

export, growth was rapid and profitable, but more recently has been affected adversely by reevaluation of currencies, industrial troubles, and developing competition for markets from Brazil, South Africa, and India.

The future will have to contend with the problems mentioned, also with the threat of a fuel crisis affecting shipping and, in the long term, the high phosphorus content of some of the ore. With huge reserves available, the demand for this iron ore will continue and some of the present problems will be solved.

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DEVELOPING BASALTIC ISLAND WATER SUPPLY—DIKE COMPLEX AND BASAL LENS

Rainfall, the primary source of water resources of basaltic islands such as Hawaii, is distributed contrastingly between low and elevated areas. Typically, in mountain areas rainfall averages 200 to 300 in. a year, whereas in coastal areas rainfall averages only 20 to 30 in. a year. In spite of the prolific rainfall in mountain areas, direct runoff in some watersheds amounts to as little as 20% of rainfall. A permeable basaltic rock terrane accounts for the great absorption of rainfall and the consequent creation of large bodies of groundwater in basaltic rocks. High-level groundwater bodies, present at elevations of as much as 1,000 ft in volcanic-dike complexes of wet mountain areas, are called dike water. Unseen below the surface, groundwater presumably moves from these high-level bodies into even greater and more extensive bodies of groundwater standing basally a few feet to several tens of feet above sea level as buoyant bodies of fresh water on salt water. Salt water saturates the island at depth. The problems of developing dike-complex water supplies relate primarily to hydrologic yield and utilization of natural storage, but the problems of developing basal-lens supplies involve the added constraint of the quality of water produced under pumping conditions. Infiltration tunnels, Maui-type shafts, and drilled wells are utilized in developing dike-complex and basal-lens water supplies. The method of development chosen depends upon the hydrology of the area, water supply design requirements, and economics.

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IRON ORES, COAL, AND STEEL PRODUCTION IN NEW ZEALAND

The present status of knowledge of iron ore and coal deposits in New Zealand is discussed with emphasis on titaniferous iron-sand ore and subbituminous coal. Development of steel production, first from scrap steel and subsequently from titaniferous iron sand, is described in relation to local logistic factors, market requirements, and development of production technology to suit local raw material characteristics. Possible future trends in production, marketing, and technology, and possible applications of the technology in other Pacific countries are mentioned briefly.

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KAPUNI AND MAUI GAS-CONDENSATE FIELDS OF NEW ZEALAND

The onshore Kapuni and offshore Maui gas-condensate fields containing New Zealand's only hydrocarbon reserves are in the Taranaki basin in the west of the North Island. Kapuni, discovered in 1959, first produced in May 1970. Maui, discovered in 1969 in 360 ft of water 25 mi offshore, is not due to produce until October 1978. Production from both fields is from Eocene sandstone reservoirs within the Kapuni Formation which was deposited between Late Cretaceous and Early Oligocene time in a widespread coastal plain and fluvio-marine environment.

The original recoverable reserves of the 4-well Kapuni field, which produces from below 11,300 ft, are estimated at 460 million million BTU of dry gas (630 Bcf at 730 BTU/cu ft) and 34 million bbl of condensate. Production averaged 46.3 MMCFGD (carbon dioxide content 43%) and 3,500 b/d of condensate in 1973.

With the additional wells to be drilled in 1974, the maximum deliverability reserves will increase to 260 MMCFGD and 18,000 b/d of condensate so that 108.7 million million BTU (about 24% of the original reserves and two thirds of the production) can be supplied as raw gas, with its original carbon dioxide content, to the New Plymouth power station during 1975-1978.

The reserves of the Maui field are estimated at 5,730 million million BTU of dry gas (5,590 Bcf at 1,025 BTU/cu ft) with 161 million bbl of condensate and 41 million bbl of recoverable LPG. Two platforms will be constructed 23 and 33 mi offshore. Processing facilities will handle a throughput of 750 MMCFGD and 20,000 b/d of condensate. The gas will fuel over 3,000 megawatts of generating capacity in North Island power stations.

Kapuni raw gas, without condensate, is sold at the field by Shell, BP, and Todd for NZ 17.5 cents/million BTU. The Natural Gas Corp. will remove carbon dioxide and distribute in the North Island. Maui gas will be sold at NZ 37 cents/million BTU delivered at the power stations. Development of the Maui field and associated processing and distribution facilities will be undertaken jointly by the New Zealand Government (50%) and Shell, BP, and Todd.

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PETROLIFEROUS TAIWAN BASIN IN TECTONIC FRAMEWORK OF WESTERN PACIFIC OCEAN

In the western Pacific, the Ryukyu fold belt extends southward, parallel with the Taiwan Sinzi fold zone, across the downwarped Okinawa trough, and, at the north end of Taiwan, they merge into the Taiwan Central Range complex. From the Miocene to the late Pleistocene, orogeny in Taiwan was increasingly more intense, pushing westward and northward to fold and thrust the sediments in the Neogene basin toward the west. However, the tectonic influence was limited only to the onshore sediments of the island.

Within the Taiwan Sinzi fold zone along the edge of the continental shelf of the East China Sea, the Taiwan basin covers the Taiwan Strait, the western coastal