

—that no amount of book learning can take the place of field work and the privilege of chatting and corresponding informally with one's fellow-professionals. It is a pity that a dirt archaeologist who has these privileges cannot cover the ground with equal literary facility. Perhaps someday this miracle will take place and the intelligent layman will get the genuine article. In the meantime, with strong reservations in the interpretive field, this is a working substitute.

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Frost Action in Soils: A Symposium. Presented at the Thirtieth Annual Meeting, January 9-12, 1951. Highway Research Board, Special Rept. No. 2. Washington, D. C.: National Research Council, 1952. 385 pp. \$3.75.

This book discusses problems related to the freezing and thawing of soils—a branch of the young science of soil mechanics. It contains 39 papers written by 48 men, mostly engineers connected with highway departments, railroads, the Corps of Engineers, or educational institutions; but geologists, geographers, botanists, physicists, and soil scientists are represented. Canada contributed two papers, Norway two, England one, and the United States 34. These facts account for inevitable differences of opinion and widespread duplication of research.

The papers are grouped under six headings: "Climate and Distribution of Soil," "Soil Temperature and Thermal Properties of Soils," "Basic Data Pertaining to Frost Action," "Frost Action and Spring Break-up," "Remedies and Treatment," and "Needed Research."

Most of the authors agree that frost heaving is due to growth of ice crystals, often arranged in more or less well-defined layers, rather than to volume change accompanying change of state. Water is fed by capillary forces to growing crystals where soil is sufficiently fine-grained and where the capillary fringe above the water table extends into the freezing zone. Silts and, to a lesser extent, clays are susceptible to frost heave. Engineers define clays on the basis of particle size instead of mineral composition. One author, a geologist, emphasizes that the water-holding properties of the various clay minerals can affect the physical properties of soils. With modern methods of highway construction, pavements suffer less from heaving than from excessive amounts of water liberated by spring thaws.

An effective although expensive preventive method is replacement of susceptible soils with gravel, crushed stone, sand, cinders, or (in Norway) peat. Drainage, or raising highways above the general surface, is common practice. Calcium chloride prevents objectionable heaving, but the effects are not permanent.

Formulas are developed for predicting subsurface temperatures and the depth of freezing and thawing, but this problem is complicated by the variability of

several factors. One writer estimates that it takes at least 22.7 years for heat from the earth to thaw a foot of permafrost upward from the bottom.

Typographical errors are common: titles under two diagrams are interchanged; some figures are illegible because of excessive reduction; and one paper having 35 illustrations refers to none of them directly by number. Absence of the jargon associated with "cryopedology" is refreshing. Although the book contains valuable information and some excellent papers, it does not come up to standards desirable in publications sponsored by the National Academy of Sciences and the National Research Council.

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Scientific Book Register

The History of American Epidemiology. Sponsored by the Epidemiology Section, American Public Health Association. C.-E. A. Winslow *et al.*; Franklin H. Topf, Ed. St. Louis: Mosby, 1952. 190 pp. Illus. \$4.75.

Die Wuchsstofflehre: Ergebnisse und Probleme der Wuchsstoffforschung. Hans Söding. Stuttgart: Georg Thieme, 1952. 304 pp. Illus. DM 33.

Development of the Guided Missile. Kenneth W. Gatland. London: Flight Pub.; New York: Philosophical Library, 1952. 133 pp. Illus. \$3.75.

Psychiatry and the Law. Manfred S. Guttmacher and Henry Weihofen. New York: Norton, 1952. 476 pp. \$7.50.

Traité de Zoologie: Vol. I, Phylogénie, Protozoaires: Généralités, Flagelles. Pierre-P. Grassé, Ed. Paris: Masson et Cie, 1952. 1071 pp. Illus. 9000 fr.; 9600 fr. bound.

Annual Review of Nuclear Science, Vol. 1. Stanford, Calif.: Annual Reviews, 1952. (Published in cooperation with the National Research Council.) 645 pp. \$6.00.

Design for a Brain. W. Ross Ashby. New York: Wiley, 1952. 260 pp. Illus. \$6.00.

Organic Chemistry: The Chemistry of the Compounds of Carbon. 2nd ed. Lucius Junius Desha. New York-London: McGraw-Hill, 1952. 595 pp. Illus. \$6.50.

Vergleichende Physiologie: Sinnesphysiologie, Band I. 3rd ed. W. von Buddenbrock. Basel: Verlag Birkhäuser, 1952. 504 pp. Illus. Cloth, 45.75 Swiss fr.; paper, 41.60 Swiss fr.

Pasture Production and Management. R. H. Lush. New York-Toronto: Blakiston, 1952. 193 pp. Illus. \$3.75.

The National Health Service in Great Britain: An Historical and Descriptive Study. James Stirling Ross. New York: Oxford Univ. Press., 1952. 398 pp. \$7.00.

Mesons: A Summary of Experimental Facts. Alan M. Thorndike. New York-London: McGraw-Hill, 1952. 242 pp. Illus. \$5.50.

Elasticity in Engineering. Galcit Aeronautical Series. Ernest E. Sechler. New York: Wiley; London: Chapman & Hall, 1952. 419 pp. Illus. \$3.50.

Man the Chemical Machine. Ernest Borek. New York: Columbia Univ. Press, 1952. 219 pp. \$3.00.

The Indian Tribes of North America. Smithsonian Institution, Bureau of American Ethnology, Bull. 145. John R. Swanton. Washington, D. C.: Supt. of Documents, GPO, 1952. 726 pp. and maps. \$3.50.