sion with the changes which Bell introduced after the announcement of Magendie's discovery of the functions of both dorsal and ventral roots of the spinal nerves in the second volume of his *Journal de Physiologie et Pathologie* in 1822. The alterations from the original can only have been made with the intention of making it appear that Bell had anticipated Magendie. On one page alone (133 in *Medical Classics*) of this doctored edition there are three conspicuous alterations from the text in the *Philosophical Transactions*: after the words, "it is a branch of this nerve which supplies sensibility to the members," the phrase "and animates its muscles" is omitted; the sentence about the elephant's trunk is an addition; the passage, "receives roots both from the medullary process of the cerebrum and the cerebellum," is changed to read, "receives roots from both the column of sensibility and motion." Other discrepancies of an equally damaging character have been pointed out by Austin Flint, Jr., in Robin's *Journal de l'Anatomie et de Physiologie* (1868, 5, pp. 575–583), and in Professor A. D. Waller's letters to the *Lancet* of 1911–12. Attention has been called to this dishonest act by many writers from Claude Bernard in 1867 to J. F. Fulton in 1930. It is a pity that such a dishonestly doctored document should have been chosen as a "medical classic."

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# SOCIETIES AND MEETINGS

## THE NEW ENGLAND INTERCOLLEGIATE FIELD GEOLOGISTS CONFERENCE

THE thirty-third annual conference of the New England Field Geologists was held in New York City on October 8, 9 and 10. Dr. Daniel T. O'Connell, of the College of the City of New York, was local secretary in charge of arrangements and was assisted by a committee composed of members of geology departments of the New York City colleges. More than 200 geologists were in attendance on the field trips and at the dinner-discussion meeting which was held at the Concourse Plaza Hotel on October 8.

Three different trips were offered visiting geologists on Friday afternoon. "A Study of the History of the Bronx River" was the subject of the trip led by George F. Adams, of City College. This trip ended with a visit to the seismic station of Fordham University under the guidance of the Reverend J. Joseph Lynch. A trip to the American Museum of Natural History and to the Hayden Planetarium was led by Fred H. Pough and Harold E. Vokes, of the American Museum of Natural History. The third trip of the afternoon was in charge of Dr. Daniel T. O'Connell, and included a geologic traverse of the northern portion of New York City from the Hudson River to Long Island Sound. Type localities of the Manhattan schist, the included amphibolite, the Inwood limestone and the Fordham gneiss were visited with a view of having the visitors become acquainted with the general lithological characteristics of the formations whose geological age is questioned by some students. The leader pointed out that the Inwood limestone does not carry graphite and in that respect is different from the limestone east of, and beneath, the Fordham gneiss. The correlation of the ridges of Manhattan with the underlying rock formations and the adjustment of streams to fault planes were stressed.

The visiting geologists were welcomed by Dr. Frederick B. Robinson, president of City College, and Mr. Lyons, president of the Borough of the Bronx, at the dinner-discussion meeting. After routine business was disposed of, Dr. Robert S. Balk, of Mt. Holyoke College, gave an interesting illustrated lecture on the "Progressive Metamorphism of the Hudson River Series in Dutchess and Putnam Counties." This lecture was in preparation for the field trip to be held in connection with the meeting.

Three separate field excursions were conducted on Saturday. A mineralogical trip to Paterson and Franklin Furnace, N. J., was led by Dr. Paul F. Kerr, of Columbia University. Geologists visited the mines and dumps of Franklin Furnace, West Paterson and Prospect quarries, of Paterson, and then viewed mineral displays at the Paterson museum. Dr. Cecil Kindle, of City College, was in charge of a paleontological trip to the New Jersey Coastal Plain which visited prolific fossil localities in the Miocene, Eocene and Upper Cretaceous of the Coastal Plain. Of special interest to the visitors were the pelecypods of the Tinton beds of the Red Bank sand (Cretaceous). At Beers Hill, pelecypod shells have been replaced either wholly, or in part, by vivianite. The third trip was made in two buses which conveyed the visitors northward from New York City toward Bear Mountain Bridge. Highly metamorphosed stages of the Manhattan schist, Inwood limestone and Fordham gneiss were studied in the southern part of the Hudson Highlands. A series of somewhat similar lithological characteristics was studied near Millwood, N. Y. These rocks, it was pointed out, were not correlated with the typical rocks of the New York City area because graphite was found in the limestone. Many of the visitors did not agree to the use of graphite as a diagnostic mineral for correlating or differentiating

rock formations. Near Croton-on-Hudson an excellent example of topset and foreset delta beds was seen. This delta was formed when the Hudson River stood at a higher level. While members were viewing the glacial delta, a small landslide occurred in the gravel bank. As the bank slid into the pond a small tidal wave was generated.

The unmetamorphosed Wappinger limestone of Cambro-Ordovician age was studied near the Pumping Station at Peekskill. Evidence for and against its correlation with the more highly metamorphosed Inwood limestone of the New York City area was discussed. Nearby, the Hudson River phyllite and the Canada Hill granites were studied. The party paused long enough on Bear Mountain bridge to study the gorge of the Hudson. Luncheon was served at Bear Mountain Inn. The bus party then ascended Bear Mountain and made a study of the general topography of the region. The return from Bear Mountain was made by way of the west shore highway and at Tomkins Cove the Wappinger limestone was again studied. Here the limestone stands at a high angle and shows the same stratigraphic relations with the Hudson River phyllite as were shown at and near the Peekskill pumping station.

Before returning to New York City the entire Bear Mountain group was entertained at a buffet supper in the home of Dr. Armin K. Lobeck, of Columbia University, in Englewood, N. J.

Saturday evening was spent visiting the various departments of geology throughout the city. The Geological Society of America House was also open to visitors, who were entertained by Drs. Charles P. Berkey and H. R. Aldrich.

The final excursions of the conference were held on Sunday. George F. Adams was the leader of a party that studied the glacial geology of Long Island. The knob and kettle topography of the Harbor Hill (Wisconsin) moraine, the scarp between the moraine and the outwash plain, and the Ronkonkoma moraine were the chief points of interest on this trip. Thomas W. Fluhr, of Columbia University, was in charge of a group that studied various engineering projects in New York City. Of special interest to this group was the fact that the New York pier and the anchorage of the George Washington bridge rest on Manhattan schist, but the New Jersey pier is on Triassic shales, and the New Jersey anchorage is on diabase. A fine sedimentary section was shown in and near the new Lincoln Tunnel under the Hudson River.

Dr. Robert S. Balk, of Mt. Holyoke College, led a group of nearly 100 geologists to view the area in which he has made a thorough study of progressive metamorphism of the Hudson River series. The trip began at Billings, New York, where, in the vicinity of Sprout Creek, black and greenish gray Hudson River slate shows numerous zigzag holds, fracture cleavage and is unmetamorphosed. The route of the trip was planned to pass from these unmetamorphosed pelites northward and eastward across the series to near Camby, where calcareous interbeds were studied. Here the limestone is finely crystalline, occurs as lenses, and is isoclinally folded and sheared. From Camby eastward, the characteristics of the series change. Biotite crystalloblasts make their appearance; then occurs a garnet zone, and finally a staurolite zone. Progressive metamorphism of the Hudson River series seems to have been well established and well illustrated by Dr. Balk. It was also the feeling of some of the members of this final trip that the more highly metamorphosed phases of the Hudson River series are closely similar lithologically to the metamorphosed rocks of the Manhattan area.

The thirty-fourth annual field meeting of the New England Geologists will be held in southern Vermont, with Dr. George L. Bain, of Amherst College, acting as host.

LLOYD W. FISHER,
*Permanent Secretary*

BATES COLLEGE

# SPECIAL ARTICLES

## SHIFTING BOTTOM IN SUBMARINE CANYON HEADS

THE writer has previously called attention to the slight shifting of the bottom observed in the heads of several submarine canyons along the California coast.[1] Since some skepticism was aroused in regard to the basis on which these shifts were reported, it seemed advisable to test the methods employed. Accordingly, soundings along ranges used for these comparisons were repeated on the same day. The results of these checks showed errors of negligible amounts. Even on relatively steep slopes the soundings could be repeated with a difference of not more than 0.2 fathoms (.35 meters) whereas changes of as much as 3 fathoms (5.46 meters) were observed when long intervals had elapsed. A further test was made by the running of a line in relatively deep water along the same range that had been used in 1934. Here, despite the extremely steep slopes which would make the most minute differences of position or variation in the vertical show up as large changes of depth, the comparison gives a very gratifying agreement (Section 3). This indicates both that

[1] F. P. Shepard, *Am. Geophys. Union Trans.*, pp. 221–223, 1936.