

# Oil shale

R. C. Selley

*Oil Shale.* (Developments in Petroleum Science, 5.) Edited by Teh Fu Yen and George V. Chilingarian. Pp. xi+292. (Elsevier Scientific: Amsterdam, Oxford and New York, 1976.) Dfl.90; \$34.75.

OIL SHALE is a fine-grained organic-rich sedimentary rock which releases crude oil when heated. The industrial extraction of oil from shale began in Scotland in 1862, but at the present time the oil shale industry is moribund in the UK. (A review of British oil shales has been given in a recent paper published by the Department of Energy.)

Over much of the Western World the oil shale industry was important in the past, and will be so in the future, but is dormant at the present time. It is currently practised, however, in the USSR and China. One is reminded of the White Queen's rule: 'Jam tomorrow and jam yesterday-but never jam today' (Carroll, *Alice through the Looking Glass*, Macmillan, 1871).

The world's resources of oil shale may contain some  $30 \times 10^{18}$  barrels of oil, only 2% of which is available for present-day commercial exploitation. This figure is controlled by two factors: the price of crude oil and extraction technology.

The conventional method of extraction necessitates mining the shale and distilling off its oil by retorting above ground. Subsurface *in situ* retorting, aided by explosive fracturing and fluid injection, is still in the experimental stage. So too are biochemical extraction methods currently under investigation at the University of California.

Due to recent advances in organic geochemistry the composition and molecular structure of oil shale hydrocarbons are well known. Similarly the geographical distribution and the geological factors which control the formation of oil shales are well documented. All that is needed to revive the oil shale industry is either a further increase in the price of crude oil, or a major breakthrough in the technology of extracting oil from oil shales.

It is a cliché of our time to say that oil is too precious to burn. It should be used only as the foundation of the petrochemical industry, never as an energy resource. Nonetheless, if nuclear, geothermal or any of the other energy sources currently under review fail to supply the demand then oil shales may become very important.

*Oil Shale* provides a useful review

of current knowledge of many aspects of oil shales. The book consists of twelve chapters edited by T. F. Yen, Associate Professor in the Department of Chemical Engineering in the University of Southern California, and G. V. Chilingarian, Professor, His Imperial Majesty Shahanshah Arya Mehr Chair of Petroleum Engineering, in the same university.

It is true to say that the University of Southern California is the intellectual font of the book, providing a third of the sixteen contributing authors. The geological core of the book is undoubtedly the Green River oil shale, which, according to the index, is mentioned on 66 pages of the 266 pages of text.

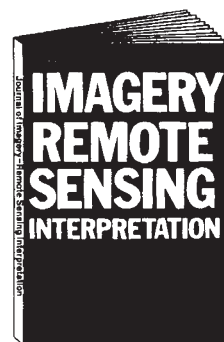
Nonetheless, the book covers the field well. It begins with a brief review of the topic. This is followed by an account of the geological setting of oil shales and their geographical distribution. The latter is displayed in a series of maps showing the distribution of oil shales during different geological periods. This could have been greatly improved had the data also been tabulated so that the reader could find the literature source for every oil shale located on the maps.

An account of the origin and formation of oil shale follows, and is succeeded by a chapter on the origin and characteristics of the Green River oil shale. This Tertiary lagoonal deposit covers large areas of the states of Colorado, Utah and Wyoming, and contains some  $80 \times 10^{12}$  barrels of oil (recoverable by existing technology), representing 15 years reserves of crude for the USA at the 1973 consumption level.

The following chapter, on the mineralogy of oil shales, in point of fact contains a fuller account of the geology, as well as the composition, of the Green River oil shales, than that which precedes it. Succeeding chapters review retorting technology, well-logging techniques, environmental implications (of course) and the history of oil shale research over the past 30 years.

Considered overall, therefore, this book provides an important and comprehensive corpus of up-to-date information on the geology, chemistry and extractive technology of oil shale, which will be of interest to geologists, chemical engineers, government officials and other assorted doom-watchers. In common with most books from this publisher its price of about £20 (at today's rate) puts it beyond the reach of everyone except pop stars and oil sheiks. □

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