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.

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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

the Late Triassic (Indosinian events). In the eastern part of the continent, four major east-trending sutures (Red River, Qin Ling, Yan Shan, and Mongol-Okhotsk) bound three major blocks (respectively, South China, North China-Korea, and Manchuria-Bureya).

The Yanshanian geology in eastern Asia, particularly the widespread belts of calc-alkaline igneous rocks, can be interpreted as resulting from magmatism superposed above major peripheral subduction zones that dipped northwestward under South China and westward under North China-Korea and Central Mongolia from 200 to 100 m.y.B.P., and westward under North China-Korea (fronted by Southwest Honshu) and Manchuria-Bureya from 100 to 50 m.y.B.P. Some subduction also took place from 200 to 100 m.y.B.P., parallel to the Qin Ling, Yan Shan, and Mongol-Okhotsk sutures, as all finally closed. Hydrocarbon-rich basins formed as the result of major epeirogenic subsidence on western margins of the oldest continental nuclei, farthest from the eastern subduction zones. Rates of subsidence and subduction appear correlative; areas of magmatic arcs and volumes of sedimentary basins reflect subduction rates; both reach a maximum in the Late Jurassic and Early Cretaceous.

The post-Yanshanian (since 50 m.y.) geology in eastern Asia can be interpreted as resulting from northeast-southwest crustal extension in the region between the Siberian craton and the continental margin from Primorye to Taiwan, contemporaneously with collisions between Asia and the Okhotsk block in the northeast, the India block in the southwest, and the Philippine arc in the southeast. The extension is evidenced by hydrocarbon-rich Tertiary grabens, by voluminous Late Tertiary alkalic basalt volcanism localized along former plate sutures, and by historically recorded, scattered, intraplate, shallow seismicity.

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Tectonic Guidelines for Oil and Gas in the Circum-Pacific

(No abstract)

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Petroleum Potential of Southern Part of Tonga Platform

The Tonga platform is roughly outlined by the 2,000-m isobath with an average width of about 60 to 75 mi (100 to 120 km) surrounding the Tongan Islands of Vava'u, Ha'apal, and Tongatapu. Single-channel seismic profiles across the platform were acquired between 1977 and 1979 by scientific expeditions sponsored by CCOP/SOPAC (Committee for Cooperation of Joint Prospecting for Mineral Resources in South Pacific Offshore Areas) and ORSTOM (Office de la Recherche Scientific et Technique Outre Mer). This survey and a five-well drilling program on Tongatapu were inspired by the discovery of seeps of weathered crude oil from vuggy coralline limestone. Reef buildups and normal fault structures are interpreted from seismic data, and the wells penetrated Miocene and Eocene limestones, volcanogenic clastics, and some reached volcanic basement. Few oil and gas fields are found in fore-arc basins, of which the Tonga platform is typical, but the reefs offer prospects and the seeps suggest that the requirements of source rock and maturation may be satisfied.

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Preliminary Results of Leg 3 *Lee* Cruise—Basin Development and Resource Potential of Central Solomons Trough

A CCOP/SOPAC cruise funded by Australia, New Zealand, and the United States surveyed parts of the Solomon Islands region in May and June 1982, in order to assess the potential for petroleum accumulations and to identify geologic hazards. Work was concentrated in the central Solomons trough (the Slot) between the islands of Guadalcanal, Santa Ysabel, New Georgia, and Choiseul, where continuous multichannel, single channel, and high resolution seismic records were acquired together with magnetic and gravity profiles.

The Slot is underlain by a composite depositional basin that contains as much as 2.8 mi (4.5 km) of Cenozoic sediments. Despite its complex island-arc setting, submarine volcanoes, and 2,625 to 5,900 ft (800 to 1,800 m) water depths, the basin includes structural, stratigraphic, and possibly thermal elements that favor generation and entrapment of hydrocarbons.

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A Review of United States Active/Passive Solar Cooling Program for Building

(No abstract)

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New Gold-Silver-Copper Orebody at El Indio, Chile

In June 1975, a St. Joe Minerals Corp. geologist, Dave Thomson, visited a remote prospect called El Indio, 300 mi (500 km) north of Santiago, close to the Argentine frontier at 13,000 ft (4,000 m) elevation. He recognized the great potential and St. Joe moved promptly. However, an agreement to purchase 80% of the property was not signed until June 30, 1976. Intensive exploration and development followed. It took another year to negotiate a foreign investment agreement with the government of Chile.

On December 2, 1981, the El Indio mine-mill complex was dedicated. The total investment approximates U.S.$200 million and the facility will process 1,380 tons (1,250 MT) ore per day. Mill-feed ore reserves at the time of dedication were calculated at 3.1 million tons averaging 12 g gold, 144 g silver, and 3.5% copper. In addition, direct shipping high-grade ore reserves are estimated at 70,000 tons averaging 11 oz (345 g) of gold per ton. Similar material has been mined and shipped since 1979, containing in excess of 345,000 oz (10,750 kg) of gold. Our geological assessment is that continued exploration at El Indio will discover considerably more ore of both types.

The ore is found in a complex vein system within volcanic andesites, dacites, and quartz dacites within, but near the border