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SCIENCE

Circum-Pacific Energy and Mineral Resources

Before raw materials can be utilized, they must be found and the magnitude of the resources evaluated. These tasks are the function of economic geologists. When this particular clan gathers, formal speeches are not fully revealing. However, much additional information can be gleaned from private conversations. The recent Circum-Pacific Conference on Energy and Mineral Resources* in Honolulu provided an unusually good window on prospects for future supplies. Registrants included geologists from more than 50 countries.

On the agenda for the conference were many excellent papers. A significant phenomenon was the ubiquity of competent native geologists in countries throughout the Pacific rim. In an earlier period such competence was confined to the advanced countries, which were able to drive hard bargains in the exploitation of the world's resources.

The papers devoted to mineral resources indicated a vista of abundance. Both formally and informally, there were many reports of new discoveries and extensions of existing deposits. Optimism was partly based on the effectiveness of geochemical and geophysical tools. The concept of plate tectonics and the images obtained from the Earth Resources Technology Satellite have helped order and stimulate the thinking of economic geologists. They now know better where and how to look for minerals.

The picture with respect to energy was neither so clear nor so cheery. Some oil is being found off the coast of East Asia and in the vicinity of Indonesia. In the headwaters of the Amazon in eastern Peru there are substantial reserves of oil. The total quantities reported, while significant to the nations involved, are not great in comparison with current world consumption.

Many papers were devoted to geothermal energy. This was to be expected, for the circum-Pacific region has been picturesquely termed the Rim of Fire. Some indication of the possible magnitude of potentials was provided by D. Hadikusumo and L. Pardyanto of Indonesia. They pointed out that, in their country, there are many hundreds of volcanoes and hot springs. They estimated that, by the year 2000, Indonesia might be enjoying an installed capacity of 60,000 megawatts of electricity based on its geothermal resources.

Thus one had the impression of substantial energy potential. However, other papers indicated that there may be a long road between potential and fulfillment. Much or even most geothermal energy is associated with hot water heavily loaded with salts of various kinds. Some are corrosive; others clog pipes when the water is cooled.

A small sample of the problems to be encountered was provided by a description of results of drilling near the Hawaiian crater Kilauea, from which frequently emerges lava at a temperature of about 1200°C. The drill hole was pointed toward the predicted location of a hot pool of lava. In the first 490 meters, some of the temperatures encountered were lower than those at the surface. About 500 meters below the surface and 500 meters above sea level, the drill encountered rocks fully saturated with water having a salinity greater than that of seawater. The hole bottomed at 160 meters below sea level, and the maximum temperature noted was 137°C.

The world does not now face acute shortages of mineral resources. They are abundant, and techniques for exploitation are well developed. In contrast, energy resources are either limited or the techniques for using them are not established.—PHILIP H. ABELSON

* General chairman of the conference was Michel T. Halbouty of Houston, Texas. Selected papers from the conference are to be published in a memoir.