ching and initial fault-controlled subsidence commenced during early-middle Eocene time (or perhaps earlier), and had ceased by early Miocene time. Since middle Miocene time, there has been thermally-controlled subsidence due to conductive cooling of the lithosphere, and post-lower Miocene sediments have been deposited across the basin with little or no internal deformation.

Assuming the pre-stretched thickness of the crust to be 22 mi (35 km), the thickness of the crust in the Makassar basin is about 12 mi (19 km) at the basin margin, and it decreases to about 9 mi (15 km) in the abyssal plain. Evaluation of the degree of hydrocarbon maturation indicates that the pre-lower Miocene sediments have reached sufficient temperatures for hydrocarbon generation, assuming an initial heat flow of 1.6 HFU with crustal contribution of 0.8 HFU, and thermal conductivity of 5×10^{-3} cal/cm.s.°C.

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Energy Requirements of South Pacific and the Role of Renewables

(No abstract)

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Assessment of Reservoir Potential of Bali Geothermal Field, Indonesia

A large volume, two-phase reservoir, with a capacity of about 19 mi^3 (80 km^3), underlies the Donau (lake) Bratan Caldera on the island of Bali. Recent resistivity modeling indicates that the reservoir is at a depth of about 3,300 ft (1,000 m). If the reservoir rock porosity is assumed to be 8%, the saturation to be 32.5% and the temperature to be 245°C, the total energy stored in the reservoir is about 2×10^{12} MJ. This means that a promising geothermal field awaits development on Bali.

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Rio Zulia Field, Colombia

The Rio Zulia field in northeastern Colombia lies within the southernmost part of the oil-rich Maracaibo basin. The field measures 3.4 by 0.9 mi (5.5 by 1.5 km) and is located on a faulted anticline whose southeastern flank is cut by an east-directed thrust fault. Cumulative production during the 20 years since Chevron discovered it in March 1962 is 125 million bbl. The oil is brown, paraffinic, and has a gravity of 41.5° API. Maximum production of 35,000 BOPD was reached in 1966; present production is about 4,000 BOPD.

Almost all the production has come from the Eocene Mirador Formation, a loosely consolidated fine to coarse-grained, noncalcareous sandstone with irregularly distributed clay and siltstone interbeds. The sandstone is part of the Eocene delta built out to the northeast over the Lake Maracaibo region. The Mirador of the Rio Zulia area belongs to the back-delta fluvial system.

STEPHENS, J., and P. SMITH, U.S. BORAX, Spokane, Washington

Quartz Hill, Alaska

The Quartz Hill molybdenum deposit, located 44 mi (70 km) east of Ketchikan, Alaska, contains one of the world's largest concentrations of molybdenite. It is related to a Miocene intrusive complex referred to as the Quartz Hill stock. This deposit was discovered in 1974 by U.S. BORAX geologists as a result of a comprehensive reconnaissance geochemical rock and stream sediment sampling program designed to explore the western margin of the Coast Range batholithic complex on the mainland portion of southeastern Alaska.

The country rocks of the area, orthogneisses and paragneisses, are intruded by the Quartz Hill stock which represents at least five phases of igneous activity. The main rock type within the Quartz Hill stock is a quartz monzonite which has been intruded by steeply dipping bodies of porphyritic quartz latite, and late quartz monzonite. These rocks are chemically and mineralogically similar and consist of quartz, K-feldspar, sodic plagioclase, and minor biotite, with many of the textures suggesting isothermal "quench" textures. These intrusive felsic rocks have been subsequently intruded by regional dikes of felsic and intermediate composition.

The Quartz Hill orebody occurs entirely within the Quartz Hill composite stock. The orebody forms a large, tabular to slightly convex downward shape and is at or near the surface. Molybdenite is the only mineral of economic importance. The ore body is approximately 9,200 ft (2,800 m) long by 4,900 ft (1,500 m) wide and extends from the surface to a depth of 1,215 to 1,640 ft (370 to 500 m). Reserve calculations have projected approximately 2.5 billion tons grading 0.125% MoS_2.

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A Comparison of Gold Mineralization at Jerritt Canyon, Nevada, with Other Disseminated Gold Deposits of Basin and Range Province

The discovery of the gold deposits in the Jerritt Canyon area, containing in excesses of 2.25 million oz (70 million g) of recoverable gold, is one of the most significant precious metal developments in the last decade. The Bell Mine at Jerritt Canyon began production on July 4, 1981, and is currently producing in excess of 193,000 oz (6 million g) of gold per year from ore with an average grade of 0.24 oz per MT (7.4 g per MT).

Disseminated sub-micron gold is hosted within oxidized and unoxidized portions of Upper Ordovician and Lower Silurian limestones, dolomites, and calcarenites that have been locally extensively silicified and subjected to low pH hydrous alteration. Hydrocarbons have been locally remobilized and oxidized and may have played an important role in gold precipitation. Structural control of mineralization is manifested by the location of higher grade gold along northeasterly trending normal faults at the intersection of favorable host lithologies.

Jerritt Canyon is the most recently developed of a group of similar deposits within the Basin and Range province that collectively contain recoverable reserves in excesses of 16 million oz (500 million g) of gold. Similarities and differences between Jerritt Canyon and the other deposits are reviewed in terms of geologic setting, geochemistry, host-rock characteristics, structural controls, and ore reserves.

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Indonesia's Role in World Energy Markets in the 80s

Recent trends in consumption showed that world demand for petroleum peaked in 1979-80. However, as industrialized nations emerge from the current economic recession, and as

development continues in the developing and underdeveloped countries, a resumption in the demand pattern is likely. This economic growth will need increasing amounts of energy over the remainder of this decade and the majority of that requirement will be met by oil and gas, although other forms of energy will have more rapid growth. Despite the current "oversupply" condition, exploration and development expenditures have continued to grow and have been rewarded by additional discoveries such as in Mexico, the North Sea, offshore Indonesia and North America.

In Indonesia, exploration and development expenditures are at an all-time high and the success ratio is considered above average; secondary recovery projects are underway; production of oil is again on the increase after a slight falling off since 1978. However, the rate of growth of domestic requirement for oil is tapering off as higher selling prices have been fixed and as diversification to other forms of energy have shown positive results.

Indonesia will continue to be an oil and gas exporter throughout the 1980s, but not in significant quantities relative to total world requirements. In the Pacific Basin, however, Indonesia is the leading exporter and is likely to continue in that capacity. As a member of ASEAN, Indonesia has been especially responsive to the needs of the other member countries.

Indonesia's contribution to the development of modern oil industry practives have also been meaningful. The production sharing concept, which was pioneered in Indonesia, was later adopted by many other host countries. This form of contract established the basis for cooperation and trust between the parties.

Having oil and gas resources is both an opportunity and a responsibility. Indonesia intends to make the most of the opportunity by exporting as much oil and gas as possible, but only in a responsible way by providing a steady and reliable source of supply to its neighbors in the Pacific Basin region.

SYMONDS, PHILIP A., Bur. Mineral Resources, Canberra, A.C.T., Australia, and JURGEN FRITSCH and HANS-ULRICH SCHLUTER, Bundesanstalt fur Geowissenschaften und Rohstoffe, Hannover, Federal Republic of Germany

Continental Margin Around Western Coral Sea Basin: Structural Elements, Seismic Sequences, and Petroleum Geological Aspects

Surveys across the western Coral Sea Basin during 1978 and 1980-81 by the Federal Institute for Geosciences and Natural Resources, F.R. Germany, in cooperation with the Australian Bureau of Mineral Resources, have provided new information on the change from continental to oceanic crust in this area.

The opposing margins of the Queensland and Papuan Plateaus are underlain by part of a complex rift zone which would have been up to 50 mi (80 km) wide prior to continental break up. Marginal or "outer" basement highs, which appear to have low angle contacts with the oceanic crust, occur in the oceanward part of the rift zone on both sides of the Coral Sea Basin. Similar highs also occur beneath the lower slope of the Eastern Plateau and within the northern Queensland Trough and the Osprey Embayment. The origin of these highs—listrically faulted and rotated continental blocks, late-stage uplifts of pre-rift rocks, or massive accumulations of volcanic rocks—and its consequences for the deposition and nature of the rift phase sediments are discussed.

The northern Queensland Trough and the western margin of the Eastern Plateau are considered to have the best petroleum potential in the region, in that they are underlain by grabens containing up to 3.1 mi (5 km) of sediments, part of which may be a Mesozoic deltaic sequence similar to that intersected in the Anchor Cay 1 well, or a deeper water equivalent. As these depocenters generally lie in water depths greater than 6,500 ft (2,000 m), they can probably only be considered as long-term prospects. Gently folded ?Mesozoic sediments beneath the eastern margin of the Eastern Plateau, in water depths of just over 4,900 ft (1,500 m), may also have some petroleum potential.

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Impact of Agricultural Renewables on China's Energy Supplies

China has depended upon agricultural materials as sources of energy for many years. These sources, together with wind power, water power, and solar energy, have formed a self-sufficient energy system in the countryside.

Accompanying the progress is agricultural modernization, petroleum products and artificial fertilizers have become increasingly important agricultural inputs. Simultaneous soil depletion and losses, due to the burning off of crop residuals, have become so serious that the energy equilibrium is threatened. Therefore, a new system must be established through the application of new technology. Improvement in household furnaces, development of more efficient biogas and solar energy facilities, expansion of fuel forests, and advances in wind and water power utilization (including small hydroelectric plants) are all measures of supreme importance. Integration of these various energy resources, with one supplementing the other, will provide optimum results and ultimately alleviate the country's dependency upon commercial energy supplies. This is one of the most urgent problems facing Chinese agricultural engineers today.

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Subduction of Woodlark Spreading System at Solomon Island Arc

The initial results of a marine program sponsored by Australia, New Zealand, the United States, and CCOP/SOPAC to investigate the subduction of the Woodlark spreading system beneath the Solomon island arc can be reported. This unusual tectonic situation provides (a) a controlled experiment in which the roles of subducted oceanic crust and sediments in island arc petrogenesis can be assessed, and (b) an opportunity for determining the relation between the thermal structure of the subducted oceanic lithosphere and the thermal regime of the island arc/back arc. Station work during the 24-day cruise included dredging, coring, and digital heat flow measurements.

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The Last 200 Million Years in Eastern Asia: Yanshanian Subduction and Post-Yanshanian Extension

The pre-Yanshanian (pre-200 m.y.B.P.) geology of Asia can be interpreted as an unique record of numerous small plates, some of which were separate rifted blocks as early as 1,500 m.y.B.P. The north-south agglomeration of these blocks to form the bulk of modern Asia began in the west during the Carboniferous (Hercynian events) and climaxed in the east during