

Book Reviews

The Search for Petroleum

Trek of the Oil Finders. A History of Exploration for Petroleum. EDGAR WESLEY OWEN. American Association of Petroleum Geologists, Tulsa, Okla., 1975. xvi, 1648 pp., illus. \$38. AAPG Memoir 6. Semicentennial Commemorative Volume.

This large book has been over ten years in preparation and contains a staggering amount of information. After introductory chapters on the early oil industry and the state of early European and American geologic theories, the book covers thinking about and activity in exploration around the globe at 10- or 20-year intervals between 1860 and 1920. These 445 pages of early history are followed by 515 pages on activity in the United States and Canada after 1920. Exploration in Central and South America, the Middle East, Russia, Africa and the Far East, and Europe and the North Sea is covered in the next 600 pages. There is also a concluding chapter of philosophical reflections on the changing patterns in oil exploration and production. The book describes the changes through time in the geologic thought that has guided most of this exploration; it credits the men and organizations chiefly involved in both successes and failures; and it effectively shows the historical relationship between the need for petroleum, economics, governmental action, and the search itself.

Petroleum from surface seeps has been used by men for at least 5000 years. The Chinese developed drilling tools that could go to depths of 3000 feet more than 800 years ago, and Burma had 500 active oil wells before 1800. The modern oil industry began, however, with Colonel Drake's 1859 discovery at Oil Creek, Pennsylvania. All of the significant domestic discoveries that followed, for example, Spindletop and East Texas, Glenn Field in Oklahoma, Rangely in Colorado, Elk Hills in California, and Prudhoe Bay in Alaska, are treated in detail in the book.

Exploration for oil in foreign countries is given equal treatment. Contributions from authors other than Edgar Wes-

ley Owen help to make the book an international enterprise. The chapter on Latin America was written by J. Herbert Sawyer, who spent 50 years there, and the authors of the chapter on Africa include two Moroccans, four Frenchmen, a Swiss, a Canadian, and three Americans. In addition, representatives of British Petroleum and Iraq Petroleum made major contributions to chapters on the Middle East. Here is the background on giant field discoveries, such as Leduc reef in Canada, Golden Lane in Mexico, fabulous Lake Maracaibo in Venezuela, and the key fields in Iran, Saudi Arabia, Indonesia, Russia, and the North Sea. The unsuccessful searches are also reported, and they illustrate the frustrations and the risks in looking for petroleum.

Since oil and gas accumulate in sizable deposits only in ancient underground rock formations, geology has provided the principles often applied in searching for oil and gas. The application of geology by oil finders is traced historically from the use of basic ideas developed in England by James Hutton, Charles Lyell, and others, to the anticlinal or upward arch theory of accumulation that the American S. P. Hildreth used in 1836 to explain Pennsylvania seeps, to the use of stratigraphic or facies principles to locate wedge edges of porosity. The origin of contour maps to depict underground surfaces is discussed, as are various controversies over the hypotheses and assumptions involved in attempts to unravel the geologic history of rocks originally deposited millions of years ago and now buried miles below the surface.

The *Trek* also discusses the many surveying instruments used by geologists and other explorers, including the torsion balance and ground magnetometer (introduced in Hungary in the early 1900's), the refraction seismograph (Germany, 1920), the reflection seismograph (Texas, 1926), the electrical borehole log (France, 1927), and the aerial magnetometer (Pennsylvania, 1944), as well as surface electrical and geochemical surveying methods. The extensive contribution of paleontologists in determining rock correlations and depositional envi-

ronments by studying microscopically small fossils is covered, and their place in the oil finders' search is clarified. Although enough information about these tools and procedures is included to give the reader a feel for the activity and its place in the trek, detailed descriptions and illustrations must be sought elsewhere.

The roles of hundreds of oil finders are mentioned in the book, and their personal theories on exploration are added in many cases. Stories of their experiences, such as that of a geologist in Venezuela who had a Motilone Indian arrow penetrate a copy of *Reader's Digest* in his rear pocket and that of a survey of an Afghanistan desert that required a 21-day camel caravan, enliven the book. The original "wildcatters" were often on their own, but as the cost of exploring increased more and more oil finders came to work for organized companies. These companies, whether they are integrated majors or small independents, and whether they are owned by stockholders or by foreign governments, play an important part in the exploration process. The growth of most oil companies is due to their success in exploration, and many examples in the book make this clear.

The combined and often interactive effects of economic forces and governmental actions on past explorations are carefully documented. For example, crude oil brought 20 dollars a barrel before Colonel Drake's discovery, only 50 cents two years later. After the discovery of East Texas, the price of crude went as low as 10 cents a barrel, and the Texas Railroad Commission reacted with prorationing. Other governmental actions covered include renegotiation of foreign concessions and changes toward foreign government participation and nationalization.

There are numerous maps showing the location of the major fields under discussion. Tables showing production from these fields are also included, but the only photograph is of E. L. DeGolyer, to whom the book is dedicated, and the single cross section is of Swedish tar sands and dates back to 1740. Quotations, many from personal letters and footnotes, are used extensively and tend to make the people involved seem both real and alive. Each chapter has a set of references and the book contains three indexes: a subject index, a geographical index, and a proper-name index.

Because of its length and detail, few will want to read the book from cover to cover. Far better would be the selective reading of specific chapters or even sections of immediate interest. Many will

find it advantageous to start with the last chapter, "Summary and analysis," particularly those seriously concerned with divestiture or government exploration. People involved in any technical, management, or service phase of the oil business in a particular geographic area should find the coverage of that area of great interest. And anyone making a career of exploring for oil or gas should eventually read the entire book.

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Medical Matters in Antiquity

The Healing Hand. Man and Wound in the Ancient World. GUIDO MAJNO. Harvard University Press, Cambridge, Mass., 1975. xxvi, 572 pp., illus. \$25. A Commonwealth Fund Book.

In this book Guido Majno, professor of pathology at the University of Massachusetts, has accomplished an important task. Begun as a historical preface to a monograph on inflammation a decade ago, the book has grown into a history of wound treatment in the ancient civilizations of Mesopotamia, Egypt, China, India, Greece, and Rome and among the early Arabs. Wounds lead to surgery and to other medical practices, as well as to concern with healing and infections, so that what may appear to be a relatively restricted subject is in fact so broad that at times Majno has difficulty in confining himself.

A "prelude" giving a short discussion of wounds, wound healing, and inflammation sets the tone for the book. The author is at heart an enthusiastic teacher, always taking sufficient space to describe basic biological principles, explanation of which is especially helpful for the non-medical reader. He gives the impression that his studies have greatly enriched his own work and life and he now wishes to share his knowledge, and his joy in it.

It is with the Egyptians that Majno waxes particularly enthusiastic, writing a chapter of 71 pages in which he delves into medical practices as well as the deciphering of hieroglyphs. In this chapter, as elsewhere, Majno attempts to provide an interesting perspective on ancient practices by submitting them to 20th-century scientific scrutiny. Honey, he shows, will not support bacterial growth and is, in fact, mildly antibiotic as measured by modern laboratory methods. Thus the use of honey as constituent of wound dressings did make some sense.

Similarly, the copper in blue eye make-up inhibits bacterial growth. The problems these and similar examples present for the historian, however, are not as simply solved as Majno would have us believe. To show mild antibiotic activity is not yet to prove that Egyptian physicians drew the same conclusion. In fact, there is in this book a tendency to assess early ideas and practices in terms of good and bad, of truth and error; hence on occasion this is history "as if," if only the ancients knew what we know today.

The Smith papyrus, Majno shows, is really a treatise on wounds, not a surgical one in the strict sense, for the knife is not used. In the Ebers papyrus there is an early statement about pus in wounds, making it one possible source for the later doctrine of laudable pus, the idea that good healing progresses only in the presence of a thick, white pus formation. A question of interpretation here is crucial: Majno maintains that the statement about a rotting wound may be "under-

stood to mean that some pus is desirable as long as it is not excessive." If one were to insert "acceptable" for "desirable" the argument that this is "laudable pus" becomes blurred, it seems to me.

The relatively short chapter on Arabic wound healing is mostly given over to the uses of gums, resins, balsams, and aromatic compounds. Spices and wines were also used, and the author does convince us that "the jump from spices to wounds to wine is not as long as it may seem." What is missing, however, is a bit more about the social and cultural context in which wounds occurred and in which they were treated. The Chinese, Indian, and Greek chapters suffer less from this defect, and I suppose it is unfair now to criticize Majno for not having written a still larger book.

There are really four chapters dealing with Greek surgery, if one includes those on Alexandria and Rome and the final chapter on Galen. The Hippocratic collection, Majno maintains, is at its best in matters surgical. Much of the daily practice of the *iatreion* was surgical, and hence we have come to use "the surgery" for the doctor's place of work. One should not forget, however, that both diet and drugs were probably used more frequently in therapeutic regimens than was surgery.

There are many photographs, illustrations, and diagrams in this book, greatly enhancing its value as a source for learning about ancient medicine and surgery. Many of Majno's interpretations depend upon translation and derivation of words, matters to which he pays a great deal of attention. I cannot help wondering what will happen when the sinologists, Egyptologists, and other scholars begin to look closely at this aspect of Majno's work.

As a historian of medicine I am concerned when I see Charles Daremberg favorably quoted regarding the Greeks: "They tried to explain nature while shutting their eyes." Much of Majno's own achievement is to show that this interpretation is no longer acceptable. Nor am I heartened to see him say of Galen, "He is still in disgrace." It is those of us who view Galenic medicine in this light, I am afraid, who should be in disgrace.

All this is not to say that Majno's accomplishment is not an impressive one indeed. Not since Henry Sigerist's two volumes of *A History of Medicine* have we seen such a large-scale discussion of ancient medicine. Majno understood the risks when he began, and I applaud him for seeing it through. He has given us a provocative, well-written book and has



Nose bandage from Greek antiquity. "Boxing had degenerated by 400 B.C. [It] was taken over by huge brutes [who] wore . . . sharp, cutting gloves." The physician (*iatreion*) treating a boxer with a nose or ear injury would "not bother to examine the rest of the body . . . Greek boxers . . . aimed only at the head." Concerning this type of bandage a Hippocratic author wrote, "Those who practice dexterity without judgement look forward to meeting a case of fractured nose, that they may apply the bandage. For a day or two, then, the physician glories in his performance, and the patient . . . is well pleased, but speedily . . . he complains of the incumbrance." [Reproduced in *The Healing Hand* from Guido Guidi's *De chirurgia*, courtesy of Biblioteca Nazionale Braidense, Milan]