

geophysical map is given, while in the seismic section only two or three examples appear.

Nevertheless, the petroleum technologist who is interested should derive much benefit from the book, for the mathematical treatments are usually preceded by a section devoted on the physical

principles involved, and the physicist should find it an easy introduction to the subject. Both, however, would find it necessary to supplement the volume with practical examples before the true purpose of the book was achieved.

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MODERN SURVEYING

(1) Plane and Geodetic Surveying for Engineers

By the late Prof. David Clark. (Text Books of Civil Engineering.) Vol. 1: Plane Surveying. Third Edition, revised and enlarged by James Clendinning. Pp. xvi+620. (London: Constable & Co., Ltd., 1940.) 27s. 6d. net.

(2) Engineering Surveys

By Harry Rubey, Prof. George Edward Lommel, and Prof. Marion Wesley Todd. (Engineering Science Series.) Revised edition. Pp. xv+322+142. (New York: The Macmillan Company, 1940.) 15s. net.

(3) Route Surveying

By Prof. George Wellington Pickels and Prof. Carroll Carson Wiley. Second edition. Pp. xv+427. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1939.) 21s. net.

(4) Introduction to Mine Surveying

By W. W. Staley. Pp. vii+276. (Stanford University, Calif.: Stanford University Press; London: Oxford University Press, 1940.) 21s. 6d. net.

IN a general text on surveying, as is pointed out by the author of one of these books, there is little room for originality except in treatment. Regarded as a branch of mathematics or as a conventional system of making, recording and plotting earth measurements, the subject is one which demands strict adherence to well-established rules. The improvements in instruments made possible by better designs and by increasing precision of manufacture whereby the degree of accuracy has risen from 1 in 5,000 to 1 in 30,000, cause changes to take place such as the substitution, in certain cases, of traversing for the more laborious method of triangulation.

(1) As an example of a text-book which has been maintained in close relation to modern tendencies, Clark's "Plane and Geodetic Surveying" may be cited. The third edition of vol. 1 deals with practically all the knowledge required of the average civil engineer and is distinguished by the clear terms in which instruments and methods have been described and explained. To bring it into line with recent developments the editor has added a chapter on linear measurements and has extended

the original section on traversing so that it is now represented by one dealing with field work and another with office computations. Other important additions include instruction on the theory of errors, on road transition curves and on the important aid to hydrographic surveying provided by the echo-sounding apparatus.

(2) "Engineering Surveys" deals in a more concise but equally clear way with the same general subject from the point of view of the present-day engineer. In the revised edition, the excellent Macmillan Mathematical Tables have been retained and one giving the average air correction for barometric levelling temperature has been added. Otherwise, changes made in the text are matters of detail introduced to ensure a practical up-to-date presentation of the subject eminently suitable either for instruction or for casual reference.

(3) "Route Surveying" is more limited in scope and deals with the essentials of railroad, highway and other route surveys as required for transmission lines, pipe lines, canals, drainage, etc. The major changes introduced include extensive new matter on circular curves and spirals and on the string-lining method as applied to the re-alignment of existing railroad curves. Although the spiral is usually regarded as complex and difficult, the presentation of it here from the point of view of change of curvature makes it appear but slightly more difficult than a simple curve, and the treatment is probably as complete as any so far available.

(4) In "Mine Surveying", another branch of the subject is presented. It is a new book devised to make good the deficiency of works on the subject and is largely based on a questionnaire sent to prominent companies in North America engaged in gold, silver, copper, lead and zinc mining. The author, from his own experience, has supplemented and organized the important information thus obtained as to present-day practice. As the reader is assumed to have a basic knowledge of plane surveying, the text is wholly devoted to the specialized methods and instruments devised for use in mines, and represents well-authenticated practice of the present day.