what may be regarded as a laudable American aspect, it can scarcely be thought possible that he has not consulted, and consulted freely, every fascicle of Tschirch's "Handbuch" as it has been issued from the press. Though the present unfortunate war is teaching us how derelict we have been in making ourselves independent of Europe, so far as vegetable drugs are concerned, yet the pharmacognocist, above all, should ever be mindful of the inscription on the Flueckiger medal: *Scientia non unius populi sed orbis terrarum.* E. K.

Practical Oil Geology. By DORSEY HAGER. McGraw-Hill, New York, 1915. Pp. xii + 141; figs. 76, three being full page, and one plate. $2.00 net.

This handy pocket book puts the stock-in-trade of the petroleum geologist and engineer before the petroleum investor in a way that invites friendship. Further, it lays sound ideas of applied structural and stratigraphical geology before a class which is glad to substitute such revelations for the "luck" of the oil (or water) wizard.

While the space is so small as to call for brevity at the expense at times of clearness, the numerous excellent cuts—most of them evidently the author's—more than balance in field ingenuity and the applications of pure geology what may be wanting in the way of academic clarity of statement.

Only two or three proof errors appear in the text proper. An early second edition for so good a book on a timely subject seems sure, and in the reappearance no doubt there will be weeded out such oversights as: "Igneous rocks, or volcanics," p. 28; "a level line in the plane of the horizontal," p. 71; "curved axis," fig. 50 and p. 86; Comanchean equivalent to the whole Mesozoic, p. 38. Certainly the errors in Table XI. will not be recopied, nor perhaps that in averaging the viscosity of Oklahoma oils, especially the unfair inclusion of the high viscosity from Wheeler, Table VI. Convenience would be served by referring to a figure on a definite page rather than, say, "(See Fig. 19, Chapter III.)."

Useful adaptations for the layman are: Geological Names (Kemp); Mathematical Tables (Hayes); Tests for Oil (Woodruff); Favorable and Unfavorable Indications for Oil (Craig); Definitions of Formation and Member (Snyder). Other tables and data will serve more technical needs, and the cuts will doubtless be freely drawn upon by other authors.

The neat and convenient get-up, and strong, leather binding are characteristic of these publishers.

CHARLES T. KIRK
STATE UNIVERSITY,
ALBUQUERQUE, NEW MEXICO

SPECIAL ARTICLES

ON THE RELATIVE NUMBERS OF RHIZOPODS AND FLAGELLATES IN THE FAUNA OF SOILS

THE investigations upon the protozoan fauna of the soil and its interrelations with the bacterial flora therein contained has opened a new field of exploration and suggested a new line of attack for the problem of "sick soils." The work of Russell and Hutchinson and their school indicates that the constituents of the protozoan fauna, notably the amœbas, affect appreciably the bacterial content of the soils they inhabit, and thus impinge upon some of the problems of fertility. This line of evidence has stimulated many preliminary investigations into the extent, distribution and qualitative make-up of the protozoan fauna of the soil. In many cases these attempts at the qualitative determination of these organisms have gone no farther than to record the relative numbers of the individuals belonging to the groups of rhizopods, flagellates and ciliates, with occasional questionable identifications of a few genera or more rarely still of species. The purely preliminary status of such investigations is readily inferred by those familiar with the fields of bacteriology, immunity and protozoology. Valid conclusions here can rest only upon a knowledge of the fauna which extends to an accurate determination of the species concerned and of their feeding habits or symbiotic relationships to the bacterial flora, which may be even more subtle than the gross phase of food relations.

One naturally recalls in this connection the