matter even how ill-advised their leadership, the contact of man with man which they directly cause, must, in the long run, lead to higher principles and better methods. Satisfaction with the distribution of the results of productive effort as between wage earners and capitalists, we shall not see. Probably, if we did see it, we should wish for a condition which gave more occasion for effort and more justification for hope. But while complete satisfaction with the proportions received is neither likely to be attained nor properly to be considered as entirely desirable, the time when much of the present friction shall have disappeared is already very clearly foreshadowed.

H. T. NEWCOMB.

THE ASSOCIATION OF AMERICAN AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.

THE seventeenth annual convention of this association, held in Washington, November 17–19, 1903, was one of the largest meetings in point of attendance which has ever been held. Something over 200 delegates and visitors were registered, and the representation was very general from different sections of the country.

As has been customary for several years past, the annual meeting of the official horticultural inspectors was held during the days of the convention in conjunction with the meetings of the section on entomology.

The convention as a whole was notable for its harmony and the expedition with which business was transacted, and was remarked by many of the delegates as a most satisfactory meeting.

The address of the president of the association, James K. Patterson, of Kentucky, dealt with the general topic of the origin and work of the colleges and universities represented by the association, and the influences of these institutions upon the development of technical and industrial education.

One of the most important items of business was the consideration of the amendments to the constitution proposed at the Atlanta meeting. These amendments had been before the association for a year, and were adopted with practically no discussion. They provide for a reduction in the number of sections to two, one on college work and administration and the other on experiment station work, three members of the executive committee to be chosen by the first section and two by the latter. There is provision for each section to create such divisions as it may find desirable, but no such divisions have yet been made, and the report of the committee on the organization of the new section for station work recommended that for the present no such divisions be made. The section on horticulture and botany, however, expressed a desire to continue its meetings in the future, and appointed a committee to confer with the executive committee with reference to this matter.

The report of the bibliographer, A. C. True, called attention to the more important bibliographies which have appeared during the year, a list of 110 bibliographies with explanatory notes constituting the main part of the report. Special mention was made of the 'International Catalogue of Scientific Literature,' several parts of which have been noted in this journal. The incompleteness of this catalogue in regard to certain lines of work in agricultural science, notably that of the experiment stations, was a matter of much regret.

The standing committee on indexing agricultural literature called attention in its report to the index cards for the publications of the Department of Agriculture which are being prepared by the Department Library, and also to the cards for the accessions to this library. The latter are

now being printed by the Library of Congress, and can be obtained at small cost, as may also the catalogue cards of the Library of Congress relating to agriculture. The card catalogue of the Department Library now contains over 110,000 cards, and the library is thus in position to render more efficient aid than ever before to the agricultural colleges and experiment stations, by furnishing them information in regard to the literature on particular topics, loaning books, etc. Attention was called in this report to the combined index, now in press, to the first twelve volumes of 'Experiment Station Record,' and to the card index of agricultural literature issued by the Office of Experiment Stations.

The report of the committee on methods of teaching agriculture, presented by A. C. True, was on the relation of the natural sciences to agriculture in a four years' course, and presented a plan for a course of study including these natural sciences and noting in brief the principal subjects under each to be covered. The report pointed out that the older method of arranging the courses in agriculture tended to make experts in analytical or agricultural chemistry or in pathology, rather than to give a broad training in agriculture and the natural sciences. It was urged that there should be a sufficient period of general study before specialties are taken up, and that the paths of the specialist and the agriculturist should early diverge. The college course can not be expected to fit men for expert work in the Department of Agriculture, and the experiment stations, but for this work at least a master's degree and ere long the doctor's degree are likely to be required. This paper brought out much discussion, illustrating the marked interest which has developed within the past few years in the matter of courses of study and in agricultural education of different grades. The work of this committee was highly commended and was pronounced one of the most important features of the association's work.

The standing committee on agricultural engineering presented its first report through W. E. Stone, chairman. The report pointed out the increase in the number of engineering problems in agriculture and their prominence, the enormous extent to which agricultural machinery, and especially that of a complicated character, is being used by American farmers, the problems of irrigation and of drainage, the terracing of hillsides, the construction of roads and other topics, as illustrating the desirability of more systematic attention to instruction in these topics in connection with the college courses, and of extended scientific investigation. The courses in rural engineering in the colleges, it was stated, have not kept pace with the progress of the times. The committee declared in favor of separate departments of rural engineering in the colleges, the enlargement of the work of the Department of Agriculture to include agricultural engineering in addition to irrigation, and recommended that the executive committee of the association aid in securing the increased appropriation asked from congress for this purpose. This report was adopted, as was also a resolution commending the work of the Department along the lines of irrigation. The report brought out considerable discussion and indicated that this matter is occupying the attention of a number of institutions at this time.

The report of the committee on cooperation between the experiment stations and the Department of Agriculture, presented by E. A. Bryan, called attention to the statement of fundamental principles embodied in the two previous reports, expressed gratification at the appointment of a committee within the Department of Agriculture for perfecting the details of a

system of cooperation, and reiterated its belief that a full and free consultation between the stations and the members of the department forces in regard to the work undertaken in the several states is very desirable and would do much to remove possible sources of friction.

The standing committee on uniform fertilizer laws, of which H. J. Wheeler is chairman, called attention to the satisfactory progress which is being made in the direction of greater uniformity, the recommendations of the association having been of value in securing the recent passage or amendment of fertilizer laws in Indiana, Florida, Missouri, Pennsylvania, Tennessee and other states. This report also included recommendations concerning the laws for feeding stuff inspection.

The report of the standing committee on pure-food legislation, made by W. A. Withers, noted considerable progress along the line of pure-food legislation during the year. New legislation was enacted in two states, and provisions made by congress for the inspection and control by the Department of Agriculture of foods imported from foreign countries. This was pronounced an unusually important step in food legislation, and its execution has resulted in considerable progress in the preparation of standards of purity.

The farmers' institute work which the Department of Agriculture has taken up was outlined by A. C. True, who stated clearly the policy of the department in regard to this work. There will be no attempt to interfere with the state management of farmers' institutes in any way, but rather to cooperate with the state officials and to aid them in building up the institutes in the several states. The department will be a general agency for coordinating and strengthening this work throughout the country. One of the main objects at present is to help to increase the efficiency of the institute lecturers, now numbering over 800, less than half of whom are connected with the work of the colleges or the stations. A corps of specially trained institute workers was recommended as eventually desirable, to relieve the college and station men of much of the burden of this work, as it is the opinion of the department that the prime object of college men is to teach and of station men to investigate. The speaker pointed out the greatness and importance of the farmers' institute enterprise as a means for the future development of agriculture, of building up of a proper system of agricultural education and research, and developing a generation of farmers who will be in a position to appreciate and apply the results of the work of these institutes.

The following officers were elected for the ensuing year:

President—W. O. Thompson, of Ohio.

Vice-Presidents—D. F. Houston, of Texas; J. C. Hardy, of Mississippi; J. H. Worst, of North Dakota; H. J. Wheeler, of Rhode Island; and B. C. Buffum, of Wyoming.

Secretary and Treasurer—E. B. Voorhees, of New Jersey.

Bibliographer—A. C. True, of Washington, D. C.

Executive Committee—H. C. White, of Georgia; G. W. Atherton, of Pennsylvania; J. L. Snyder, of Michigan; W. H. Jordan, of New York; and C. F. Curtiss, of Iowa.

Section on College Work and Administration—Chairman, W. E. Stone, of Indiana; secretary, G. E. Fellows, of Maine; committee on program, W. E. Stone, of Indiana, G. E. Fellows, of Maine, and H. W. Tyler, of Massachusetts.

Section on Experiment Station Work—Chairman, E. H. Jenkins, of Connecticut; secretary, M. A. Scovell, of Kentucky; committee on program, J. H. Shepperd, of North Dakota, B. W. Kilgore, of North Carolina, and M. A. Scovell, of Kentucky.

In the meetings of the sections the most important papers and discussions were those on soil fertility, animal breeding, instruction in horticulture and botany, problems of forest entomology, methods of work in

economic entomology, the mission of the land-grant colleges and short courses.

E. W. Allen.
U. S. Department of Agriculture.

SCIENTIFIC BOOKS.

The Lower Devonian Fishes of Gemünden. By R. H. Traquair. Transactions of the Royal Society of Edinburgh, Vol. XL., Pt. 4, pp. 723–739, pls. 7, 1903.

Dr. Traquair's recent paper will be welcomed as throwing light on *Drepanaspis,* one of the lowliest vertebrates. In earlier papers Dr. Traquair has briefly referred to this armored form, known only from the lower Devonian slates of Rhenish Gemünden: in the present memoir he completes his studies upon it, basing them upon a remarkable series of the fossil which he has collected during the past dozen years.

Gemünden fossils, one may note incidentally, are remarkable for the great beauty with which their external characters have been preserved, shown especially in mollusks, trilobites and starfish; and the armored fishes have proven no exceptions to the rule. The specimens however, are always pyritized and are therefore, unfortunately, valueless for histological study. Besides *Drepanaspis,* the only armored fish known hitherto in detail from this horizon, Traquair now describes a *Coccosteus,* a *Phlyctænaspis* and two forms *insertæ sedis.* Of these the first, *Gemündina,* is a fish somewhat ray-like in form, characterized by a stout vertebral column and an integument well encrusted with shagreen denticles. What it is no one can say, although its describer regards it as 'possibly a chimæroid,' admitting, however, that his idea 'rests more upon feeling than upon anything else.' Until, therefore, more and better material can be secured one is constrained to conclude that nothing further need be said about its affinities. *Hunsrückia,* the second problematical form, is represented only by a series of vertebral arches whose structures suggest very doubtfully a pleuracanth shark. Regarding *Drepanaspis* the paper gives many interesting details, and they do not, we find, lead the author to alter his earlier opinion as to the affinities of this form. He places it near the classic *Pteraspis,* and regards it as the more generalized, a view which will probably meet general acceptance. It is a source of satisfaction to students of these earliest chordates that in the present form both dorsal and ventral sides are now known with fair accuracy. Desirable, none the less, is a better knowledge of the region of the mouth, which is practically terminal, surrounded by a rather indefinite series of dermal plates, and of the lateral angles of the body, where possibly an opercular opening is situated. And while we are duly grateful to Dr. Traquair for his skilful and continued efforts to elucidate this remarkable form, we are none the less impatient for further details. The object is, at the best, difficult to orient, and as a symptom of this it may be doubted whether the interpretations of even an author of Dr. Traquair's experience and acumen are always valid. Thus, his grounds seem inadequate for distinguishing dorsal and ventral sides. In no specimen figured is the relation of the dorsal lobe of the tail shown convincingly to be continuous with the so-called dorsal aspect; moreover, the eyes occur on the side which Traquair regards as ventral. Unless additional evidence is forthcoming, it would accordingly seem to me more probable that the 'labial' of Traquair was the 'rostral' plate, a structure which appears constant in *Heterostracans.* This interpretation would permit the eyes to be seen at the sides of the dorsal armoring, as indeed, they occur in *Pteraspis,* and would enable us, at the same time, to locate the greater number of the larger plates on the dorsal side. This conclusion is the more satisfactory on comparative grounds, since there is not an instance in the chordate phylum in which the eyes and the most complete part of the armoring appear on the (morphological) ventral side. And I doubt whether, on the present evidence, we can assume, with Professor Patten, that *Drepanaspis* might have evaded the law of vertebrate orientation by swimming on its back. Dr. Traquair has attempted to solve this dorsoventral difficulty by suggesting that either the orbits are 'sensory' pits, *i. e.,* not orbits, or