Vice-Presidents, John J. Flather, University of Minnesota, and Frederick W. McNair, President of Michigan College of Mines.

Secretary, Clarence A. Waldo, Purdue University.

Treasurer, Arthur N. Talbot, University of Illinois.

Members of Council until 1905: William Esty, Lehigh University; Henry S. Jacoby, Cornell University; Lewis J. Johnson, Harvard University; Ellwood Mead, University of California; Edward Orton, Jr., Ohio State University, and William M. Towle, Syracuse University.

HENRY S. JACOBY,
Secretary (1901–2).

CORNELL UNIVERSITY.

ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

THE fourteenth annual meeting of the Association of Economic Entomologists met in the West Room of the Lecture Hall, Carnegie Institute, Schenley Park, Pittsburgh, Pa., Friday and Saturday, June 27 and 28, 1902. The following papers were presented:

'Some Notes on the Use of Lime Salt and Sulphur and Resin Washes in Ohio': A. F. BURGESS, Columbus, Ohio.

(1) 'Experimental Work in New York State against the San José Scale'; (2) 'Observations on Certain Insects of Pine Trees': E. P. FELT, Albany, N. Y.

'Soluble Arsenic in Arsenical Insecticides': JOHN K. HAYWOOD, Washington, D. C.

'On the Study of Forest Entomology in North America': A. D. HOPKINS, Morgantown, W. Va.

'Recent Work against Shade-tree Insects': A. H. KIRKLAND, Boston, Mass.

(1) 'Résumé of the Search for the Native Home of the San José Scale in Japan and China'; (2) 'Present Status of the Imported Asiatic Lady-Bird Enemy of the San José Scale; its Possible Usefulness with the Native Lady-bird Beetle, *Chilocorus bivulnerus,* and the Natural Enemies, which may Check the Influence of Both Insects': C. L. MARLATT, Washington, D. C.

'Notable Insect Occurrences in Ohio for the First Half of 1902': H. OSBORN, Columbus, Ohio.

(1) 'Report of Experiments with the Lime, Salt and Sulphur Wash against the San José Scale in Maryland'; (2) 'On the Feeding Habits of the Adults of the Periodical Cicada': A. L. QUAINTANCE, College Park, Md.

'Egg-laying Record of Plum Curculio': A. L. QUAINTANCE and R. I. SMITH, College Park, Md.

'Results of some Recent Experiments against the San José Scale in Georgia': W. M. SCOTT, Atlanta, Ga.

'Notes from Delaware': E. DWIGHT SANDERSON, Newark, Delaware.

The following officers were elected for the ensuing year: *President,* Dr. E. P. Felt, Albany, N. Y.; *Vice-President,* Wm. H. Ashmead, Washington, D. C.; *Second Vice-President,* Professor Lawrence Bruner, Lincoln, Neb.; *Secretary and Treasurer,* Professor A. L. Quaintance, College Park, Md.

A. L. QUAINTANCE,
Secretary.

SCIENTIFIC BOOKS.

Ophthalmic Myology, a Systematic Treatise on the Ocular Muscles. By G. C. SAVAGE, M.D. Nashville, Tenn. 1902. Published by the author.

Dr. Savage's book is one that will doubtless gain a wide currency among ophthalmologists. Even those who differ with him the most widely must acknowledge the painstaking care, the thoroughness, the great ingenuity and the perfect sincerity which combine to make his work suggestive and valuable. Moreover, his long and ample experience in this special field gives him a certain right to speak with authority wherever practical questions are involved.

Among those who busy themselves with practical eye work, the book is sure to be widely read and quoted, and its teachings to find extensive, though not universal, acceptance. But for this very reason it becomes all the more necessary for the reviewer to point out what he cannot but regard as essential and considerable errors in the work. And if he confines himself mainly to this more ungracious part of his task, it is because the good qualities of the book speak for themselves and make encomium of them supererogatory.

One of the fundamental notions in Dr. Savage's book and one that affects the reasoning all through it is found in the statement on p. 2:

"With this axis [the visual axis] the four recti muscles are *alone** concerned as to the final result of their action. The superior and inferior recti of the two eyes are required to keep the visual axes always in the same plane. * * * The oblique muscles are required to so relate the vertical antero-posterior planes of the two eyes that the vertical axes which lie in these planes may be parallel with each other, and with the vertical plane of the head." The inference is that the superior and inferior recti are practically the only muscles concerned in elevating and depressing the eyes, and the obliques the only ones that rotate the vertical meridians or keep these meridians vertical. And that this is his view is shown unmistakably by the further statement (p. 4): "Each of the conjugate innervation centers controls *two* muscles, *one for either eye*. The first [serving to elevate both eyes] controls the two superior recti; the second [serving to depress both eyes], the two inferior recti; * * * the sixth [serving to keep the vertical axes from diverging above], the two superior obliques; the seventh [serving to keep the vertical axes from converging above], the two inferior obliques." So also his eighth and ninth centers, which are supposed to keep the vertical axes of both eyes parallel with the median plane of the head in the oblique positions of the gaze, control respectively the right superior and left inferior, and the right inferior and left superior obliques.

Now if there is one fact in regard to the eye-muscles that is demonstrated alike by anatomy, by physiology and by clinical investigations, it is that in elevation of the eye both the superior rectus and the inferior oblique take part, and that about equally, although in the straightforward direction of the gaze the superior rectus is the more efficient of the two. The elevating center, therefore, controls the two inferior obliques quite as much as it does the two superior recti; and the depressing center controls the two superior obliques as well as the two inferior recti. So too both physiological investigations and a study of the results of paralysis show that the inferior and superior recti quite as much as the obliques are concerned in producing torsion of the vertical meridians, and Savage's various centers, by which this torsion is regulated and the vertical meridians kept vertical and parallel, must govern these recti as well as the obliques.

It is but just to say that Dr. Savage himself admits this, at least in part, in speaking of the action of the individual muscles (pp. 39 *et seq.*); and it seems all the more strange that he should not recognize the bearing of this admission upon his theories of the combined actions of these same muscles, produced by the coordinating centers.

The error above noted has an important practical consequence. It leads Dr. Savage to the further erroneous teaching that in the diagnosis of paralysis of the various muscles, it is sufficient to determine the curtailment of rotation or determine the amount of diplopia in the four cardinal directions only (up, down, in and out). This would be so if, as he assumes, the four recti alone acted to carry the eyes in these various directions. If, for example, the inferior rectus was the only muscle that depressed the eye, measurement of the degree of downward rotation would indicate whether the inferior rectus was weak or not. But since the superior oblique takes a very large part in performing this downward rotation, we cannot, from the mere fact that this rotation is limited, infer that the inferior rectus is weak. We can do so only by demonstrating that the limitation of movement increases markedly in looking downward and outward and diminishes to zero in looking downward and inward.

In fact for diagnosticating weakness or paralysis of the individual muscles, we must determine the range of excursion of the eyes or the amount of diplopia in six, not in four, cardinal directions, viz., right, left, up and right, up and left, down and right, down and left. Unless this fact is realized, the diagno-

* Italics mine.

sis of ocular paralysis cannot be made with certainty, and Dr. Savage's differentiation (on pp. 514 and 515) is hence inadequate, and, if strictly adhered to, would often mislead. In particular, it may be said that the tilting of the false image, upon which he relies for his diagnosis, is a very unsafe guide, being often absent and sometimes transferred to the image formed by the non-paralyzed eye. This part of the book, in fact, must be characterized as quite unsatisfactory.

It is not necessarily true, as stated on page 517, that in comitant squint there is no diplopia. In many, indeed in their beginning probably in most, cases of comitant squint there is a diplopia, which, in distinction from that of a paralytic squint, remains the same in all parts of the field.

Objection must also be raised to his statement that in oblique directions of the gaze, the obliques act to keep the vertical meridians of the two eyes not only parallel but also always vertical. This certainly runs counter to a vast mass of anatomical and physiological data accumulated by various observers, and seems to be supported by no direct proof, being based solely on *a priori* reasoning.

The author's well-known views on cyclophoria, its production by oblique astigmatism, and its correction by means of cylinders, are given full place in the book. The reviewer has not seen reason to concur in these views nor to consider cyclophoria as an important element in muscular anomalies.

There are various other points regarding which the reviewer would take issue with the author, such as his notion that in esophoria the presence of a certain amount of hyperopia necessarily argues that a certain proportion of the esophoria is false or accommodative (p. 198); his failure to recognize divergence anomalies; and in general his tendency to attribute muscular anomalies too exclusively to disturbances in the tension and action of the muscles *per se*, rather than to disturbances of the conjugate centers, particularly those for convergence and divergence. We have good reason for thinking that it is in these centers that most motor anomalies arise, so that in their origin at least such anomalies are usually bilateral, affecting the movements of both eyes equally, while the muscles *per se* are normal at the outset, and do not become affected until later on.

Enough has been said, however, in the way of criticism, and it seems fitting to close with a word of hearty praise for the many original ideas that the book contains; for the author's skill in their presentation; for his fairness in dealing with the work of others; and finally for the many happy suggestions that he puts forth, particularly as regards treatment, whether by exercise or by operation.

ALEXANDER DUANE.

NEW YORK CITY.

SOCIETIES AND ACADEMIES.

THE TEXAS ACADEMY OF SCIENCE.

AT the meeting of the Texas Academy of Science, held in the Chemical Lecture Room of the University of Texas, February 21, 1902, Dr. William Morton Wheeler, Professor of Zoology, presented "A Consideration of S. B. Buckley's 'North American Formicidæ'" (by title), and delivered an illustrated lecture on 'The Principles of Acceleration and Retardation in the Development of Animals.'

At the meeting of April 25, Mr. E. T. Dumble, of Houston, read a paper on the 'Cretaceous and Later Rocks of Presidio and Brewster Counties,' which is of interest on account of the prominence now given the last-named county, owing to the discovery and development of quicksilver deposits in the Terlingua District.

The second paper on the program was presented by Dr. William L. Bray, Professor of Botany in the University, who discussed 'The Present Status of Forestry in Texas.' Many excellent views, illustrative of the subject, were thrown upon the screen.

The formal meeting of the Academy was held in the Chemical Room of the University on Wednesday, June 11, at 3:30 P.M.

President J. C. Nagle announced the result of the election of officers for 1902–1903, which is as follows: *President,* Robert A. Thompson, M.A., C.E., Expert Engineer to the State Railroad Commission; *Vice-Presidents,* Professor O. C. Charlton, M.A., late of