

Book Reviews

The Future Supply of Nature-Made Petroleum and Gas: Technical Reports

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Reviewed by R. E. Folinsbee
Department of Geology
The University of Alberta
Edmonton, Alberta T6G 2E3

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A massive tome, of critical concern to all earth scientists engaged in petroleum exploration, centering on the world's energy predicament. The editing is excellent, the quality of the 63 papers variable. Publication is in offset form from clean 8½ x 11" typescript and the black and white illustrations are well drafted and of good size. It has taken the reviewer six months of off and on reading to digest the papers, and references given can lead one down many an interesting variant path. Opinion is heavily weighted against those earth scientists who foresee a continuing crisis in the petroleum and natural gas industry; no North wind blows. Many of the authors perceive a technological fix that will see us through the transition to new energy sources within 50-200 years when all acknowledge the dominance of petroleum and natural gas as convenient packagable sources of energy will cease.

One of the best balanced papers in the volume is that of H.D. Klemme of

Weeks Natural Resources, on world oil and gas reserves from analysis of giant fields and basins. Klemme holds that only one billion barrels (136 million metric tons) of oil equivalent reserves remain to be discovered - a figure two-thirds that arrived at in the 1975 World Petroleum Congress, one-half that of the U.S. National Academy of Sciences 1975 paper. This difference is of critical import to a world which consumed 21.5 billion barrels of oil (2936 metric tons) in 1976 and where consumption is increasing at a rate of at least 3.5 per cent per year (8.2 per cent in 1976). Adding published proved reserves of 550.9 billion barrels (74.5 billion tons) this conventional oil and gas resource will last for 24 to 37 years.

In a single chilling diagram Doscher of UCLA points out the limits on discovering new crude oil resources, using the mature West Texas - New Mexico Permian basin as an example. The first 14 per cent of the exploratory wells (1932-48) discovered 75 per cent of the total known oil (24 billion barrels). The remaining 86 per cent of the exploratory wells (1949 to the present) have led to gambler's ruin for many an explorationist. This reflects the 80-20 rule of Pareto's (Zipf's) law: "The significant items in a given group normally constitute a small portion of the total; the majority of items will be, in the aggregate, of minor significance". This same law governs the giant field approach to petroleum exploration.

Emery gives a sober analysis of the problems of producing oil from the deep sea and points out that drilling must precede speculation on the size of this resource.

On the other hand Seidl of IIASA (International Institute for Applied Systems Analysis) and Barnea of UNITAR (United Nations Institute for Training and Research) hold that oil and gas re-

sources are price sensitive and that the inevitable higher prices will greatly broaden the resource base. Barnea calls on pyramid power to overcome the limitations set by the Hubbert pimple governing a finite resource. Grossling of the USGS looks through his window on oil to the lesser developed countries, discerns an order of magnitude less drilling, and believes that the bridging of this drilling gap will unloose major supplies of as yet undiscovered oil.

There are noteworthy papers from the USSR and from the OPEC countries, particularly Arabia, which speak well for the increasing technical sophistication of this fertile crescent which contains most of the world's oil.

The summary by Meyer and Hocott gives one a good indication of the papers most likely to be of interest to any particular reader and leaves one with the impression that the future supply of nature-made petroleum and natural gas is secure, at least for our lifetimes. This impression the reviewer does not, intuitively, share. A good book, if not the Bible.

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