

stance of the nucleus begins to mingle with that of the cell and they not only distribute the cell contents in a definite way, thus causing differential or non-differential division, but they also probably cause the separation of the chromosomes and the division of the cell body.

When a spermatozoon enters the cortical layer of an egg, or when this cortical layer is pricked by a needle, the substance of this layer flows rapidly to the point of entrance, where it forms an entrance cone, while the sperm head with some of the cortical substance penetrates to the interior, and the egg and sperm nuclei then approach one another. Then the cell movements connected with the first cleavage begin and the egg substances become segregated and localized by means of these currents into areas which give rise to particular organs. Since the pattern of this localization is different in different groups of animals, it must be that there is an internal regulating mechanism which determines the direction and extent of the movements within the cell.

Finally the relative sizes, positions and order of appearance of different parts of a cell during division, or of an egg during the early stages of development, are indicative of certain generic relations between these parts. The centrosome and archiplasm are thus found to be causally connected with the achromatin of the nucleus; the chromatin grows at the expense of the achromatin; and the cell body influences the growth of the nucleus, while the nucleus influences the differentiations taking place in the cell body.

All of these complicated morphological and physiological phenomena are doubtless the expression of chemical and physical processes occurring in the cell; a few of these processes may now be indicated, but that which is known is as nothing compared with what remains to be learned about the physics and chemistry of the cell.

The Physical State of Protoplasm: G. L. KITE.
(Introduced by Professor McClung.)

An accurate knowledge of the physical state or conditions of living matter has been gained for the first time by the employment of new methods for the dissection of living cells under the highest power of the microscope. Most living matter has been definitely proved to be in the jelly state. In a few kinds of cells the living substance is a liquid. Micro-dissections have thrown new light on the distribution of jellies and liquid in living cells and proved for all time the physical reality of such important structures as chromosomes, nucleoli and spindles.

The Physico-chemical Organization of the Cell:

LAWRENCE J. HENDERSON. (Introduced by Dr. H. F. Keller.)

At the banquet on Saturday evening at the Bellevue-Stratford about eighty members and guests were present, the toasts being responded to as follows:

"The Memory of Franklin," by Hon. Mayer Sultzberger.

"Our Institutions of Learning," by Professor J. Dyneley Prince.

"Our Guests," by Professor Maurice Bloomfield and Sir Ernest Rutherford.

"The American Philosophical Society," by Russell Duane.

ARTHUR WILLIS GOODSPEED

PHILADELPHIA,

May 4, 1914

THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 525th regular meeting was held April 4, 1914, in the assembly hall of the Cosmos Club, with Vice-president Dr. W. P. Hay in the chair, and 35 persons present.

Wm. Palmer gave the first paper on the regular program: "Notes on the Hatching of a Local Terrapin (*Kinosternon pennsylvanicum*)."
From 4 to 5 eggs are found in nests of this turtle. The contents of one were transferred to the yard of Mr. Palmer's house in Georgetown, and apparently hatched, only after a lapse of 13 months. Mr. A. A. Doolittle and the chairman discussed the paper, the latter remarking that the diamond-back terrapin presents a similar case. The eggs are laid in the spring, and although hatched in the fall, the young sometimes remain in the nests until the following spring.

The second paper by Dr. O. P. Hay, was "An Account of a Visit to Some of the Smaller Museums." On a recent trip the speaker had visited some 40 towns for the purpose of examining specimens of Pleistocene vertebrates. He gave an account of the size and character of the collections in various towns and remarked upon the conditions under which the fossils were deposited. At Mount Union Scio College, Ohio, was seen a skull of the giant beaver, which was 13 inches long, the largest known. At Norwalk, Ohio, was found a specimen of the ground sloth (*Megalonyx*), which establishes the fact that these animals existed after the retreat of the last ice sheet. At Kansas City, Kansas, is the head of a whalebone whale, said to have been found in Oklahoma. It is undoubtedly modern, and the datum erroneous. The

most general fault with the small museums is the lack of labeling, particularly as to locality.

Dr. J. O. Snyder then presented the last paper of the program, entitled, "The Fishes of the Lahontan Basin, Nevada, their Habits and their Relation to the Geology of the Region." Dr. Snyder stated that his communication was a synopsis of the results of a scientific and practical investigation for the Bureau of Fisheries, of the following lakes and their tributaries, Eagle, Hone, Tahoe, Pyramid, Winnemucca, Carson and Walker, representing at least five distinct systems.

The fish fauna includes the following genera: *Catostomus*, *Leuciscus*, *Rutilus*, *Chasmistes*, *Salino*, *Agosia*, *Cottus* and *Coregonus*. The speaker discussed all but the last three.

The minnows of the genus *Leuciscus* change color constantly as they become sexually mature, and this change in appearance has resulted in a multiplicity of names for a single species. These little fish follow the suckers and feed eagerly on their eggs.

Chasmistes, a fish practically unknown to science, since the original description was found to spawn in immense numbers in the Truckee River. They were so numerous as to crowd part of their number out on the sandbars where they died. Large quantities are caught and dried by the Piute Indians.

Trout are abundant in the Lahontan basin. They belong to three main groups, the brook trouts, the red-spotted, and the cut-throats, each with numerous races. The silver trouts of Pyramid and Winnemucca lakes are distinguished from those of Tahoe by color, but not otherwise. They ascend the streams to spawn, in two migrations, the individuals of the two schools differing considerably in appearance.

The royal silver trout, a new species recently found in Lake Tahoe, is remarkable in remaining unknown to science for so long. It has long been known to local fishermen, and their descriptions of its peculiarities were confirmed when Dr. Snyder received specimens. The species is regarded as a superior food fish, and for this reason has not reached the markets, being kept for home consumption.

The La Hontan Basin is surrounded by San Joaquin, Sacramento, Klamath, Columbia, Bonneville and Colorado systems, but is isolated from them. Geological evidence is to the effect that the basin has always been without outlet. So far as the fish fauna is concerned, *Chasmistes* points to a possible relationship with the Klamath and Bonneville systems, in both of which it is found.

This communication was discussed by Messrs. A. A. Doolittle, M. W. Lyon, Wm. Palmer and the speaker.

The 526th regular meeting was held April 18, 1914, in the lecture hall of the Cosmos Club, with Vice-president Dr. J. N. Rose in the chair and 40 persons present. Under the heading of brief notices, President Paul Bartsch commented on the absence of red-headed woodpeckers in the vicinity of Washington. Apparently none had wintered and it was thought migrants were overdue. Dr. M. W. Lyon gave similar testimony. Mr. Alex. Wetmore said the species was seen along the Patuxent River, Md., March 15, and that in his experience, when the red-head is not present in winter it does not return till late.

Titus Ulke then gave the first paper on the regular program, entitled, "Notes on Bermuda Birds." The speaker noted the large number of birds that have been recorded from the Bermudas, a large proportion of which are casual visitors. He then gave notes on the distribution, habits and local names of the following 18 species: Bermuda catbird, bluebird, northern water-thrush, Bermuda white-eyed vireo, European house-sparrow, Bermuda cardinal, belted kingfisher, pigeon hawk, Bermuda ground-dove, golden plover, jacksnipe, great blue heron, bittern, coot, black duck, blue-winged teal and European goldfinch. The paper was discussed by Messrs. T. W. Vaughn, Wm. Palmer, W. L. McAtee and the author.

T. Wayland Vaughn then delivered his communication on "Reactions of Corals to Food and to Non-nutrient Particles, and the Nature of the Food of Corals." He first gave a sketch of the structure of the coral polyp, in so far as it is related to prehension and assimilation of food. The entire ectoderm of the animal is armed with nematocysts for disabling living prey. It is further covered with mucus and is provided with cilia which waft food toward the mouth and rejected objects away. Experiments in feeding coral polyps were made with the following substances: bits of crab meat, cut-up minnow and beef juice. When solid food was placed on the oval disc, the tentacles expand, bend over, and pass food to mouth; the edges of the oval disc contract over the mouth until swallowing is completed. The impulse to expand the tentacles stimulated by a food particle is communicated from polyp to polyp until the whole colony is expanded.

Corals can be satiated with food, and when this condition is reached all objects are wafted away

from mouth. Corals free themselves from foreign objects, as sand. These are sometimes swallowed, but eventually all are rejected. Corals living where wave action is great have less power to cleanse themselves than species living on sand or mud-flats.

Corals sometimes swallow as large objects as small jellyfish and crabs. In experiments they took pieces of fish, crustacea and even pieces of other polyps. They ate also every kind of marine plankton, except Pycnogonida, which were rejected. Every copepod dropped on the oval disc of a coral or even on the column wall was killed and wafted to mouth. No vegetable matter of any kind was taken. Pure cultures of diatoms were invariably rejected; if dipped in beef juice diatoms were swallowed, but later ejected. Bits of seaweed were similarly treated. The conclusion is, therefore, that coral polyps are strictly carnivorous. The communication was discussed by Mr. A. A. Doolittle and the speaker.

Mr. A. A. Doolittle then gave the last paper of the program: "The Plankton Resources of Some Massachusetts Ponds." He spoke of the bearing plankton studies have on the broad problem of the conservation of natural resources. A study of the plankton is necessary to the utmost utilization of the fish resources, since practically all fishes, at some stage of their existence, feed on plankton, especially the entomostraca.

In the eight Massachusetts lakes studied, samples were taken from bottom to surface and in all parts of the lakes. Twenty-six species of Entomostraca were collected, one new. Copepods were much more numerous in individuals than the Cladocera, and composed from 50 to 75 per cent. of the total plankton. The number of plankton under a square yard of surface varied from seven thousand to eighty-two thousand. The largest numbers were found in the shallower lakes. The number per cubic yard of water varied from 500 to 17,500, the largest number by this estimate also in a shallow lake. In fact the number of plankton varies inversely as the depth, the deeper parts of quiet lakes having few or none.

Knowing the amount of plankton in a lake, if stomachs of fish are examined to determine the amount they consume, we can estimate the number of fishes the water may support. Mr. Doolittle's paper was discussed by Drs. C. D. Marsh and M. W. Lyon.

The 527th meeting was held May 2, 1914, in the lecture room of the Cosmos Club, with Vice-presi-

dent Dr. W. P. Hay in the chair, and 46 persons present. Frederick M. Gaige, University of Michigan and Frederick C. Lincoln, Colorado Museum of Natural History, were elected to membership. It was announced that the 527th would be the last meeting of the season.

In response to the call for brief notes, W. L. McAtee compared the abundance of birds in the neighborhood of the District of Columbia, as stated in Coues's and Prentiss's lists of 1862 and 1883, with that of the present. Discussion followed by Wm. Palmer and W. W. Cooke.

Calling Dr. M. W. Lyon to the chair, Dr. W. P. Hay gave the first paper of the regular program: "A Journal of the Wilkes Exploring Expedition." The journal in question is a manuscript by Mr. Sinclair, the navigating officer of Captain Wilkes' flagship. Dr. Hay sketched the history of the Wilkes' expedition, gave the personnel of the scientific staff, and an account of the itinerary of the voyage. He also noted the character and manner of distribution of the de luxe report on the expedition, which was in 20 volumes and of which only 100 sets were distributed.

The journal of Mr. Sinclair began at Norfolk, Va., August 9, 1838. Dr. Hay read various excerpts, relating to the following subjects: the death and color changes of the dolphin, a waterspout, phosphorescence, behavior of whales; notes on the towns of the west coast of South America, including Valparaiso and Callao; description of the cruise to the Antarctic, including notes on the aurora, icebergs, penguins, seals, storms and the discovery of land; the last excerpt read was a description of San Francisco. The paper was discussed by Drs. M. W. Lyon and Theodore Gill.

The second contribution to the program was an account of the home and country of Linnæus by S. M. Gronberger, illustrated by lantern slides. Mr. Gronberger sketched the home, school and professional career of Linnæus, and gave an account of his travels. He showed views of Linnæus's home and country, as it now is, and spoke of the distinguished visitors entertained by Linnæus and the mode of life of these companies. Numerous views of places of historical interest also were shown.

The evening's program was completed by the exhibition of an interesting series of lantern slides of Washington's wild flowers by L. D. Halleck. Wm. Palmer spoke briefly on certain of our wild flowers, remarked on their cultivation, and gave running comments on the slides

W. L. McATEE,
Recording Secretary pro tem.