The submergence of this area proceeded from the west, the axial part being overlain by Olean conglomerate, while the part of the area from Allegheny Valley to the Allegheny front received only the Connoquenessing sediment of later age than the Olean. The correlations following from the conditions described are as follows: The Pocono equals the Waverly, the Burgoon at the top being the same as the Logan group of Orton; the beds immediately below the Olean conglomerate in western New York and Pennsylvania are the equivalent of the top of the Erie shale in Ohio; the Salamanca conglomerate is the same as the Venango third oil sand instead of the first oil sand, as supposed by the Pennsylvania geologists; and the Berea sandstone is the first oil sand of Venango County and the 100-foot sand of southwestern Pennsylvania.

The Grand Gulf and Lafayette Formations in Northern Florida: FREDERICK G. CLAPP.

Overlying the Tertiary formations of northern Florida are three types of surface deposits, similar in sequence and character to the Grand Gulf, Lafayette and Columbian formations of adjacent states. The most recent of the Florida deposits (Columbian) is a fine-grained, quartz sand, a few feet in thickness, largely wind-blown and covering nearly the entire state. This sand overlies the so-called Lafayette beds with a marked unconformity. The Lafayette is distinguished from the Columbian by its coarser nature, its abundant water-worn quartz pebbles, its deep surface oxidation, its greater thickness, and its older topography. Below it is a series of quartz sands interstratified with beds of plastic clay (correlating with the Grand Gulf formation of Dr. E. A. Smith in Alabama), the whole ranging in thickness from a few feet in northeastern Florida to 500 feet or more in northwestern Florida. This formation is of estuarine origin. In northwestern Florida numerous flat-topped hills have an average elevation of 250 feet, and are capped by Lafayette. They appear to be remnants of a once extensive terrace of probable Grand Gulf age. At Pensacola the records of deep borings from which fossil shells have been brought up corroborate Smith's evidence at Mobile that his Grand Gulf formation is of late Pliocene or early Pleistocene age.

The deposits hitherto classed as Lafayette in northwestern Florida are complex and consist of parts of several formations. What is presumably the true Lafayette form a mantle covering a wide range of topographic conditions from the top of the 250-foot terraces to the bottom of many valleys. These deposits are believed to be largely of fluvio-terrestrial origin, and were presumably formed during a considerable period of denudation succeeding the Grand Gulf deposition. Hence where the Lafayette beds are of highest elevation they are nearly or quite conformable with the Grand Gulf and were formed early in the Lafayette epoch; while similar deposits in the valleys show strong unconformities and are much more recent.

Brief Discussion of the Copper Deposits of Kasaan Peninsula, Southeastern Alaska: C. W. WRIGHT. (No abstract.)

RALPH ARNOLD,
Secretary

ELISHA MITCHELL SCIENTIFIC SOCIETY OF THE UNIVERSITY OF NORTH CAROLINA

THE 178th meeting was held in the main lecture hall of the Chemical Laboratory, April 28, 1908, 7:30 P.M. The program was as follows:

"Stresses in Masonry Dams," by Professor William Cain.

"Pathologic Effect of Alcohol on Animals," by Professor W. DeB. MacNider.

A. S. WHEELER,
Recording Secretary

THE ORAL OPENING OF THE NASAL CAVITY IN ASTROSCOPUS

ANY communication between the nasal cavities and oral cavity is rare among the fishes, being found in the case of the Dipnoi and hagfishes.

While studying the electric organ of *Astroscopus guttatus* the writer found well-developed posterior nostrils opening into the oral cavity from each nasal cavity. A brief study

of the organs in action showed them to be used as intakes for water during inspiration. They are used in this way both while the mouth is so used and also when it is closed tightly. Each of these two internal openings is provided with an independent valve which automatically prevents the regurgitation of water.

Besides these openings the nasal cavity is also provided with the usual anterior and posterior nares. A fuller account of this structure will appear shortly in another journal.

Ulric Dahlgren

SPECIAL ARTICLES

BLACKHEAD, A COCCIDIAL DISEASE OF TURKEYS[1]

In many districts of the United States, and in Rhode Island in particular, there has been known to exist since about 1894 a highly infectious disease affecting the ceca and liver of turkeys and, to a less extent, of fowls. It is characterized, in the ceca, by inflammation, thickening, occasional perforation of the walls and denudation of the epithelium; in the liver by enlargement and by the formation of cream-yellow spots.

Since the investigations of Theobald Smith, published in 1895, it has been commonly believed that the disease is due to an ameba, *Amœba meleagridis* Smith. The present writers believe they have demonstrated, however, that the disease is caused by a *Coccidium*, which, according to the nomenclature adopted, may be a variety of *Coccidium cuniculi*, and that *Amœba meleagridis* Smith is probably the schizont stage in the development of the *Coccidium*.

The stages of the *Coccidium* most commonly found were the schizonts and the macrogametes or oocytes. The former were first discovered in smears by means of a rose-analin-violet and methylene-blue stain. Later they were recognized in fresh preparations, both within and without the epithelial cells. The macrogametes were most common in the cecal and the intestinal content below the junction of the ceca, and were often present when the cyst stage was absent. Besides these stages the microgametocytes, the microgametes, the merozoites and the sporozoites were recognized both in fresh preparations and in sections stained with hematoxylin and eosin.

By placing the cecal content containing macrogametes in a solution of 10 per cent. potassium bichromate, the growth of bacteria was stopped and the development into cysts and then into sporozoites could be watched. The cysts are commonly oval, and have an average size of 21 by 14 micra. Cultures containing cysts were also made to develop in 2 per cent. formalin, saturated solution of thymol, 4 per cent. boracic acid, 1 per cent. lysol and 2 per cent. carbolic acid. The organism is common in the soil and is frequently found in apparently normal fowls, which do not appear to be so susceptible as turkeys to this form of the disease.

By means of feeding portions of cecal content or parts of ceca of diseased birds, the disease was produced experimentally in turkeys, chicks and sparrows, but not in guinea-pigs, kittens or in rabbits. In young turkeys the disease is almost certainly fatal; older birds may recover. It is doubtful if death is caused directly by the *Coccidium* in the majority of cases; whether there is a specific accompanying organism pathogenic to turkeys under these conditions, and less so to chickens, has not yet been determined. In cases of perforation of the cecum, death soon follows from acute peritonitis. No method of treatment is at present recognized.

The investigations reported above were made at the Rhode Island Agricultural Experiment Station, in cooperation with the Bureau of Animal Industry, U. S. Department of Agriculture, during the year 1906–7.

Leon J. Cole
Philip B. Hadley

[1] Abstract of paper read before the Zoologists' meeting at New Haven, December, 1907.

THE NATIONAL CONSERVATION COMMISSION

Pursuant to the recent Conference of Governors in the White House on the conservation of our natural resources, the President on June 8 appointed a National Conservation Commission, comprising Senators and Representatives in Congress, scientific and technical