rium conditions (F. L. Peterson).—The success of injection operations depends primarily on injection capacity and fate of the injected waste. To evaluate these factors properly an understanding must be obtained of local hydrogeologic conditions, hydrodynamics of injection under Ghyben-Herzberg lens conditions, and possible chemical and biologic effects. Hawaiian hydrogeology is understood fairly well, and where adequate information is not available, it usually is possible to collect these data by careful field investigation. Considerable information is available from other parts of the world on the hydrodynamics of waste-water injection. However, much of this information is not directly applicable to injection in the Hawaiian environment. Particularly troublesome are the complications caused by the extreme heterogeneity of Hawaiian receiving formations and Ghyben-Herzberg lens effects. Likewise, because chemical and biologic reactions depend on the nature of the injected waste, the receiving waters, and the receiving formations, many of the data collected elsewhere are not applicable in Hawaii.

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HEAVY MINERAL SAND MINING IN AUSTRALIA

The history of the industry from its inception in 1934 at Byron Bay to the present-day projects at Eneabba is outlined. A brief description of the geologic environment and the exploration methods employed indicates how the commercial deposits are located and evaluated.

Mining methods and equipment used in the industry today including restoration of mined areas are discussed. General description of techniques and equipment used to separate the constituent minerals of the mine concentrate including transport, packaging of the finished products, and the quality control are given.

The unusual problems associated with mining in an area of high land-use demand are described as are those associated with establishing infrastructure in such remote areas as Eneabba. The contribution to the economy of the communities involved also is discussed.

The discussion of marketing includes the features associated with commodities of which Australia is practically the sole supplier (rutile and zircon), and the situation in which the competition is worldwide (ilmenite).

The many diverse uses of the products are discussed briefly as a background to the effects in the market on changing uses and changing demand.

The growing demand for the products, Australia's and the world's capacity to meet the demand, and the future of the industry are covered. The future of the individual minerals and their possible substitutes is discussed as a means of predicting the future of the heavy mineral sands industry in Australia.

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RECENT KNOWLEDGE OF HYDROCARBON POTENTIALS IN SEDIMENTARY BASINS OF INDONESIA

Although the search for hydrocarbons in Indonesia was initiated about eight decades ago, exploration work is still at a high level.

Recent studies have resulted in a new understanding of the prolific Tertiary sedimentary basins and, especially, knowledge concerning offshore sedimentary basins has been updated significantly. More important, however, is the current knowledge on the mechanism of basin formation which seems to enhance the validity and applicability of the new global tectonics to the geology of Indonesia.

The Tertiary sedimentary basins in western Indonesia previously have been described as "idiogeosynclines," situated around the periphery of a supposed landmass of pre-Tertiary age (the Sunda Shelf). Recent exploration surveys and subsequent drilling have shown that the southern part of the Sunda Shelf actually consists of many sedimentary basins and intervening uplifts. Major faults are common throughout the area and clearly control the distribution and shapes of the basins. Block faulting appears to have broken up the periphery of the Sunda Shelf at the beginning of Tertiary time. The chief crude-oil production in western Indonesia is from the regressive and deeper transgressive sand series of Oligocene-Miocene age, except in East Kalimantan where producing zones range from Eocene to Pliocene age.

Prospects have changed considerably since oil and gas in economic amount have been proved within the interbedded limestone formation of Tertiary age and additional reserves are anticipated within stratigraphic traps.

Oil and gas discoveries within deltaic sandstones, notably in East Kalimantan, have upgraded significantly the onshore and offshore potentials of the area. Carbonate rocks are becoming a prime objective in the search for oil, especially in the East Java-Madura basinal area.

Although eastern Indonesia was chiefly the site of late Paleozoic and Mesozoic sedimentation, oil has been proved only within the strata of Tertiary age, notably in the Salawati basin. Of particular importance was the recognition of the tremendous potential that reefs, and in particular Tertiary reefs, possess as hydrocarbon reservoirs. A similar basin and environmental model is anticipated for the Bintuni basin.

Scientific cruises within the last five years have indicated the presence of several potential basinal areas between the Sunda Shelf and the Sahul Shelf.

The sedimentary basins in Indonesia can be classified into grabenlike basins, present foreland basins, and basins which are in front of the present magmatic arc.

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GROUNDWATER POTENTIAL OF AREAS UNDERLAIN BY VOLCANICLASTIC ROCKS—EXAMPLES FROM INDONESIA

Many areas in Java, Indonesia, underlain by subrecent to recent volcaniclastic rocks support a dense population (more than 1,000 persons per sq km) and contain large reserves of groundwater. Three areas are typical: Yogyakarta in central Java, Bandung in west Java, and Nganjuk-Kertosono in east Java. The volcanic material is mostly of andesitic composition.

The Yogyakarta area is underlain by about 100 m of ash, sand, gravel, and coarser aggregate from the continuously active volcano Merapi. In the Bandung area, lavas and breccias from the ancient Sunda volcano are overlain by about 120 m of lahar from the volcano