ical investigations have shown extensive faulting within this crustal block—some of which appears to have locally offset Holocene deposits. Most of the faults within the Salinian block in the Monterey Bay region occur in two major intersecting fault zones; the northward-trending Carmel Canyon fault zone, extending offshore from Point Sur (oriented N25°W), and the northwest-trending Monterey Bay fault zone, extending offshore from the town of Monterey (oriented N50°W). The Carmel Canyon fault zone appears to connect the Palo Colorado fault in the south with the San Gregorio fault in the north. The Monterey Bay fault zone appears to be the offshore continuation of the Sur-Nacimiento fault zone.

Epicenters of many recent earthquakes are concentrated at the intersection of the Carmel Canyon and Monterey Bay fault zones, in the central part of Monterey Bay. First-motion studies of 8 earthquakes indicate right-lateral strike-slip displacement on these offshore faults. The cessation of a 10-day period of rapid tectonic creep along the adjacent San Andreas fault in 1970 coincided with a 4.3-magnitude earthquake in the Monterey Bay fault zone. This, as well as first-motion studies of the earthquakes and mapping of the offshore faults and seismicity, suggests a direct coupling between the San Andreas fault and the adjacent fault zones.

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GEOLOGIC EFFECTS OF CITIES

Human activities in an industrial society are geologically significant in coastal cities because of the amounts of sediment and wastes moved and resulting topographic changes. Small streams are altered or destroyed, many becoming sewers. Large streams are dredged to accommodate ocean-going vessels and nearby river banks are bulkheaded. Shallow areas (including wetlands) are filled to provide space for city growth. Sewer, industrial, and sediment discharges are deposited in navigation channels which eventually require extensive dredging and waste disposal operations. The volume of wastes, and the sediment yield per unit area of the city, equals or exceeds the discharge of many rivers. Dams and public water-supply systems change river flows and dredging can change tidal regimes in the estuaries. Sand and gravel production and construction of groins, bulkheads, and other structures change ocean shorelines and disturb beach processes.

In the future, human activities will extend to the continental shelf where sand and gravel deposits will be exploited, offshore electrical power plants will be built, and port facilities will be constructed for deep-draft vessles requiring extensive dredging across the shelf. Even offshore airport centers have been proposed.

These urban processes and their geologic effects are well documented in the New York metropolitan region.

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PROBLEMS OF A NEW FRONTIER

It is becoming generally accepted that in the near future North America will be faced with a serious energy crisis. The Canadian Arctic will play a most important part in satisfying the Western Hemisphere's energy needs. A new frontier in exploration has opened. Because of its location and environment, it poses new problems. Some of the prevailing exploration methods do not work efficiently in this new environment. The costs of mobilization and demobilization and logistical support have mushroomed to staggering proportions. Inflationary trends have caused further cost increases.

The application of previously accepted geophysical exploration field methods in this high-cost area dictates concerted investigation into improved efficiency of field operations, use of highly portable accommodations, reduction of costs for expendable supplies, and the need for adequate time for preplanning of projects.

Several new approaches have been applied to these inherent problems, with varying degrees of success. New approaches in Arctic transportation, camp accommodations, and surface-energy sources are being developed, and must be considered in relation to today's mushrooming costs, while maintaining man's safety as a prime consideration.

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REPETITIVE CARBONATE-BANK DEVELOPMENT AND SUBSEQUENT TERRIGENOUS INUNDATION; CAMBRIAN CARRARA FORMATION, SOUTHERN GREAT BASIN

Three times during the deposition of the Lower and Middle Cambrian Carrara Formation, shallow-water carbonate banks developed in southern Nevada and southeastern California. Each bank attained a minimum width of 150 km normal to the depositional strike. Eastward the banks were bordered by terrigenous clays, silts, and sands from the stable craton, and westward they were bordered by siliceous "lime" muds lacking shallow-water depositional features. The position of rock units with respect to 5 trilobite faunules within the Carrara suggests that carbonate deposition waxed and waned subsequent to eastward and westward migrations of areas of detrital sedimentation.

During each of the 3 episodes of carbonate deposition, a sequence of 4 lithologic changes is repeated as follows: (1) upward fining and thinning of terrigenous clastic deposits; (2) the beginning of carbonate deposition, first as scattered skeletal grainstones, later as oolitic grainstone, oncolite packstone, and "lime" mudstone accumulating as a shallow subtidal bank; (3) the deposition of loferites, bird's-eye and mudcracked limestones, cryptalgal laminites, and stromatolites as low carbonate islands on the western half of the banks; and (4) the relatively abrupt termination of carbonate deposition with renewed sedimentation of detrital clay and silt. Each sequence is repeated farther east during succeeding episodes of carbonate sedimentation.

HANSEN, C. P., U.S. Senator (Wyoming), Washington, D.C.

GOVERNMENT AND THE ENERGY CRISIS: COLLISION OR COLLABORATION

In recent years the Federal Government has begun to recognize and come to grips with our national energy crisis. Contributing to improved government understanding of the problem was the National Petroleum Council's report released last December.

The National Fuels and Energy Study being conducted by the Senate Interior Committee, on which I serve, has made great progress in attempting to develop our own recommendations for national energy policy. We have been especially assisted by the expert testimony of The American Association of Petroleum Geologists.

President Nixon earlier this year announced his proposals for abating our energy crisis. The Congress has been asked to act. However, the question remains whether the Congress will cooperate with the President, as I believe it should, or whether a matter as important to our national security and economic well-being as our energy supply will be turned into a political football by an uncooperative Congress.

HARRIS, DONALD G., and J. O. SZABO, Esso Production Research Co., Houston, Tex., and F. B. WILLIAMS, British Petroleum Co., Anchorage, Alaska

KEYS TO RECOGNITION OF CARBONATE RESERVOIR ROCKS

A 4-step procedure has been developed that provides key information for recognizing the reservoir facies in carbonate