EARLY HYDROGRAPHIC WORK ON AN AMERICAN LAKE

FOR many years there has been hanging in the building of the Skaneateles Library Association, Skaneateles, N. Y., a framed manuscript chart of Skaneateles Lake. It is poorly drafted to a scale of a little more than an inch to a mile, on two pieces of paper that had lain folded for years before being mounted, and has probably rarely received more than a casual glance. Recently, through the kindness of the association, particularly its librarian, Miss Alice E. Washburn, the writer was able to examine this chart more closely.

The chart was drawn up in 1824 and in 1827 by a Captain Benjamin Lee,[1] primarily on the basis of a series of soundings made by him with "deep-sea leads" made for the purpose. Apparently he made no survey of the shores or outline of the lake, for his delineation of its configuration, while vaguely correct, evidently was strongly influenced by the presumed meaning of the Indian word "Skaneateles"—"The Beautiful Squaw"[2]—and his indicated widths of the lake in places near the lakehead are twice the actual figures. The soundings, however, are quite accurate when compared with the bathymetric map of the lake prepared by the College of Engineering, Cornell University, and published by Birge and Juday in 1914.[3] Lee's chart indicates a maximum depth of 275 feet off "Nine Mile Point" (now Carpenter's Point), whereas the maximum depth, at approximately the same place, is 287 feet, according to Plate III of the paper cited (but given as 297 feet in the text, p. 537).

Curiously, through two compensating errors, Lee's estimate, contained in a manuscript note on the chart, of the volume of water in the lake is very near the figure arrived at by Birge and Juday ninety years later on the basis of far more complete and accurate data. Lee estimated the area at 20 square miles and the average depth at 100 feet, with a volume of 1,546,240,000 long tons (55,664,640,000 cubic feet). Actually the lake has an area of 13.9 square miles and a mean depth of nearly 143 feet, with a volume of 55,151,000,000 cubic feet (Birge and Juday, p. 537).[3]

Most significantly, however, Lee took bottom samples with his "deep-sea leads" and indicated on his chart, in proper nautical fashion, the character of the bottom at a number of sounding stations. The accuracy of this aspect of the chart can not be completely verified at present, for we know no more about the bottom sediments of the Finger Lakes now than in Lee's day, so far as published data are concerned. In general, except for local near-shore or shore-line deposits of sand and gravel, they are assumed to be composed of silts and muds, and from the writer's very limited investigations this generalization holds at least for the heads of Cayuga and Skaneateles lakes.[4] On Lee's chart, however, the bottom of the center of the lake at three stations between Carpenter's Point and a point a short distance south of Mandana is noted as "clean white sand." North and south of these points the bottom is indicated as muddy. This would seem to be worth checking, for even if it proved to be neither clean nor white, a sand bottom in the middle of such a lake, virtually a gigantic settling basin, is unexpected.

Lee's manuscript chart, in spite of its imperfections, is not only interesting historically, but significant scientifically because it contains data bearing on a problem that unfortunately has not yet been studied in the case of any of the Finger Lakes, namely, the nature, distribution and origin of the bottom deposits —a problem whose solution should shed much light on the late Pleistocene and Recent geological history of central New York.

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[1] This may have been the Benjamin Lee mentioned in the "National Cyclopedia of American Biography," who, after having been a minor officer in the British Navy during Revolutionary times, came to this country and entered the merchant marine as a captain. He lived in Cambridge, Mass. The chart very likely resulted from observations (for amusement?) made while visiting the pleasant, cultured village of Skaneateles.

[2] The proper rendering of Skaneateles is "long lake" (see H. W. Thompson, 1940, "Body, Boots and Britches," Philadelphia, p. 461).

[3] E. A. Birge and C. Juday, *U. S. Bur. Fisheries Bull.*, 32: 525–609, pls. 111–115, 1914.

[4] About 27 years ago Professor G. D. Harris made several dredgings of the bottom at moderate depths near the head of Cayuga Lake in connection with the late Carlotta Maury's studies of the molluscan fauna of central New York. Fine gray mud was reported (*Nautilus*, Vol. 30, p. 32).

PRE-TENNYSONIAN THOUGHTS ON AIR TRANSPORTATION

IN the issue of SCIENCE for November 12, 1943, on page 431, Mr. M. F. Ashley Montagu quoted certain stanzas from "Locksley Hall," in which Tennyson anticipated aviation in its commercial and military aspects. It is thought that the following two extracts which for some time have been among my collection of clippings might be of interest to your readers in this same connection.

From the *Proceedings of the Liverpool Naturalists Field Club*—1904, page 30:

> Soon shall thy arm unconquered stream afar,
> Drag the slow barge or drive the rapid car,
> Or on wide waving wings expanded bear
> The flying chariot through the fields of air.
>
> —ERASMUS DARWIN, 1802.

In a publication by the Rockefeller Center, it was reported that George J. Atwell has brought to light the following inscription from the tombstone of Saint

Francis of Paula, 1416–1508, in Kirby Cemetery in Essex, England:

When pictures look alive with movements free;
When ships, like fishes, swim beneath the sea;
When men outstripping birds shall scan the sky;
Then half the world, deep-drenched in blood, shall die!

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SCIENTIFIC BOOKS

PLANTS AND VITAMINS

Plants and Vitamins. By W. H. SCHOPFER, director of the Botanical Institute, University of Bern. Authorized translation by N. L. Noecker. xiv and 293 pp. Foreword by W. J. Robbins. Waltham, Mass.: The Chronica Botanica Company. New York City: G. E. Stechert and Co. 1943. $4.75.

TEN years ago no book could have been written about vitamins in plants, although plants were clearly recognized as an important source of accessory factors for human and animal nutrition. During the last decade extraordinary progress in the study of vitamins has resulted in a rich literature which supports the ambitious goal which the author of "Plants and Vitamins" has undertaken, namely, to crystallize our knowledge of vitamins in plants, to show the relations of this domain to general biochemistry and physiology and to suggest fertile areas for cultivation by future investigators. The book contains 24 chapters, an author index and a general index, and many illustrations and structural formulae of compounds.

The contents are organized into three parts. The first deals with the capacity for synthesis and the functions of vitamins in green autotrophic plants. In the second part, the author gives an extensive discussion of growth factor deficiencies in organisms which have lost the ability to synthesize vitamins. Part three presents some general phenomena which are wholly or partially explained on the basis of the vitamin concept. Well-deserved emphasis is given to the discussion of growth factors in microorganisms, because it is in this particular field that outstanding progress has been made in such a short time. Of special interest to both plant and animal physiologists are the chapters on biological synthesis and the roles of growth factors in protoplasm. The discussion of vitamins in enzyme systems could have been more extensive, and much remains to be said about competitive inhibition, sulfonic analogues, etc.

As stated by the author, his book does not by any means claim finality, but rather represents a stage of progress in research which continues to advance. Although some workers may not wholly agree with certain of the author's conclusions and the emphasis placed upon various topics, this book fills the need for a critical and authoritative appraisal of the advancement of our knowledge concerning vitamins in plants. The writing of such a book required the consultation of a very extensive bibliography. It is a matter of regret that many interesting and important contributions mentioned briefly in the discussion are not cited by specific references to the literature. It is easy, however, to forgive omissions of literature published since 1941, when one considers the difficult circumstances surrounding the author in Switzerland.

Only in the past several years have we learned that the fundamental functions of vitamins are the same in regulating the metabolism of both plants and animals. A vitamin, according to Professor Schopfer, is an "organic substance, the need for which results from the loss of the capacity for its synthesis, whose action is catalytic (active in small amounts), quantitative and markedly specific." The book indicates that at all phylogenetic levels the requirements of living matter are approximately the same regardless of the structure of the organism. The only aspects that differ are the morphological expressions to which vitamin deficiency may give rise. The author shows how vitamins constitute the meeting ground for specialized sciences, where workers in organic chemistry, enzymology, human, animal and plant physiology all meet to solve fundamental problems.

The philosophical view-point of the author is indicated in the following quotations taken from his concluding chapter:

> In order to understand the problem of vitamins in all of its ramifications it is no longer possible to confine oneself to one field. The plant physiologist has learned from his confrère, the human physiologist, what an avitaminosis and a vitamin is. The plant physiologist in turn has shown that plants are the seat of the biosynthesis of vitamins and thus has established a new intimate relationship between two kingdoms. The biochemist, by establishing the chemical structure of vitamins, has been obliged to create new groups of chemical compounds. The enzymologist finds to his surprise that these vitamins are nothing but the active portions of enzymes which have been studied for a long time. The microbiologist, who for years had been trying, without success, to isolate the "growth factors" of his microorganisms, proved that typical animal vitamins were the factors he was looking for. The concept of growth factors (in the exact sense) conforms with that of vitamins (in the strict sense) and is identical with it. . . .
>
> The problem of vitamins started with man and, in the last analysis, it returns to man after an apparent departure from him. All the progress accomplished in this domain contributes to a better understanding of the prob-