from the Barbadoes in 1848 in Schomburgk's history of that island, was the West Indies to Key West and the west coast of Florida. Between August 30th and October 4th, 1899, nine small specimens of uniform size were taken on five different days in Katama Bay.

Teuthis hepatus Linnæus. SURGEON-FISH; TANG; LANCET-FISH.

Teuthis cæruleus (Bloch & Schneider). BLUE SURGEON; BLUE TANG.

Teuthis bahianus (Castlenau). BARBEIRO.

These three species are recorded from Florida, the West Indies, and Brazil; the first-named has been taken as far north as Charleston, S. C. During August, September and October, 1899, all of them were found in some numbers in Katama Bay, and about 50 specimens were obtained on seven different occasions. The last examples were secured on October 4th, when the three species were represented in one seine-haul. About half the specimens are referable to the common species (*T. hepatus*). All the examples are small, although those last taken exhibit a slight increase in size compared with those caught early in September.

Lactophrys triqueter (Linnæus). TRUNK-FISH. This fish inhabits the West Indies, Florida, and the Bermudas, but has not been previously reported from Massachusetts, although the common trunk-fish, *Lactophrys trigonus* (Linnæus), has been known from the region for many years and is taken at Woods Hole every season. A number of small specimens of *L. triqueter* were obtained in 1899; several collected in 1897 and earlier years had been identified as *L. trigonus*.

Lactophrys tricornis (Linnæus). TRUNK-FISH; COW-FISH. This widely distributed species has been reported as far north on our coast as Chesapeake Bay, whence its range extends to the Gulf of Mexico, West Indies, Brazil and west Africa. Its occurrence in the Woods Hole region, in company with the following species, was noted for the first time in September, 1899, when it was found on 4 or 5 occasions in Katama Bay. All of the specimens were small. On November 6th, 1899, a fish 15½ inches long was washed ashore at Cuttyhunk.

Chilomycterus antillarum Jordan & Rutter. BUR-FISH. Described from Jamaica in 1897; in 1868 cited from Cuba by Poey as '*C. fuliginosus* or a doubtful species;' and not heretofore known from any other localities. On September 7th, 1897, a small specimen was taken in Quisset Harbor, near Woods Hole.

Scorpæna plumieri Bloch. SCORPION-FISH. This species, which is common from the Florida Keys to Brazil, has not been recorded north of Key West. On seven days in August, September, and October, 1899, the fish was found at Woods Hole, and 20 small specimens were taken.

Scorpæna grandicornis Cuvier & Valenciennes. SCORPION-FISH; LION-FISH. The normal range of this species is southern Florida to South America, in shallow water. One small example was secured in Katama Bay on September 29th.

HUGH M. SMITH.
U. S. COMMISSION OF FISH AND FISHERIES.

ZOOLOGY AT THE COLUMBUS MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

COLUMBUS MEETING, A. A. A. S.

THE work of this Section showed a flattering increase of interest over recent years and a list of papers of more than usual value. The discussions were often animated and general, and the effect of the meeting as a whole was to give a very encouraging future for the Section. The address of the Vice-President, Professor S. H. Gage, of Ithaca, N. Y., was a very practical paper and the views expressed received very general concurrence. It has already been published in the columns of

this JOURNAL on pages 305–315, September 8, 1899.

The following is a complete list of the papers read, accompanied by short abstracts:

The Utility of Phosphorescence of Deep Sea Animals. C. C. NUTTING, Iowa City, Iowa.

The paper is an attempt to explain phosphorescence in terms of utility to its possessors. When possessed by free swimming forms it acts in a manner analogous to 'alluring coloration,' in some cases. In others it reveals the prey, in others it may be 'directive,' and in still others protective in function. Among the Protozoa it may serve to keep individuals of a species together, and thus secure conjugation. When possessed by fixed forms, such as many coelenterates, the phosphorescence does not serve the purpose of warning coloration, nor is it useful to attract the mate, or sex elements of opposite sexes, but it is useful in attracting many organisms that serve as food for its possessors.

Investigation of the Course of the Fibers in the Optic Chiasma of Bufo lentiginosus. BURTON D. MYERS, Ithaca, N. Y.

1. The decussation is total. 2. The chiasma is made up of a crossing of fibers and not of bundles of fibers as described by the earlier writers. 3. There is not that gradually increasing complexity of decussation in the chiasma from fishes to mammals as described by Wiedersheim. 4. There are no interretinal fibers. 5. The trophic center for at least the greater part of the fibers of the optic nerve is in the retina. 6. On experimental grounds the toad is capable of monocular vision. 7. After loss of sight of one eye, contrary to the old belief, the toad does not die of starvation. 8. Flemming's fluid hardening is superior to Marchi's method in that the normal nerve tracts are absolutely free from those blackened granules so closely resembling degeneration. 9. Degeneration after severance of the optic nerve of the toad is first seen after five days.

On Reighardia, A New Genus of Linguatulida. HENRY S. WARD, Lincoln, Nebr.

In the air sacs of gulls on Lake St. Clair was discovered in 1894 a vermiform parasite which could not be definitely placed. It occurred infrequently and even when found was present in small numbers. The host was *Bonaparte's Gull.* Last year the same parasite was found in the common tern on Lake Erie. Here it is even rarer, only one bird in 100 being infested. One of the three parasites obtained was a female containing well developed embryos and, from their character, it was easy to determine the taxonomic position of the parasite as closely related to the Linguatula. Subsequent careful study showed also the characteristic hooks of the family, yet very poorly developed. The body is elongated, cylindrical transparent and devoid of any annulations. The cuticula is thin, bearing around the mouth-opening a chitinous framework recalling that of the Sarcoptidæ. Of its post-embryonic development nothing is known. Our species of Linguatula is recorded from a gull of Arctic Ocean. This form, which is incompletely described, probably belongs to this new genus, a view strengthened by some minor details mentioned by the author.

Photographing Natural History Specimens under Water or other Liquids with a Vertical Camera. SIMON H. GAGE, Ithaca, N. Y.

The purpose of this paper was to show by specimen photographs what could be done in getting accurate pictures of live aquatic animals and of delicate specimens which must be supported in liquids. By means of a vertical camera, this is as easily accomplished as photographing in the ordinary horizontal position. The most notable

photograph, perhaps, was that of a live fish with five just transformed lake lampreys attached.

On some Heteropterous Insects formerly Responsible for Spider-bite Stories. L. O. HOWARD, Washington, D. C.

This paper was published in full in *Appleton's Popular Science Monthly* for November, 1899, pp. 31–42, under the title 'Spider Bites and Kissing Bugs.'

Cave Animals, their Character, Origin and their Evidence for or against the Transmission of Acquired Characters. CARL H. EIGENMANN, Bloomington, Indiana.

Cave faunas bear the same relation to those of the neighboring regions that island faunas bear to those of neighboring continents, but caves are not as a rule colonized by accident. As far as the vertebrate fauna is concerned only those types are represented which in their epigean existence were negatively heliotropic, and caught their food under rocks, under logs and in crevices, the amblyopsid salamanders, rats, etc. A gradually disappearing light leads to an increase in the size of the eyes, viz.: nocturnal animals in general; whereas the gradual diminution of the use of the eyes leads to the reduction of their size and the simplification of their histological complexity whether light is present or not.

The degeneration, if it takes place in the light, affects first the retina, then the dioptric arrangement, and finally the purely passive structures, as the scleral cartilages. The lens, after it is once affected, degenerates much more rapidly than the other elements, and usually disappears before the other structures vanish. The evidence from the differential degeneration is for the transmission of disuse effects. The habits and structure of the species of blind fishes and the differential degeneration mentioned eliminate the possible influence of natural selection, panmixia compensation of growth principle, or germinal selection, as factors in the phylogenic degeneration of these eyes.

Have we More than a Single Species of Blissus in North America? F. M. WEBSTER, Wooster, Ohio. Published in the Amer. Nat., Oct., 1899, pp. 813–817.

Æstivation of Epiphragmophora Traskii in Southern California. MRS. M. BURTON WILLIAMSON, Los Angeles, California.

This paper, read by title, described an experiment with two *Epiphragmophora traskii* to ascertain how these snails suspended in the air would remain with the functions of digestion and respiration in a state of torpor, and also to compare their longevity with other helices of the same colony kept in a snailery in the garden.

Natural Taxonomy of the Class Aves. R. W. SHUFELDT, Takoma, D. C.

This paper, read by title only, briefly takes into consideration the origin of birds as a group, as evidenced by the structural organization of its living members, and a study of such fossil material as has fallen into the hands of science. An historical sketch is presented giving the main features of the various schemes of classification of the Class, in times past, by the best recognized authorities, with critical comments thereon. The peculiar difficulties attending the classification of birds is contrasted with the problem as presented by other groups of the vertebrata. Such morphological characters as best subserve the purposes of avian taxonomy are examined into and compared, with brief notes upon their significance and value. A scheme of classification of the Class Aves is presented wherein osteology has been the main anatomical system used, although by no means to the exclusion of the remainder of the bird's structure.

Notes on the Chick's Brain. SUSANNA PHELPS GAGE, Ithaca, N. Y.

A systematic review of the development

of the brain of the chick has been undertaken with the end in view of determining the real value of the furrows upon the mesal or endymal surface of the brain tube. In the earliest stages, while the dorsal union is taking place, there is a furrow demarkating the region adjacent to the neural crest from the remainder of the nervous tube and ending in the optic cup. As the neural crest separates into ganglia which grow down the side of the tube this furrow disappears and the brain tube assumes the well-known moniliform with total folds of the wall.

Of the five transverse furrows of the oblongata, two certainly leave a remnant which can be traced definitely to the 9th and 10th days. To that time there is not reëstablished a continuous longitudinal furrow throughout the brain tube separating the so-called dorsal and ventral zones of His, but in each portion of the brain arise furrows of limited extent which from comparison with other brains promise to prove of value in homologizing parts.

Further Notes on the Brook Lamprey. (*Lampetra wilderi.*) Simon H. Gage, Ithaca, N. Y.

In this paper were brought out the additional facts bearing upon the non-parasitic habits of the adult brook lamprey.

1. It was shown that the lake lamprey, as soon as completely transformed, attacked fish with great ferocity.

2. Transformed brook lampreys under the same conditions never attacked the fish.

3. The alimentary canal of the lake lamprey was comparatively large with many secondary, longitudinal folds at the time of transformation, while that of the brook lamprey was very small and quite or almost completely unfolded.

Bearing upon the question of possible ancestral parasitism in the brook lamprey, serial sections were made of the larvæ at the beginning of transformation, when the transformation was nearly complete and of the adult at the spawning season. It was found:

1. That the branchial apparatus undergoes the same modification as in the lake lamprey in that the common branchial chamber becomes divided into seven branchial pouches on each side, and the formation of a common median branchial canal opening into the mouth and by passages into each branchial pouch.

2. That there is developed an esophagus connecting the mouth with the alimentary canal as in the known parasitic forms (lake and sea lamprey).

4. The buccal and lingual armature of horny teeth is well developed.

It was concluded that the indications all point to an almost certain conclusion that the progenitors of the brook lamprey were true parasites although at present the brook lamprey possesses the esophagus which is not used for swallowing food and buccal and lingual teeth which are no longer used for lacerating prey, but remain as stigmata of an ancestral mode of life.

Respiration in Tadpoles of the Toad. S. H. Gage, Ithaca, N. Y.

On comparing the behavior of toad tadpoles with that of the tadpole of the bullfrog, for example, one is surprised to find that the toad tadpoles go to the surface with far less frequency, and if the water is very fresh they may appear not to go to the surface at all. In a small glass vial they may remain at the bottom for half an hour or more. An investigation of the development of the lungs showed that they appear very early, that is long before the hind legs, but it was found that the opening of the trachea into the mouth through the glottis, and the development of the larynx did not occur until the tail was nearly absorbed. From this structural condition there could

be no aërial respiration by the lungs in the tadpole state as the lungs do not communicate with the exterior, but are closed sacs.

The apparent aërial respiration of the toad tadpole is explicable only on the ground that air is taken in and mixed with the water which passes over the internal gills, something as fish go to the surface and gulp air when air dissolved in the water is too nearly exhausted.

Effects of Hydrocyanic Acid Gas upon Animal Life and its Economic Use. W. G. JOHNSON, College Park, Md.

A preliminary report upon a series of experiments with this gas upon animal life.

A Discussion of Aspidiotus cydoniæ and Its Allies. C. L. MARLATT, Washington, D. C.

This paper was published in full in the *Canadian Entomologist* for August, 1899, pp. 208–211, under the title '*Aspidiotus convexus* —a correction.'

The Histogenesis of Muscle in the Metamorphosis of the Toad (Bufo lentiginosus americanus). B. F. KINGSBURY, Ithaca, N. Y.

The author spoke of the occurrence of metamorphosis in the development of certain animals, among them the toad, the necessity of changes in metamorphosis, histolysis and histogenesis of the tissues, etc.; the views on the changes constituting histogenesis of tissues, muscle especially; the results of work on the toad and frog; and the bearing of these results on general biological principles.

The Progenitors of the Batrachians. THEO. GILL, Washington, D. C.

This paper gave evidence showing that the Batrachians are probably descended from a type of fishes most nearly represented in the present fauna by the Polypterids.

Observations on the Variations, Life History and Habits of a Mimetic Locust (Œdipoda maritima Uhl). HERBERT OSBORN, Columbus, Ohio.

Discussion of the possible factors affecting variations in a locust which shows striking protective resemblance and some observations regarding habits and life history.

A Chart Illustrating the Origin and Evolution of Animal and Vegetable Life. A. D. HOPKINS, Morgantown, W. Va.

An original scheme for illustrating theories on the origin and evolution of forms, genera, families, orders, etc., of life by means of a disk divided into spaces of various sizes and forms and by curved and straight lines rising from the center of the disk.

Geographical Variations, as Illustrated by the Horned Larks of North America. HARRY C. OBERHOLSER, Washington, D. C.

Discusses the distribution of the Horned Larks; their relation to faunal areas; their distribution compared with other plastic groups; geographical variation in the Horned Larks, and comparison of variation in other groups; anomalies in variation of the Horned Larks; an examination into the causes of geographical variation.

C. L. MARLATT,
Secretary.

SCIENTIFIC BOOKS.

REPORT OF THE FUR SEAL INVESTIGATIONS, 1896–1897.

The Fur Seals and Fur Seal Islands of the North Pacific Ocean. By David Starr Jordan, President of Leland Stanford, Jr., University, Commissioner in Charge of Fur Seal Investigations of 1896–1897; with the following Official Associates: Leonhard Stejneger and Frederic A. Lucas, of the U. S. National Museum; Jefferson Moser, Lieutenant-Commander, U. S. N., in command of the U. S. Fish Commission Steamer *Albatross;* Charles H. Townsend, of the U. S. Fish Commission; George A. Clark, Secretary and Stenographer; Joseph Murry, Special Agent; with