

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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WISCONSIN GEOLOGICAL AND
NATURAL HISTORY SURVEY

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 CHLOROPHYLL¹

A RAPID and accurate method of measuring quantities of chlorophyll in plant extracts reported previously² 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.