

Using physics to find oil, minerals, military targets

Geophysics in the Affairs of Man

C. C. Bates, T. F. Gaskell, R. B. Rice

492 pp. Pergamon, New York, 1982. \$60.00 cloth, \$25.00 paper

Reviewed by Ralph D. Bennett

The subtitle of this book is *A Personalized History of Exploration Geophysics and its Allied Sciences, Seismology and Oceanography*. Indeed, in addition to providing an encyclopedia, and highly readable, coverage of earth physics, the book cites key accomplishments contributed by many of the more than two thousand men and women who have been active in the field within the United Kingdom, Canada and the United States. This story acquaints the reader with how physics has been brought to bear on the search for oil, natural gas and metallic minerals. It also deals with searches for military targets—heavy artillery, submarines, undersea mines and lost hydrogen bombs. It describes the creation of the technology required to verify adherence to underground nuclear test ban treaties.

After touching lightly on accomplishments before the 20th century, the narrative reviews in increasing detail progress from World War I to the present. W. Lawrence Bragg headed the British effort to locate enemy artillery by geophysical methods. After the war, some of his collaborators in the US, led by William P. Haseman, mapped areas of Oklahoma by seismic methods. Although their first effort failed financially, by 1926 refraction seismograph crews were finding new oil fields in coastal Louisiana and Texas at remarkably low costs.

These successes led to the founding of the new petroleum geophysics industry, which in 1980 spent over three billion dollars in the continuing worldwide search for new energy deposits. The primary sensors were seismic, gravitational, magnetic and electrical. The measurements are supplemented by very sophisticated data processing that makes exploration geophysics one of the largest users of computer time.

In its longest chapter the book, turning to geophysics as a business, de-

scribes the varying degrees of success geophysical firms have had. Of particular interest is the multinational conglomerate Texas Instruments.

The closing chapter, "Geophysics As They Saw It," records the reflections of two score participants in the business. Among them are writings of Sir Harold Jeffries, Maurice Ewing, Frank Press and J. Tuzo Wilson. The presence of many pictures taken over the years enhances the personal character of the book. Unfortunately they are too small to make identification of individuals easy in group pictures.

This collection of facts, figures and personal adventures could have been assembled only by long-time, vigorous and widely acquainted participants in geophysics. Such are the authors. Thomas Gaskell is vice president of the Royal Astronomical Society, which publishes its own earth science journal. Charles Bates and Robert Rice have served as vice president and president, respectively, of the Society of Exploration Geophysics.

All in all, this book provides a lucid, enjoyable overview of governmental, academic and industrial geophysics and their intricate interactions.

* * *

Ralph D. Bennett was Technical Director of the US Naval Ordnance Lab and headed the Advisory Board of the US Naval Oceanographic Office.



Bank of Geotech helicorders, which provide real-time monitoring of worldwide earthquakes by the global seismology branch, US Geological Survey, at Golden, Colorado (photograph courtesy US Geological Survey).

Modern Crystallography. Vol. 1. Symmetry of Crystals, Methods of Structural Crystallography

B. K. Vainshtein

399 pp. Springer, New York, 1981. \$47.50

Vol. 2. Structure of Crystals

B. K. Vainshtein, V. M. Fridkin, V. L. Indenbom

433 pp. Springer, New York, 1982. \$49.00

By the early 1950s x-ray crystallography had become firmly entrenched as a scientific discipline in its own right and as one of the more important research tools of chemists, physicists, biologists, materials scientists and others. Industry and technology used x-ray methods