These holes showed a promising geothermal potential and a first program of seven to ten production drill holes was undertaken to obtain enough steam to install a geothermal power plant with an initial capacity of 25 or 50 M.W. The possibility of freshwater production from this field also has been considered.

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COAL RESOURCES OF CANADIAN CORDILLERA

The Canadian cordillera is estimated to contain 87 billion tons of coal categorized as measured, indicated, and inferred and all ranks of coal are represented. The most important coal deposits are within a narrow belt, not exceeding 35 mi in width, that extends along the extreme eastern edge of the cordillera from lat. 49°00′ northwestward for 600 mi to approximately lat. 56°00′.

The coal-bearing formations are Late Jurassic-Early Cretaceous in age and have been subjected to severe tectonism so that the seams are inclined at all angles, folded, contorted, and displaced by faults, some of which involve lateral movements of up to 30 mi. Much of the coal in this belt is a high-quality metallurgical type and currently some 8 million tons of this type of coal are produced and shipped annually to Japan.

Other coal deposits are in widely distributed areas throughout the cordillera. They generally are confined to small areas, the more accessible of which mainly are mined out and the remainder have undergone little or no exploration. The coals range in age from Late Jurassic to Tertiary and vary in rank from lignitic to anthracitic but none are known to be of metallurgic quality. The more important of these deposits appear to be the Hat Creek coalfield of south-central British Columbia and the Groundhog coalfield of north-central British Columbia. The Hat Creek deposit is of Tertiary age and contains at least five lignitic seams having a total aggregate thickness in excess of 2,000 ft. The Groundhog coalfield contains low-volatile bituminous and anthracitic coal of Late Jurassic-Early Cretaceous age. Limited exploration of the southern part has shown it to be structurally complex and the coal is generally high in ash. The northern part is believed to be disturbed and seems to offer better opportunity for exploration of which there is none to date. No significant coal deposits are known in the immediate coastal area of the cordillera.

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OCCURRENCE AND DEVELOPMENT OF SEDIMENTARY MANGANESE ORE, GROOTE EYLANDT, NORTHERN AUSTRALIA

One of the world's major deposits of high-grade sedimentary manganese ore is on Groote Eylandt in the western section of the Gulf of Carpentaria in northern Australia.

Production and marketing of the ore commenced in 1966 after establishment of mining and treatment equipment together with ancillary facilities such as housing, roads, port facilities, water, and power supply. Subsequently further detailed exploration, development, and metallurgical work resulted in the construction of a comprehensive ore-treatment and beneficiation plant and additional handling facilities.

Current production capacity is of the order of 1.25 million tons of manganese ore per annum, of which 80% is exported. A new expansion program will provide for a production capacity of the order of 2 million tons per annum by the end of 1975, and bring the total capital expenditure on the developments to approximately $65 million.

The manganese ore is a tabular bed approximately of 13 sq mi. It crops out adjacent to the western coastline of Groote Eylandt, and is covered by soft Tertiary and recent sediments.

The ore exhibits varied physical characteristics ranging from fine loose powdery material to unconsolidated oolites and pisolites and to massive laterite and cemented boulders of pisolites. It ranges in thickness from 0.5 to over 15 m, and is present over a 45-m stratigraphic interval of sediments.

Marine arenaceous Foraminifera of Early Cretaceous age have been identified from within the ore zone and no apparent tectonic deformation of the zone has occurred.

The deposit has the appearance of having been formed under shallow-water conditions, being associated with typical shallow-water sediments including unconsolidated clays and sands containing typical shallow-marine (inner sublittoral) faunal assemblages.

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IRON ORE DEPOSITS OF WESTERN AUSTRALIA—GEOLOGY AND DEVELOPMENT

Although iron ore deposits were recorded in Western Australia as early as 1888, not until 1960 were the economic and political conditions conducive to assessment of their potential. Since that time, regional geologic mapping and intensive local evaluation have increased the total reserves from 275 to 24,000 million tons of ore containing 55% or more iron. This ore is of three main types: hematite enrichment, pisolitic limonite, and sedimentary ores. These contribute to production in the approximate porportions 20:2:1, whereas the equivalent proportions for reserves are 200:70:1.

Hematite enrichment ore formed by selective replacement by hematite, probably during Proterozoic time, of a banded iron-formation (BIF) host. Although such ore bodies are widespread in Archean (>2,500 m.y.) BIFs of the Yilgarn and Pilbara blocks, the largest ore bodies, exceeding 1 billion tons, are in the lower Proterozoic (*c.*2,000 m.y.) BIFs of the Hamersley iron province. Ore bodies of this type show stratigraphic and structural control. The ore is hematite with a variable admixture of late goethite. Pisolitic limonite ore, which forms sheets capping elongate sinuous mesas along rivers draining the Hamersley iron province, was formed during the Tertiary in the flat beds of a sluggish paleodrainage system which is closely paralleled by present drainage lines. Sedimentary iron ore is represented by concentrations of supposedly clastic hematite within folded Proterozoic (1,800 m.y.) sediments of the Yampi Sound area.

With a good overseas market available in Japan, export of ore commenced in 1966 and has risen rapidly to 73 million tons in 1973. In the earlier years of