Likewise *Paramœcia* which in an acid culture are positive to the electric current may be made to reverse their reaction by gradually neutralizing the acid with sodium hydrate. Lillie has observed a similar relation between the response to the electric current and the condition of the protoplasm, whether acid or alkaline, in his experiments upon nuclear and cytoplasmic structures cited above. He showed that nuclear structures, which contain a large amount of nucleic acid, move toward the anode, while cells very rich in cytoplasm, which is basic in reaction, move in an opposite direction when exposed to the electric current.

It thus appears, from the experiments on *Paramœcia* here outlined, that the conclusions suggested by the work of Mathews and of Lillie are capable of a wider application than has heretofore been given them, and that a definite relation exists between the sign of the charge carried by the protoplasmic particles and certain external conditions surrounding the organism. It also follows from the experiments that by varying these external conditions, we are able not only to reverse the charge carried by the protoplasmic particles, but also the response of *Paramœcium* to certain forms of chemical and electrical stimuli.

A. W. Greeley.

Zoological Laboratory,
Washington University, St. Louis, Mo.,
May 19, 1903.

NOTES ON ENTOMOLOGY.

Mr. W. L. Tower has given an account of the origin and development of the wings of coleoptera.* It is illustrated by seven plates and figures in text. The studies were based on species of various families (mostly phytophagous). He believes that the elytra are homologous to the fore-wings of other insects, the only logical position. As to the origin of the wings his studies lead him to accept Verson's view that the wings are derived from the rudiments of the meso- and metathoracic spiracles. Verson's theory was published in 1890, and based on his study of the silk-worm (*Bombyx mori*). Very substantial objections are advanced by Tower to the two other theories of wing-origin, that of the tracheal-gill origin and that as prolongations of the thoracic tergum. However, his evidence does not show that the ancestors of the Pterygota were terrestrial, and not aquatic.

In a recent number of the *Bericht über Land- und Forstwirthschaft im Deutsch-Ostafrika* are two articles of an entomological nature. One by V. Lommel on the tsetse-fly,* deals with the distribution of this pest in East Africa, and its habits. The other is by Dr. A. Zimmerman† and treats of African coffee insects. The most injurious species is the common coffee leaf-miner (*Cemiostoma coffeella*). An unnamed pentatomid does considerable injury to the coffee beans by puncturing them; quite possibly it gives entrance to some fungus. It seems strange to see a work published in Germany with good figures of insects but without their scientific names, which could easily have been supplied by German entomologists.

The last number of 'Fauna Arctica'‡ contains articles on the hymenoptera, hemiptera and siphunculata of the Arctic regions. The former is by Kiaer and Friese, the latter two by Breddin. There is a good bibliography, and many notes on distribution and time of flight in bees. No new species are described; but there is a fine colored plate representing sixteen species of *Bombus*.

Dr. Otto Schenk, of Jena, treats of the sense organs on the antennal surface of some lepidoptera and hymenoptera.§ He considers the sexual differences in the antennæ of these insects, the structure of the sense organs and their probable function. He arranges these sense organs in several classes, and concludes that most of them are for the detection of odors; but that the *sensilla ampullacea* or 'pits of Forel,' are probably hearing organs.

Dr. L. Melichar has recently completed his monograph of the Flatidæ of the world.‖

* *Zool. Jahrb., Abth. f. Anat.*, 17 Bd., pp. 517–572, 7 pls.

* Bd. 1, Heft 4, pp. 34–350, 1903.

† *Ibid.*, pp. 358–374, 1 pl. (colored).

‡ 'Fauna Arctica,' II., Lief. III., December, 1902.

§ *Zool. Jahrb., Abth. f. Anat.*, 17 Bd., pp. 573–616, 2 pls.

‖ 'Monographie der Acanaloniiden und Flatiden,' Ann. Naturhist. Hofmuseums, Wien, 1902.

Over 90 genera and 525 species are treated. Only about 15 species occur in the United States, although several described by Say are unknown to the author. The Malay archipelago and Madagascar are especially rich in large and curious forms. The article is illustrated by nine plates.

Professor F. Meunier has given us another article on the dipterous fauna of the amber.* He describes species of Tabanidæ, Xylophagidæ, Leptidæ and Empidæ. But what is perhaps of most interest is a diopsid, *Sphyracephala breviata,* very similar to the one species occurring in the eastern United States.

Mr. R. Shelford has published an interesting article on insect mimicry in the Malay region.† There is a systematic arrangement of the cases of Batesian mimicry according to the natural orders, details being given in each case. This is followed by a chapter on convergent groups. Several Müllerian associations are represented, particularly the lycoid, coccinellid, and that of melipona. There is an appendix with descriptions of the new species by various specialists. It is illustrated by five colored plates. The cases figured, as well as those figured by Marshall from South Africa, are no more striking than can be found in the insects of our own country.

THE *Anales Sociedad Espanola de Historia Natural,* Vol. XXX., 1902, contains several entomological articles. Uhagon completes his revision of the Malachidæ of Spain; M. Medina y Ramos gives a synopsis of the Spanish Chrysididæ (101 in number); and A. Martinez y Fernandez-Castillo gives a revision of the group Calopteni of the grasshoppers, treating the known forms of the world; none of which, however, occurs in the United States.

An increase in entomological activity in South America is indicated by Volume V. of the *Revista Museu do Paulista* (São Paulo, Brazil, 1902), which contains three large papers on insects. One of two hundred pages with fine plates is by H. W. Broleman on the myriapoda of the Museum of São Paulo. Another is descriptive of the solitary bees of Brazil. It is by C. Schrottky, synoptic in form, illustrated by two plates, and contains notes on the habits of some species. The third article is by J. G. Foetterle on new Brazilian lepidoptera, illustrated by four handsomely colored plates, and describes fourteen species.

Dr. L. Sander has published a long account of locust invasions of the German colonies in Africa.* The migratorial African grasshoppers are species of *Pachytylus* and *Schistocerca,* the latter similar to those of South America. The author gives an historical account of the ravages of locusts, followed by chapters on structure and life-history. He considers the causes and extension of the migrations, and the various natural enemies, especially birds, that prey upon the pests. A large part of the book treats of remedies, chiefly a history of what has been done in other countries, much attention being given to American methods. An appendix contains an old German edict against grasshoppers.

M. Neveu-Lemaire has devised a new classification of the Culicidæ.† After an historical review he criticizes the classification of Theobald, and proposes his new arrangement based on mouth parts and venation. He divides the family into four subfamilies: Anophelinæ (including only *Anopheles*), Megarhininæ (two genera); Culicinæ (with eight genera); and Aëdëinæ (with six genera). He indicates the type species of each genus.

NATHAN BANKS.

* 'Etudes des quelques Diptères de l'Ambre,' *Ann. Sci. Nat. Zool.*, XVI., December, 1902, pp. 395–405, 1 plate.

† 'Observations on Some Mimetic Insects and Spiders from Borneo and Singapore,' *Proc. Zool. Soc. London,* 1902, II. (1903), pp. 230–281.

THE HARPSWELL LABORATORY.

THE EDITOR OF SCIENCE asks an account of the Harpswell Laboratory. It is easy to comply, for this biological station is one of the most unpretentious structures one could imagine, as will readily be understood when it is said that the whole plant—land, building

* 'Die Wanderheuschrecken und ihre Bekämpfung in unseren afrikanischen Kolonieen,' Berlin, 1902, pp. 344, figs. and maps.

† 'Classification de la famille des Culicides,' *Mém. Soc. Zool.*, France, 1902, pp. 195–227 (1903).