can not omit the stage of heterospory, as some eminent paleobotanists have suggested. The genetic line must have been: homosporous ferns; heterosporous ferns; seed plants. This thesis is very ably defended on morphological grounds.

The Cycadales, the only living representatives of the Cycadophytes, are presented in five chapters, including their geographic distribution, their life history, their gametophytes and fertilization, their embryogeny and seedling anatomy and their phylogeny and taxonomy. It is well known that Chamberlain has made notable contributions to the morphology of this group and in his chapter on their habitat and geographic distribution, he speaks with the authority of one who has studied them carefully in the field in various parts of the world. We find many new details on stem and leaf anatomy, on their gametophytes and on other structural features not previously included in similar books. In a discussion of hybrids among cycads several species crosses are described. A feature which should be of considerable interest to geneticists is the fact that generic hybrids have been obtained in the cross: *Ceratozamia mexicana* × *Zamia monticola*.

The chapters on Cordaitales and Ginkgoales indicate that there has been no great research activity in these groups in recent years. The author shows some excellent restorations of Cordaitales, and he has included some new figures and descriptions of features of the vegetative anatomy of Ginkgo.

Six chapters are devoted to the conifers, which include about four fifths of the genera of living gymnosperms. Here we find much new material selected from the literature which is reviewed, as well as original contributions. Many problems which remain are pointed out, so that the investigator of gymnosperms will find this book indispensable as a ready reference. There is much new material on the embryo, and the introductory chapter on the geographical distribution and habits of conifers shows that the author has also studied this group extensively in the field.

The Gnetales are treated in three chapters, including not only an excellent summary of the literature, but also some original studies on the details of floral organography in *Welwitschia*. Very little attention is given to the Caytoniales, whose phylogenetic position is still uncertain.

The final chapters are devoted to a discussion of phylogeny and the alternation of generations. The latter chapter is broadly inclusive—algae to seed-plants—and shows why the author holds strictly to the antithetic theory of alternation. A bibliography of 719 titles is included. The book is written in an attractive style and serves as an excellent text-book covering the morphology of gymnosperms, suitable for advanced courses in botany. For paleobotanists and students of historical geology, it presents the background essential to the interpretation of fossil seed plants and ferns. The investigator, if he is a beginner, will find this book indispensable as a ready reference; if he is an experienced investigator in the group, he will still find it essential for the numerous new and original contributions which it contains.

J. T. BUCHHOLZ

UNIVERSITY OF ILLINOIS

STATE ACADEMIES

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE thirty-fourth annual meeting of the North Carolina Academy of Science was held at the Woman's College of the University of North Carolina, Greensboro, North Carolina, on May 3 and 4, 1935. About 265 persons, members and visitors, attended the meeting. Sixty-three papers and two exhibits were on the program. (The Proceedings and abstracts of most of these papers and several complete papers will appear at an early date in the *Journal of the Elisha Mitchell Scientific Society*.)

The first day was set aside for the presentation of papers before the General Section, after which was held the annual business meeting. The evening meeting was taken up with an address of welcome by Dean Geneva Drinkwater and the presidential address, "The Caprifoliaceae, or the Honeysuckle Family, in the Southeastern States," by the retiring president, Dr. H. R. Totten, professor of botany at the University of North Carolina. The addresses were followed by a social hour in Society Hall. The forenoon of the second day was set aside for the meetings of the following sections: General Section, Chemistry Section, Mathematics Section and Physics Section.

During the business meeting, a resolution of respect was read, honoring the memory of Dr. Collier Cobb, for many years professor of geology and chairman of the same department at the University of North Carolina.

The academy elected to life membership Dr. E. W. Gudger, of the American Museum of Natural History, and Professor R. N. Wilson, of the department of chemistry, Duke University. The executive committee reported the election of forty-three new members during the year and the reinstatement of seventeen former members.

In the high-school science essay contest, sponsored by the academy, first prize was awarded to Miss

Thelma Bardwell, Montreat College, for her essay entitled "Mental Hygiene." The prize was an excellent set of books on scientific subjects. The contest will be continued in 1935 in the fields of chemistry and physics.

The officers elected for 1935 are:

GENERAL ACADEMY

President, W. L. Porter, Davidson College.
Vice-President, F. W. Sherwood, State College.
Secretary-Treasurer, H. L. Blomquist, Duke University.
Executive Committee: The above officers and E. T. Browne, The University of North Carolina; W. E. Speas, Wake Forest College; H. R. Totten, The University of North Carolina.
Representative to the American Association for the Advancement of Science, Bert Cunningham, Duke University.

CHEMISTRY SECTION

Chairman, R. W. Bost, The University of North Carolina.
Vice-chairman, A. M. White, The University of North Carolina.
Secretary-Treasurer, W. C. Vosburgh, Duke University.
Councillor, L. A. Bigelow, Duke University.
Executive Committee: The officers and H. D. Sherwood, State College; H. D. Crockford, The University of North Carolina; J. S. Black, Wake Forest College.

MATHEMATICS SECTION

Chairman, W. N. Mebane, Jr., Davidson College.
Secretary, V. A. Hoyle, The University of North Carolina.

PHYSICS SECTION

Chairman, C. C. Hatley, Duke University.
Secretary, J. S. Meares, State College.

The thirty-fifth annual meeting of the North Carolina Academy of Science will be held in 1936 at Duke University, Durham, North Carolina.

H. L. BLOMQUIST,
Secretary

REPORTS

REPORT OF THE SUB-COMMITTEE ON SCIENTIFIC INVESTIGATIONS OF THE FISHERIES ADVISORY BOARD

THE fundamental contributions of science have aided materially in the development of the fishing industry and the conservation of the fish supply. Further researches and investigations and the application of the fundamental facts are necessary for the continued progress of the industry.

The committee recognizes the need of a better organization of scientific research and a more complete application of the technical knowledge so gained to the practical problems of fishery management and development. It is essential that all agencies define their objectives and prepare broad plans of research, into which may be fitted investigation of temporary or immediate problems in contradistinction to the haphazard development of unrelated projects. Coordination of these research programs of the several agencies is essential.

The economic prosperity of the commercial fisheries depends upon accurate continuous knowledge of the fluctuations and supply of raw materials of the industry, that can be obtained only through a systematic program of technical observation. These data will enable adjustment of the fishery business to the supply.

The conservation of game fish production depends upon management that implies intensive stream and lake surveys, the improvement of the environment especially through the abatement of destructive pollution, the stocking to maximum carrying capacity of artificially impounded waters and those restored to their natural state on submarginal land, and, lastly, the proper regulation of the use of such fish stocks.

FEDERAL FISHERY RESEARCH

The Federal Government should concern itself primarily with investigations of a fundamental nature having the widest application both scientifically and in a geographic sense. Variation in abundance of commercial fishes, migratory habits of fishes, particularly in interstate waters, and the accumulation of data upon which the prediction of future runs may be based; the prevention of the destruction of migratory fish on federal reclamation projects; the survey and improvement of streams and lakes in national parks and forests; studies of the means of abating water pollution and the development of rational plans for restocking waters are suggested as types of research especially suitable for federal consideration.

Projects supported by emergency appropriations have their merit, but can not be substituted for a long-time program of scientific fishery research. A well-trained and experienced personnel, adequately compensated and reasonably sure of tenure of office, is necessary to carry out a continuing program of research.

The committee deplores the recent tendency to economize in the direction of reducing expenditures for research of such types which are vital to the national welfare. The "White Act," approved on May 21, 1930, authorized progressive increases in the federal appropriation for biological fishery research, amounting to $60,000 annually for five years, and for