# SCIENTIFIC BOOKS

*Lehrbuch der Protozoenkunde, eine Darstellung der Naturgeschichte der Protozoen mit besonderer Berücksichtigung der parasitischen und pathogenen Formen.* Begründet von FRANZ DOFLEIN, neubearbeitet von EDUARD REICHENOW. Ed. 5, Jena, Verlag von Gustav Fischer. vi + iv + vii + 1262 pp., 1201 figs. in text. 1927–1929. Price, bound, 70 marks.

AMONG the many German text-books of specialized nature issued by the well-known publishing house of Gustav Fischer, few, if any, have had the cordial reception which has been accorded to Doflein's "Textbook of Protozoology," and none has had a wider usefulness. This has been in part due to the key position which the Protozoa hold in the field of biology. They are first in the evolutionary series of animal forms, and have intimate relationship with the plant series. They present extraordinary diversifications in structure and life history; their ecological adaptations bring them into the most diversified environments; their cytological developments surpass those of all other cells in the complexities and modifications which have emerged in the long period of their evolution; it is probable that the number of species now living will be found to exceed that of all other animals, the insects included, and their interrelations in the web of life link them in intricate chains of food relations, soil conditions, oceanic deposits, commensalism, symbiosis and disease. Scarcely an animal or plant exists that is not in one or many ways entangled in this web with the Protozoa.

The merit of the series of editions of Doflein's textbook lies in the fact that he grasped the wide significance of the relationships of the Protozoa, advanced each successful edition in the forefront of this rapidly progressing science, and was never provincial in his grasp of his field or in its presentation.

In addition to these qualifications he organized his material logically, developed it symmetrically and presented it with lucidity and forcefulness. He had a keen scent for the significant organisms or features of structure—a fact revealed in the selection of subjects for his own contributions to protozoology. Protozoologists and biologists generally have come to await with eagerness the next edition of Doflein in order that they might catch up with the broader aspects of the subject. Although he always presented the parasites and pathogenic aspects of the Protozoa, he never subordinated their broader biological phases to these more practical or immediately useful subjects, as has been notably done in Wenyon's recent "Protozoology."

Another feature of Doflein's authorship which is distinctive and for which the publishing house of Fischer is also to be congratulated is the high standard of artistic and technical skill in the illustrations. New and original illustrations were often prepared, figures from other investigators never suffered at his hands and a wealth of carefully selected figures adorns nearly every page of the large volume.

The new edition prepared by Dr. Eduard Reichenow, professor and director of the protozoological division of the widely known Hamburg School of Tropical Medicine, follows in the main very successfully along the lines of the earlier editions. Changes involved are the entire omission of the Spirochaetes, which, quite properly, are now relegated to the Bacteria. New illustrations, many of them original from Doflein, to the number of several hundred, have been introduced; the formerly separated sections on morphology and on physiology are quite significantly combined in one.

More than ten years have elapsed since the fourth edition was published. The great volume of new material which has been published in the intervening years has compelled a rewriting of almost the entire text, which, together with the vast array of material to be reviewed, is no small undertaking. This fact is doubtless responsible for the relatively larger use made of German sources in this revision as compared with the earlier ones.

This is hardly the place for a critical survey of the details of the new edition, but only for a brief characterization. The text, in comparison with the best edition, is in a somewhat more involved style; there is a relatively greater proportion of German work in the new bibliographic citations, and there is a considerably fuller presentation of the parasitic genera and species, which will doubtless meet with approval of many users of this monumental work.

The reviser is to be congratulated on the high order of scientific service rendered in the preparation of this summary of a field so wide, so diverse and so widely useful. The publisher has also given the book the fitting set-up which biologists the world over have long associated with his imprint.

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*Der Hochgebirgssee der Alpen.* By OTTO PESTA. Bd. VIII of Thienemann's Binnengewässer, 1929, 156 pp., 8 pls., 41 figs. Published by E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart.

THE author restricts the term "high mountain lakes of the Alps" to those bodies of water that are situated above the timber line, which lies at 1,800 to 2,000 meters above sea-level in this region. These elevated

bodies of water range from mere tarns up to 148 hectares in area; only two of them exceed 100 hectares, while five exceed 50 hectares. The shores usually consist of gravel and boulders.

One lake is 102 meters deep and 28 are more than 30 meters deep; most of them range from 1.8 meters to 30 meters in depth. Some of the lakes are fed by glacial waters and the detritus therein gives the lake water a milky appearance. A few have dark-colored water, but most of them are green or blue-green to blue in color.

The summers are short but rather warm at this altitude; in the deeper lakes the temperature of the surface water ranges from 10° to 14°, or even 20° C. in summer, while the bottom temperatures are 3.8° to 5.6° C. In some of the more elevated lakes the surface temperature is as low as 1.5° to 4° in August. As a result of the severe climatic conditions at this altitude the various bodies of water are covered with ice from 150 to 270 days each year; a few of them may be frozen for 300 days or even the entire year at certain times. The thickness of the ice varies from 49 to 87 centimeters.

The waters of these lakes hold a relatively small amount of salts in solution so that the dry residue is small, ranging from 0.4 to 30 milligrams per liter. In general, calcium is the chief mineral constituent. The water contains an abundance of dissolved oxygen, but the amount is below the saturation-point in all cases.

Very few large aquatic plants are found in these lakes because the growing season is short and the temperature is low; also the bottom is unfavorable for attached plants because it consists of gravel and boulders. Several of the green algae, such as Spirogyra, Zygnema, etc., are found more or less abundantly in some of the lakes. The low temperature of the water and the small amount of salts are unfavorable factors for the phytoplankton; diatoms seem to withstand these conditions much better than the green algae. Peridinians and flagellates are found to a limited extent in the summer.

Animal forms are represented by amphibians, fishes, mollusks, insects, crustacea, rotifers, worms and protozoa. The biology, ecology and origin of the fauna are discussed at some length. The bibliography contains a list of 142 titles.

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*Antarctic Adventure and Research.* By GRIFFITH TAYLOR. Appleton (New World of Science Series), 1930. 245 pp., 34 figs. $2.00.

THE appearance of this little book from the pen of Captain Scott's senior geologist on his last expedition, now holding the chair of geography at the University of Chicago, is most opportune when so many are stimulated to inquiry into Antarctic conditions. It might well be doubted if there is any one to-day better fitted to treat of this broad subject. Professor Taylor's background is well displayed in his summary of Antarctic exploration which occupies the first eighty-two pages of the book. The *raison d'être* of each expedition, the importance which it assumes and the results which were achieved are all treated with a thorough grasp of the subject and with a brevity which is masterly. The delicate international questions which have sometimes been involved are dealt with fully and fairly.

The remaining chapters of the book are devoted to "The Continent, its Geology and Relation to Other Lands," "Scenery and Topography," "Ice-sheets and Glaciers," "Oceanography and Sea Ice," "Climatology," "Flora and Fauna" and "Commercial and Political Aspects." The more important reference works for each chapter are cited and evaluated, and the book has a good index. The thirty-four text illustrations, though a little crude and sketchy in character, are none the less very helpful in the exposition of the subject. A surprising amount of accurate and well-arranged scientific material has been compressed into this little book, though the interest is kept up to the end. It is to-day the best book on the subject which it treats.

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# SCIENTIFIC APPARATUS AND LABORATORY METHODS

## AN IMPROVED COLOR STANDARD FOR THE COLORIMETRIC DETERMINATION OF CHLOROPHYLL[1]

A RAPID and accurate method of measuring quantities of chlorophyll in plant extracts reported previously[2] included the use of an appropriate color standard and a colorimeter. The color standard was prepared by mixing stock solutions of the dyes, Malachite Green and Naphthol Yellow, in such proportions that the tint was practically identical with that of solutions of saponified chlorophyll. Evaluation of the color standard in terms of known concentrations of chlorophyll made it possible to determine the chlorophyll content of certain strains of corn in a convenient manner.[3] The procedure outlined offers

[1] Paper of the Journal Series, New Jersey Agricultural Experiment Station, Department of Agronomy.

[2] Howard B. Sprague, "A Convenient Method of Measuring Quantities of Chloroplast Pigments," SCIENCE, 67: 167–169, 1928.

[3] Howard B. Sprague and J. W. Shive, "A Study of the Relations between Chloroplast Pigments and Dry Weight of Tops in Dent Corn," *Plant Physiology*, 4: 165–192, 1929.