descendants of Gauss were still alive in America; and the recent occurrence of this unusual name in diplomacy has suggested that exploration in this direction would be of interest as relating to a conspicuous illustration of the dispersal of Central European centers of learning.

JOSEPH LARMOR

HOLYWOOD, NORTHERN IRELAND

SCIENTIFIC BOOKS

THE COMPARATIVE PHYSIOLOGY OF RESPIRATORY MECHANISMS

The Comparative Physiology of Respiratory Mechanisms. By AUGUST KROGH. vii + 172 pp. 84 figures. University of Pennsylvania Press. $3.00.

IN the spring of 1939, Professor Krogh delivered a series of lectures on "The Comparative Physiology of Respiratory Mechanisms" at Swarthmore College, and these lectures have now been prepared by him in a publication of about one hundred and fifty pages. The principal theme is shown by the title. It is approached through a discussion of the quantity of oxygen needed by various organisms at rest and in activity. The maximum steady metabolism indicates the maximum capacity of the animal's respiratory apparatus. Oxygen is available in the air and water at tensions differing according to the particular environment, and it is the difference between the tension in the environment and at the metabolizing tissues which determines the force available for diffusion in the respiratory exchange.

The external exchange is effected in special devices like gills and lungs, which secure the exchange in many different structures suited to the various animals, their habitat and activity. Special requirements, like heavy work or the restricted supply of oxygen during diving, show the adjustments of respiration under stress.

The blood of animals shows that there are several different chemical mechanisms utilized to facilitate transfer to the respiring tissues. The final transfer of oxygen and carbon dioxide between blood and tissues is related to the distribution and regulation of the capillary circulation, but the details for this last step in the respiratory exchange are still obscure.

The tracheal respiration of insects has particularly interested Professor Krogh. He develops this subject in detail, presenting many descriptions of analyses of the mechanisms involved which originate from his own laboratory, or as a result of his suggestions. There are so many intricate variations in the organs and methods of tracheal respiration, and Professor Krogh's knowledge and appreciation of them is so precise that this is one of the most interesting chapters of the book.

The book is written in a very succinct style, and the examples and illustrations are clear and appropriate. Printing, illustration and arrangement have been very nicely done. Each detail of the exposition is presented separately and distinctly, but the order of material and the brief conclusions always lead toward the complete picture of respiration suited to maintain the animal at its own level of activity and in its own environment.

LAURENCE IRVING

SWARTHMORE COLLEGE

ULTRAVIOLET RAYS

The Chemical Action of Ultraviolet Rays. By CARLETON ELLIS and ALFRED A. WELLS. ix + 961 pp. Illus. New York: Reinhold Publishing Corporation. 1941. $12.00

PHOTOCHEMISTRY, more than most branches of physical chemistry, has suffered from the fact that guiding principles and accurate experimental methods have been slow in their development. This is due partly to the fact that many chemists have been inadequately trained in the use of the physical methods necessary for prosecution of sound research work in this field and partly because of the very complexity of the subject itself. During recent years, however, much progress has been made, and to-day there is a growing appreciation of the importance of the study of the effects of electromagnetic radiation both from the standpoint of the pure chemist and of the biologist.

"The Chemical Action of Ultraviolet Rays" is an attempt to provide a comprehensive survey of the effects of visible and ultraviolet light on chemical systems. A glance at the chapter headings will indicate the breadth of the subject covered. Experimental methods, quantum theory, spectroscopy, photochemical reactions, applications to industrial products and applications in biology are all treated. The number of literature references runs into the thousands.

Any book which attempts to cover as much ground as this one will necessarily be open to several criticisms. The uninitiated would have some difficulty in learning much about theories of spectroscopy and of reaction kinetics from a treatment as brief as the one given, but the list of references on experimental methods is very valuable.

The authors have done a real service to photochemists in covering the literature very thoroughly. One will find cited all the important references on nearly all reactions which have been shown to be light sensitive. The reader will thus be able to ascertain many of the facts in this field. It would be much more difficult for him to obtain a clear idea of the mechanisms

of the reactions which are discussed. Photochemistry has been beset by apparent conflicts in experimental results more than most branches of chemistry. This is due to difficulties in experimental technique and to a lack of appreciation of all the variables which can effect the course of a photochemical reaction. The chief criticism of this book lies in the fact that most of the data are presented without an adequate attempt at critical evaluation. This leads all too often to the feeling that there are unresolvable differences of opinion in the interpretation of the data.

The parts of the book which deal with the biological effects of radiation are useful. Much of this material seems never to have been brought together in one place before. Lethal action, therapeutic effects, rickets and Vitamin D, and photosynthesis are among the subjects covered.

"The Chemical Action of Ultraviolet Rays" should be extremely valuable to any worker who wishes a handy reference book covering the field comprehensively. As already indicated any such comprehensive survey of the literature of a field is always of service.

W. ALBERT NOYES, JR.
UNIVERSITY OF ROCHESTER

SOCIETIES AND MEETINGS

NORTH CAROLINA ACADEMY OF SCIENCE

THE fortieth annual meeting of the North Carolina Academy of Science was held at Chapel Hill on April 25 and 26. The meeting was unusually well attended and an exceptional program was provided. The peak of attendance was approximately 300 and more than 80 papers were presented in the various scientific fields. The North Carolina Section of the American Chemical Society met at the same time and place with probably 75 attending to hear the 15 papers offered.

An innovation at the meeting was the setting aside of a definite time for demonstrations. This proved very successful for papers which were presented formally, as well as for those which consisted of the demonstration only.

The Poteat award was conferred on Miss Alma Whiffen, of the University of North Carolina, for her paper on "The Role of Chytrids in Cellulose Decomposition." The American Association grant for research went to Drs. C. H. Lindsley and N. Rosen for a study of the "Zeeman Effect in the Palladium Spectrum." Mr. John M. Stewart, a student of the Alamance High School, was awarded the project prize of $20.00, while the forestry essay prize of $20.00 was divided between William Anderson, of the Hayesville High School, and Omega Rice, of the Dorland-Bell School at Hot Springs.

A meeting was held for high-school teachers and sponsors of high-school science clubs. A program of especial interest to them was provided.

The university gave the academy a dinner, which was followed by the address of the president of the academy, Dr. J. L. Stuckey, on "Man and Minerals." The Elisha Mitchell Scientific Society entertained the academy after the address.

The committee reports were presented in mimeographed form, and these along with the treasurer's preliminary report was adopted. The secretary reported that about 80 members had been added to the roll during the year.

The following officers were elected for the ensuing year: *President,* R. E. Coker, of the University of North Carolina; *Vice-President,* C. N. Warfield, of the Woman's College of the University of North Carolina; *Secretary-Treasurer,* B. Cunningham, of Duke University (continues); *New Member of the Executive Committee,* D. B. Anderson, North Carolina State College; *New Members of the Research Grants Committee,* C. F. Korstian, Duke University, and J. N. Couch, of the University of North Carolina.

A more detailed report of the meeting will appear in the *Journal of the Elisha Mitchell Scientific Society.*

BERT CUNNINGHAM,
Secretary

SPECIAL ARTICLES

THE BIOTIN CONTENT OF TUMORS AND OTHER TISSUES

THE search for significant differences between the metabolism of normal and malignant cells has long occupied the attention of those concerned in a biochemical approach to the tumor problem. Of particular interest in this respect are substances of vitamin or enzyme nature, which in relatively minute amounts exert powerful regulatory influences on the growth of tissues. One of the more recently studied and most active of these compounds is biotin, or vitamin H, which is already known to be essential for the vital functions of many micro-organisms[1,2,3,4,5] and higher

[1] F. Kögl and B. Tonnis, *Zs. phys. Chem.,* 242: 43, 1936.
[2] P. M. West and P. W. Wilson, *Enzymologia,* 8: 152, 1940.
[3] R. Nilsson *et al., Ann. Landw. Hochschule Schwedens,* 7: 301, 1939.
[4] E. E. Snell and R. J. Williams, *Jour. Am. Chem. Soc.,* 61: 3594, 1939.