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Books on Petroleum Geology

Since the greatest developments in the oil industry, from its earliest days, have taken place in the U.S.A. it is not surprising that new books on petroleum geology are continually being published there.

This country now produces about 7 million barrels of oil per day, from over 150 major oil fields and an immense number of small fields. In order to keep production at this high level, approximately 45,000 wells are at present drilled every year. In consequence the majority of the 10,000 geologists of the U.S.A. are engaged in the oil industry. In addition, many tens of thousands of people are directly interested in petroleum geology. The annual demand for text books is therefore great indeed, not only as regards sufficient quantities of standard works, but also as regards publications communicating new information, new methods and new experience gained. Although it may be true that principles, fundamental methods applied in the search for oil, etc., do not change considerably in the course of a few years, and that, moreover, no substantial progress has been made recently in settling certain basic problems, such as, for example, the origin and migration of oil, it is nevertheless important to keep abreast of new theories brought forward, thus enabling the geologist continually to re-examine his viewpoints — as essential an element in the search for hydrocarbons as new tools and new techniques.

In view of these circumstances it is somewhat astonishing, at least for geologists who have not, in the first place, grown up involved in this petroleum era, that the new books on oil geology are not quite as comprehensive, thorough, selectively illustrated and carefully edited as might be expected. Several, fundamentally different reasons may be the cause of it.

Firstly, a large number of these books are primarily written for the requirements of students who will later be directly engaged in the oil industry. Consequently, only fundamental knowledge, essential methods, and some "ruling theories" are dealt with, combined with a description of typical American oil fields. There is neither room, time nor need for deeper penetration of the scientific problems involved.

Secondly, these text books are written by Americans mainly for Americans and are therefore designed for their own use in the first place. The vast U.S. includes such a great number of different types of oil fields, traps and reservoirs, and supplies almost everything in the way of geological background that there is no necessity to deal with the rest of the world. To keep up-to-date with their own progress and development is already almost an impossibility, and foreign sources of information are therefore inevitably neglected, although many ideas, methods, etc., of fundamental importance have undoubtedly originated in the Old World.

Another factor which may partly be responsible for somewhat cursory treatment of the subject is the incessant "drive" of the oil business, which forces the authors to try to keep pace with the developments, thus compelling them to complete their work in time. That their success is only partial is therefore a question of time available but may in part also be due to their haste to be first in the field in publishing new findings.

The reviewer thus finds himself in the somewhat awkward position of being unable to recommend any particular volume of the following text books as being the best one. It is, however, hoped that the reader will be able to make his own choice, based on the various reviews which outline the contents, qualities and deficiencies of a series of the latest text books (mainly American) on this subject.

Petroleum Geology
by
KENNETH K. LANDES

660 pp., 223 figs. Chapman & Hall Ltd., London; John Wiley & Sons, Inc., New York, 1951, \$ 10.00.

This volume is a very comprehensive and well up-to-date text book on petroleum geology. The first part (Techniques of the Petroleum Geologist) briefly describes surface and subsurface exploration, geophysical methods, drilling, sampling and mapping. Completing practices, reservoir pressures, development and reserves estimation are also treated.

The second part (Geologic Occurrence of Petroleum) devotes adequate space to principles and processes in the following chapters: Physical and chemical properties of oil and gas, origin and evolution, migration and accumulation. The last chapter gives considerable attention to the various kinds of traps in known fields and contains a large number of good illustrations.

The third part (Present and Future Oil Supplies) consists primarily of a fairly extensive description of the oil and gas fields of the U.S.A., followed by a chapter dealing with other oil regions. The concluding chapter discusses the known and possible reserves of the world.

References to the literature of the subject are given in the text, and an appendix covers the more recent and important publications on petroleum geology.

The book combines in a well-balanced way consideration of principles and theories with a practical approach to petroleum geology; it is more explicit regarding oil regions of the world than, for example, C. G. Lalicker's (1949) text book (see V. S. P. Bull., vol. 16, No. 51, pp. 34-35). The oil geologist or engineer interested in a more detailed description of subsurface matters may be referred to L. W. Le Roy (1950) "Subsurface Geologic Methods"; see V. S. P. Bull., vol. 17, No. 52, pp. 52-53, and vol. 18, No. 54, p. 32.

Principles of Petroleum Geology
by
WILLIAM L. RUSSELL

508 pp., 132 figs., 9 tables. McGraw-Hill Book Co., Inc., New York-Toronto-London, 1951; \$ 7.00.

This advanced and valuable text book covers, in its 29 chapters, approximately the same subjects as K. K. Landes' "Petroleum Geology". Its contents appear to be arranged in a somewhat peculiar way but this, according to the author, was determined by the necessity of placing first the information needed for the understanding of some of the later chapters.

The first two chapters are introductory; 3) Chemistry; 4) Physical properties of petroleum; 5) Oil field waters; 6) Methods of representing geological conditions (maps, sections, block diagrams etc.); 7) Structures; 8) Reservoir rocks; 9) Classification of traps; 10) Subsurface pressure; 11) Origin of petroleum; 12) Migration and accumulation; 13) Regional alterations; 14) Unconformities; 15) Depositional features; 16) Surface indications; 17) Salt domes; 18) to 21) Well logs and correlation; 22) Geochemistry; 23) & 24) Geophysical methods; 25) Development of oil

and gas fields; 26) Summary of methods of locating stratigraphic traps; 27) Search for oil in the Continental Shelf; 28) Exploration and appraisal of prospects; 29) The future of petroleum geology.

Discussion of the various principles and processes is generally thorough, with copious references to interesting examples from oil fields in North America, but without a regional description of the oil occurrences. The volume is for the most part well illustrated, although more numerous illustrations would have been helpful in certain sections of the book. References are given as footnotes, which renders a systematic search for the literature of the subject laborious. Except for the few shortcomings mentioned above, "Principles of Petroleum Geology" can be recommended as a reference book for oil geologists.

Petroleum Geology

by

E. N. TIRATSOO

449 pp., 122 text maps and diagrams, 8 pls., 2 folders. Methuen & Co. Ltd., London, 1951; 42 sh.

The first part of this English book, which will be of interest to both the geologist and the petroleum engineer, deals with the basic problems of the origin, migration and accumulation of petroleum (chapters 1 to 4).

In the second part the geological and geographical distribution of the world's oil fields and their structures and stratigraphy are described (chapter 5: World geography and geology of petroleum; chapter 6: U.S.S.R. and Europe; chapter 7: Asia and Africa; chapter 8: United States; chapter 9: Canada and Mexico; chapter 10: Caribbean and South America).

Although quite detailed information is given on some areas outside the U.S.A., the treatment lacks proportion, and the accompanying maps and sections appear to have been chosen at random rather than systematically, and thus hardly represent the typical features of an area. In the case of Venezuela, for instance, the second largest producing country in the world, only an inadequate map of Western Venezuela is given, and in the matter of Cretaceous production no reference is made in the text to the important fact that the prolific La Paz, Tetones (Mara) and Sibucara fields produce from limestone reservoirs. Furthermore, no mention is made of the important Bachaquero field, while Totumo is shown as an existing oil field, although it was actually closed-in many years ago and never attained any commercial significance (only 12 wells drilled). Other erroneous statements concern stratigraphy, etc.

The third part of the book (chapters 11 to 16) includes descriptions of surface indications of oil and surface oilfinding, while the remaining section covers sub-surface exploration (geophysics, methods and means of well surveying, sampling, drilling mud, correlation, etc.). Parts of these paragraphs are too generalized to be of great help to the student.

The book, which was primarily written for the needs of Honours Students of the Royal School of Mines, contains much valuable information and a series of good illustrations. It is felt, however, that its scope was made too wide by incorporating in one concise volume three subjects as different as a) geologic occurrences of petroleum, b) discussion of individual oil fields, and c) subsurface geology, and that

the author fails by devoting too much space to matters of secondary importance, while other facts or processes are described in too cursory a manner.

Practical Oil Geology (6th ed.)

by

D O R S E Y H A G E R

589 pp., 227 figs., 78 tables. McGraw-Hill Book Co., Inc., New York—Toronto—London, 1951; \$ 7.50.

The fifth edition of this book, which appeared more than 10 years ago, has been substantially enlarged to form the present edition. New ideas and data have been incorporated without there having been, however, a corresponding thorough deletion of obsolete features.

The various chapters deal with the following subjects:

1) Origin and accumulation (incl. migration, reservoir rocks, porosity and permeability); 2) Chemical composition and physical constituents, commercial values; 3) Stratigraphy (Igneous and metamorphic rocks, description of various sediments, stratigraphic traps, palaeogeography etc.); Fossils and their uses; 5) Structural geology (Cratons, geosynclines and -anticlines, orogeny, structural traps, classification, etc.); 6) Discussion of oil and gas traps; 7) Search for new fields; 8) Geological field methods; 9) Geophysics; 10) to 13) Application of geology, factors in drilling and production, well logging; 14) Estimating oil recoveries; 15) and 16) Water and gas; 17) Oil shales; 18) The geologist's position; 19) Appendix (A series of tables on rocks, formations, conversion factors, trigonometry etc.); 20) List of books on oil and general geology.

"Practical Oil Geology", which seems to be a rather widely used handbook, is primarily for the layman. The professional geologist will find the various subjects more comprehensively treated in such reference books as Landes' or Russell's "Petroleum Geology", in Lahee's "Field Geology" and in LeRoy's "Subsurface Geologic Methods".

How Oil is Found

by

W. A. V E R W I E B E

247 pp., 300 figs. Publ. by the author, Wichita, Kansas. Lithoprinted by Edwards Brothers, Inc., Ann Arbor, Michigan, U.S.A., 1951; \$ 8.50.

An abundantly illustrated, elementary introduction to principles, processes and problems of petroleum geology together with a brief description of the methods applied in the search for oil and gas; for the layman and student.

Chapter I (Seepages point the way) gives a brief description of the world's important oil and gas seepages. Chapter II (The oil rocks) is mainly devoted to sedimentological questions. In chapter III (Time and place of rock formation) exo- and endodynamic problems are discussed and an outline of historical geology is given by means of a few typical areas. Chapter IV (That magic word structure) deals with structural and stratigraphical traps and introduces geological surface and

subsurface maps. The origin, composition, transformation, migration and accumulation of oil are discussed in chapters V, VI and VII (How oil is formed. How far does oil travel? Where does oil accumulate?) which are accompanied by a great number of illustrations showing examples of the various types of traps and oil fields, mainly from the U.S.A. Finally, chapter VIII is devoted to the methods used in oil finding, such as, for example, geophysical prospecting, etc. Well logging and its application, and the different types of logs, e. g. lithologic, electric and radioactivity logs, and their correlation, are also mentioned.

Peter Bitterli

Nachrichten

P D. Dr. Eduard Wenk wurde zum ordentlichen Professor für Mineralogie und Petrographie an der Universität Basel gewählt. Nach Abschluß seiner Studien in Basel unter Prof. Dr. M. Reinhard, dessen Nachfolger er nun ist, folgte er 1934 bis 1935 Prof. Baklund als Assistent nach Grönland und Schweden und bereiste von 1936 bis 1939 Java und Borneo als Erdölgeologe im Auftrage der Shell. Anschließend bis zur Besetzung Hollands arbeitete er dann an der Auswertung seiner Untersuchungsergebnisse am technischen Hauptsitz der Shell in Den Haag. Nach Basel zurückgekehrt, wurde er erster Assistent von Prof. Reinhard, habilitierte sich 1943 und erhielt 1947 einen ersten Lehrauftrag für spezielle Kapitel aus dem Gebiete der Mineralogie und Petrographie. Gemeinsam mit Prof. Reinhard verfaßte P. D. Dr. Wenk ein zusammenfassendes Werk über die Geologie von Nordborneo im Auftrage der Regierung von Britisch-Nordborneo und der Shell. Gutachten technisch-petrographischer Natur verschafften ihm 1950 kurze Aufenthalte im Belgischen Kongo und Spanien. Das Jahr 1951 brachte ihn wieder nach Grönland, wo er als Mitglied einer dänischen Expedition das Gebiet der Petermanns-Spitze untersuchte.

Im Namen des Vorstandes gratulieren wir Prof. Wenk zu der wohlverdienten Ehrung.

Prof. Dr. R. F. Rutsch, Bern, und Prof. Dr. L. Vonderschmidt, Basel, wurden als Experten in die «Technische Kommission für Erdölfragen» gewählt, welche sich zur Zeit im Auftrag der interessierten schweizerischen Kantone mit den Fragen der Erdölexploration in der Schweiz befaßt.

Prof. Dr. J. Cadisch, Bern, und Prof. Dr. J. Tercier, Fribourg, wurden vom Bundesrat als Delegierte für den 19. Internationalen Geologenkongreß in Algier (8.—15. September 1952) bezeichnet.

Prof. Dr. Arnold Heim, Zürich, kehrte im Mai aus Persien zurück. Die Leitung des geologischen Dienstes der Iran Oil Co. ist Dr. Aug. Gansser übertragen worden.

Prof. Dr. Aug. Lombard, Bruxelles, nahm als Geologe an der schweiz. Himalaya-Expedition teil.