

St. Lawrence County," Dr. D. H. Newland, New York State Museum; "Some Aspects of Pleistocene Geology," Professor Earl T. Apfel, Syracuse University; "Adirondack Rocks in Kodachrome," and Movies of Buffalo Meeting, Professor H. L. Alling, University of Rochester; Report of Nominating Committee, Professor G. B. Cressey, Syracuse University.

The visiting delegates left for their homes on Saturday afternoon enthusiastic about the talks which they had heard and the geological features which they had seen and with their cars laden with mineral specimens collected.

The officers for next year are Professor George H. Chadwick, *president*; Robert W. Jones, *secretary-treasurer*, who will succeed Dr. Robert Wesley Brown and Dr. John S. Brown, retiring president and secretary-treasurer, respectively. The association is eagerly looking forward to next year's meeting, which will be held in the Catskills.

#### FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS

THE ninth annual meeting of the Field Conference of Pennsylvania Geologists was held in West Virginia from May 27 to 30. More than fifty geologists from New York, New Jersey, Pennsylvania, Virginia and West Virginia attended.

The conference hosts were the members of the West Virginia Geological Survey. The 1939 committee consisted of Dr. Paul H. Price, state geologist of West Virginia, *chairman*; Dr. B. L. Miller, Lehigh University; Dr. R. E. Sherrill, University of Pittsburgh, and

M. N. Shaffner, Pennsylvania Topographic and Geologic Survey, secretary and treasurer.

The annual dinner was held at the University of West Virginia at Morgantown on Sunday evening. A welcome was extended to the group by the president of the university, Dr. Charles E. Lawall. Other speakers were, Dr. Paul H. Price; Dr. Arthur Bevan, state geologist of Virginia; Dr. B. L. Miller; Dr. R. W. Stone, Pennsylvania Topographic and Geologic Survey; E. T. Heck, West Virginia Geological Survey; Professor Herbert Woodward, University of Newark, and M. N. Shaffner.

The committee accepted an invitation from the New Jersey Geologists to meet with them in New Jersey in 1940, and the following committee was appointed for that meeting: Dr. Meredith E. Johnson, state geologist of New Jersey, *chairman*; Professor Herbert Woodward; Dr. Bradford Willard, Pennsylvania Topographic and Geologic Survey, and M. N. Shaffner.

On Sunday the excursion covered strata from Lower Mississippian to Upper Pennsylvanian in the area between Morgantown and White Sulphur Springs. On Monday strata from Upper Ordovician to Middle Mississippian were covered between White Sulphur Springs and Petersburg, and on Tuesday strata from Upper Silurian to Lower Mississippian were covered between Petersburg and Berkley Springs. The leaders were Dr. Paul H. Price, E. T. Heck, Herbert Woodward and Professor H. M. Fridley, West Virginia Geological Survey.

M. N. SHAFFNER,  
*Secretary and Treasurer*

## SPECIAL ARTICLES

#### THE RELATION OF "COENZYME R" TO BIOTIN

THE value of yeast or plant extracts as stimulants to growth of the root nodule bacteria (*Rhizobium* sp.) has been long recognized. Allison, Hoover and Burk<sup>1</sup> explained the stimulation on the basis that the extracts provide a specific coenzyme for respiration (Coenzyme R), and concluded that the active agent "is certainly not identical with bios, since its addition to synthetic medium essentially free from bios resulted in growth of yeast negligible compared with the heavy growth obtained where bios was present." Apparently, it has been assumed by many workers that this implies that biotin, a growth factor for yeast, is not a growth stimulant for rhizobia, a conclusion which does not necessarily follow from the foregoing statement.

Evidence obtained in this laboratory strongly indicates a relationship between the growth factor re-

quirements of yeast and rhizobia. Treatment of yeast extract with acids, alkalis, solvents, adsorbents and oxidizing agents resulted in parallel preservation or destruction of the activity for both *S. cerevisiae* and *R. trifolii*.

During preparation of biotin concentrates by the procedure of Kögl and Tonnies,<sup>2</sup> fractions were tested at each stage of purification, and total units and purity of the active factor assayed by growth of *S. cerevisiae* and *R. trifolii*. The concentration of biotin, as assayed by yeast growth, was accompanied by the same degree of purification of the *Rhizobium* factor, until the norite adsorption step was reached. Unexpectedly, the eluate (biotin fraction) was highly active with *R. trifolii*, but inactive with yeast. On addition of a small quantity of the filtrate, however, the activity for yeast was completely restored. Further investigation disclosed that the filtrate factor could be replaced by synthetic  $\beta$ -aniline. Following this lead, a prepara-

<sup>1</sup> F. E. Allison, S. R. Hoover and D. Burk, *SCIENCE*, 78: 217, 1933.

<sup>2</sup> F. Kögl and B. Tonnies, *Zeits. Physiol. Chem.*, 242: 43, 1936.