study at the National capital.

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

President, J. E. Stubbs, of the University of Nevada; Vice-Presidents, E. W. Hilgard, of the University of California; J. M. Stone, of the Agricultural College of Mississippi; E. E. Smiley, of the University of Wyoming; M. H. Buckham, of the University of Vermont, and M. A. Scovell, of the Experiment Station of Kentucky; Secretary-Treasurer, E. B. Voorhees, of the Experiment Station of New Jersey; Bibliographer, A. C. True, of the Department of Agriculture. Executive Committee, H. H. Goodell, of the Massachusetts Agricultural College; W. M. Liggett, of the Universiity of Minnesota; J. H. Washburn, of the Agricultural and Mechanical College of Rhode Island, and Alexis Cope, of the University of Ohio.

Officers of Sections: College Work—J. K. Patterson, of Kentucky, Chairman; A. W. Harris, of Maine, Secretary. Agriculture and Chemistry—L. G. Carpenter, of Colorado, Chairman; C. D. Woods, of Maine, Secretary. Horticulture and Botany—L. A. Beach, of New York, Chairman; P. H. Rolfs, of South Carolina, Secretary. Mechanic Arts—C. S. Markland, of New Hampshire, Chairman; F. P. Anderson, of Kentucky, Secretary.

The day succeeding the adjournment of the convention was spent in visiting the University of California, and the following week was occupied in excursions to the principal agricultural and horticultural sections of central California. These excur-

sions, freely provided for the entertainment of the two Associations by the railroads and citizens of California, were much appreciated by the delegates, who were thus enabled to learn many important things regarding the wonderful natural resources and industrial development of California, which the ordinary tourist does not become acquainted with.

A. C. TRUE.

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*INTERNATIONAL CONFERENCE ON HYBRIDIZATION.**

AT the Royal Horticultural Society's gardens at Chiswick, on July 11th, an International Conference was opened for the purpose of discussing 'Hybridization and the Cross-breeding of Varieties.' There were present representatives of the government of the United States and of most of the European countries, besides a large number of British hybridists and botanists. An interesting and unique exhibition of plants and flowers had been arranged in the vinery. All the exhibits were received under condition that they were 'a new species or new variety.' Most of the plants bore a card which stated the name of the hybrid or cross-bred, the name of the female or seed parent, the name of the male or pollen parent, and remarks on variation, size, form and color. Sir Trevor Lawrence, the President of the Royal Horticultural Society, welcomed the members of the Conference, and mentioned that the King of the Belgians had conferred upon Dr. Maxwell Masters, F.R.S., who later on took the chair at the Conference, the insignia of an officer of the Order of Leopold.

At the sitting of the Conference Dr. Maxwell Masters, in opening the proceedings, gave an address on the history of hybridization. He said they had met to discuss the most important problem of modern progress in experimental horticulture. Apart from scientific experimental horticulture he did not think that they had progressed at all, as far as the practical details of cultivation were concerned, beyond what their forefathers had done. But when they came to scientific experimental work their forefathers were nowhere. If they went into present-day gardens they found that nine-tenths of the plants were the productions of the gardener's art, and not natural productions. There was a time when they took an interest in new plants introduced from the tropics and elsewhere; but now the Horticultural Society's flower shows at the Drill-hall, Westminster, did not produce anything new more than once or twice in a year. The so-called new plants now exhibited were the products of the gardener's art. Referring to the discussions in the early part of the 18th century as to the question of sexes in plants, he said that the first person in this country or any other who formed an artificial hybrid purposely—many people must have produced them unconsciously before that time—was Thomas Fairchild, who must be known to many people as the originator of the flower sermons now so common in many churches. The hybrid which he produced was a cross between a sweet william and a carnation pink, and something very much like it was still in existence. From that time, however, progress was slow until Linnæus was struck with the same phenomenon; while Thomas Andrew Knight, a former President of the Royal Horticultural Society, and Dean Herbert were celebrated for their work in the same direction. In their day there was a great prejudice against hybridization among certain religious people. It was said that by the cross-breeding of plants people were flying in the face of Providence and that the process was wicked. But Dean Herbert showed that by crossing two species of daffodils which he found on the Pyrenees he could produce

*From reports in the London *Times*.