Dives in 240–250 m water depths were made by the submersible *Alvin* in the northwest and central parts of the Wilkinson basin in July 1971. The submersible was instrumented with a probe consisting of a nuclear transmission densitometer, which directly measured bulk density and, indirectly, water content at 0.8-cm intervals, and with a static cone penetrometer, which indirectly measured shear strength at 2.5-cm intervals. The probe was pushed at a constant rate to a maximum depth of 1.45 m by means of a rack and pinion drive actuated by the *Alvin*'s mechanical arm. Three sites, located several hundred meters apart, were occupied on each of the 2 dives.

Previously measured geotechnical properties in the Wilkinson basin, a postglacial sedimentary basin of lutite, indicated relatively uniform areal and vertical (to 3 m below the bottom) conditions. The *Alvin* studies showed a horizontal and vertical heterogeneity much greater than expected. The presence in limited areas of high shear strength strata, not directly correlatable with bulk density or water content, and other apparent small-scale anomalies are not easily reconciled with conventional depositional patterns generally believed present in marine sedimentary basins.

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BEAVER RIVER ANTICLINE AND ITS ASSOCIATED GIANT GAS RESERVE IN CANADA'S NORTHLAND

The Beaver River gas field is located mostly in northern British Columbia at the approximate junction of the British Columbia-Yukon and Northwest Territories boundaries.

The Beaver structure was mapped initially by E. D. Kindle in 1944, while working for the Geological Survey of Canada. Amoco Canada mapped the area in 1955, and as a result of its map interpretation, purchased the Crown lands over the Beaver River structure, as well as several other structures. The discovery well on the Beaver River structure was commenced in 1958 and completed in 1960. The excessive length of time required to drill the well resulted from continued problems, the most serious being a gas blow-out, which resulted in the death of 2 rig hands. A total of 6 follow-up wells has been drilled on the structure, proving a recoverable gas reserve of 1.4 trillion cu ft of gas.

The gas reserve is in an anticline which can be mapped by surface geology and has been confirmed in the subsurface by conventional geophysical methods. The producing zone identified as of Middle Devonian age is a secondary dolomite with fair to good porosity and permeability. The porosity and permeability are improved substantially by fracturing associated with the structural deformation. Exploration in the area of Beaver River, while ideal relative to the standards of the surface geologist, is a nightmare of high costs and problems for the geophysicists and engineers. Access problems due to terrain variations, extreme cold in winter, and muskeg in summer, make normal operations extremely difficult and costly.

The "disturbed belt" of Northeast British Columbia and the Yukon and Northwest Territories undoubtedly holds many more giant hydrocarbon accumulations similar to Beaver River. However, for exploration to flourish in these high-cost areas, exploration incentives are necessary. Reasonable assurance that hydrocarbons when found will get to market with as little delay as possible is a primary requirement. With increasing demand for fuel on the North American continent, Canada's northland gains prominence as a potential supplier. As the demand becomes more urgent, exploration for accumulations such as Beaver River should expand.

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CALCAREOUS ALGAE AND SOME ASSOCIATED MICROFOSSILS FROM ANCIENT WALL REEF COMPLEX (UPPER DEVONIAN), ALBERTA

Nine genera of small calcareous fossils, generally attributed to the algae, are in samples from the Upper Devonian Fairholme Group exposed at the southeastern margin of the Ancient Wall reef complex at Mount Haultain, near Jasper, Alberta. In order of decreasing abundance these are *Renalcis, Sphaerocodium, Girvanella, Keega, Solenopora, Parachaetetes, Vermiporella, Epiphyton,* and *Litanaia.* Except locally, these organisms are of minor quantitative importance. They produced little identifiable loose sediment and their principal rock-forming roles appear to have been as frame-binders and secondary frame-builders associated with the stromatoporoid reef facies marking the edge of the carbonate platform.

The 3 most abundant genera at Mount Haultain exemplify some of the problems of taxonomy and affinity which are common among Paleozoic fossils usually referred to the calcareous algae. *Renalcis, Sphaerocodium,* and *Girvanella* generally are considered to be blue-green algae. *Renalcis* and *Sphaerocodium* differ in both size and form from extant blue-green algae. The branching series of chambers forming the test of *Renalcis* are more characteristic of the Foraminiferida. Its simple wall structure and irregular form suggest an affinity with the Parathuramminacea. The systematic position of *Sphaerocodium* is uncertain. *Girvanella* is a microscopic tubiform fossil reported to range from the Cambrian to the Cretaceous. Its resemblance to the calcified sheaths of several species of extant filamentous blue-green algae suggests that it may be possible to remove it from its conventional position in the artificial group Porostromata, to define its relations to blue-green algal structure and taxonomy more precisely, and to extend its geologic range to the Holocene.

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VALUE OF SEA-BOTTOM AND COASTAL MORPHOLOGIC STUDIES TO OFFSHORE EXPLORATION

Undersea conditions are such as to prevent most of the erosional processes which occur on land. Current erosion and the action of reef-building organisms have a tendency to emphasize tectonic anomalies, rather than to smooth them. Studies of sea-bottom morphology can thus permit recognition of deep-seated structures, saving large expenses in geophysical work. Such studies should include statistical analysis of water depth, as well as various interpretive maps (regional and residual bathymetric maps, sea-bottom topographic contrast maps, *etc.*).

Examination of depth and behavior of submerged