and Indian Oceans; (2) temperate and perhaps equatorial radiolarian faunas of the Pacific and Indian Oceans have contributed to the temperate and ?equatorial Atlantic radiolarian faunas since the closure of Panama; (3) the ability of relict and related forms to carry on symbiotic relations with algal associates may have enabled these forms to adapt and survive. This information adds insight into our understanding of the evolution of Cenozoic radiolarian faunas, and perhaps also Mesozoic and Paleozoic faunas.

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Radiolarian Distribution, Diversity, and Density in Water Column and Holocene Sediments of Gulf of Mexico and Adjacent Waters

Approximately 200 radiolarian species have been collected and identified from the water column and Holocene sediments of the Gulf of Mexico and adjacent seas using Nansen closing nets, DUCA high-speed plankton nets, water bottles, bottom grabs, and gravity and box cores. None of the identified species are endemic to the Gulf of Mexico. Most species appear to be endemic to or indicative of tropical surface water, subtropical underwater, North Atlantic central water, subantarctic intermediate water, and North Atlantic deep water. These water masses enter the Gulf of Mexico through the Yucatan Channel.

Living radiolarian diversities (number of species present) and densities (number of individuals/cu m of water filtered) are generally low in waters over the continental shelves in the Gulf of Mexico. Diversities and densities are highest in the surface waters of the open gulf, peak at about 100 m, and decrease to minimum values with increasing water depth.

Radiolarians are low in diversity and density in most shelf, slope, and basin-floor Holocene sediments. The fossil record for radiolarians in gulf sediments is characterized by sparse occurrences in surficial Holocene sediments, absence from subsurface Holocene to mid-Miocene sediments, and moderate occurrences in many mid-Miocene and older sediments.

Conditions of hypersalinity and/or anoxia appear to enhance radiolarian preservation in fossil sediments in the Gulf of Mexico. Previously unsampled subsurface Holocene to mid-Miocene sediments deposited under these conditions should be useful in future studies of radiolarian biostratigraphy and paleo-oceanography in the gulf.

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You Ain't Seen Nothing Till You've Seen the Tuscaloosa!

The "Baton Rouge megastructure," a giant structural complex at least 20 mi (36 km) long and 15 mi (24 km) wide, is emerging as the dominant one of several exceptionally large structural features in the Tuscaloosa gas trend. False River reservoir A and reservoir B, Profit Island, Irene, and Port Hudson fields, all large fields in themselves, are merely separate structural closures and fault blocks on the partially explored megastructure. Other fields will surely be found within the 300-sq-mi (780 sq km) area presently indicated to be productive.

The "Judge Digby megastructure," a slightly lesser feature just west of the "Baton Rouge megastructure," also contains major gas reserves. These two represent the largest structural features currently known in the trend.

Indicated reserves on these two megastructures total approximately 17.5 Tcf of gas and 1 billion bbl of condensate, representing 1/12 of the United States gas reserves and 1/30 of the United States crude oil or condensate reserves. Across south Louisiana the trend has the potential of producing at least 50 Tcf of gas and 2 billion bbl of condensate.

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Exploration Methods of Discovery and Development of Lower Wilcox Reservoirs in Valentine and Menking Fields, Lavaca County, Texas

Regional computer-aided stratigraphic studies in a 185-sq mi (481 sq km) area resulted in the broad definition and ultimate drilling of the Mixon Creek prospect and the discovery of Valentine field, Lavaca County. About 50 wells were picked for structural tops, interval sand counts, and isopach data. Simple computer printouts were contoured and analyzed to determine the trends of successive delta-front or barrier-island alignments. Ultimately a drill site was chosen updip from a show on a seismic nose.

Development of the field resulted from drilling essentially offset locations in a northeast-southwest alignment along what was believed to be a lower Wilcox barrier island cut by a tidal channel at the southwest end and truncation by a shale-filled gorge on the northeast. The Menking field discovery was made in a stratigraphically separate lower Wilcox sand in an attempt to extend the Valentine field southwest. Additional drilling along the northwest margins of these fields shows that the stratigraphic relations are complicated and difficult to solve with subsurface data. Two Valentine wells were cored, slabbed, and analyzed petrographically. R. R. Berg of Texas A&M University has suggested that these data indicate a deep marine-turbidite environment.

Valentine field has 12 wells and covers approximately 1,000 acres (400 ha.). The productive Technick sand averages 12 ft (3.6 m) in thickness with porosity of 19 to 21% and permeability of 10 to 30 md. Recoverable reserves are estimated at 1.2 million bbl. Through 1978, 758,801 bbl of oil and 2,575 Mcf of gas have been produced.

There are four wells in the Menking field draining about 300 acres (120 ha.). The principal production comes from the Kubena sand which averages 18.9% porosity and 23.9 md permeability. Recoveries are low because of restricted reservoir communication. Reserves are estimated at 300,000 bbl and production through

1978 is 113,309 bbl of oil and a small amount of gas.

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Applications of Solar Energy: What is Practical in the Near Term?

Applications of solar energy to building heating and cooling systems, industrial process heating, and power generation have been examined. Passive heating and cooling of buildings by solar energy are now technically and economically competitive with energy derived from fossil fuels.

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Subsurface Neogene Stratigraphy of Bay County, Florida

The Neogene of Bay County, Florida, contains three subsurface units, the Bruce Creek, St. Joe, and Intracoastal Formations which make up the Coastal Group and range in age from middle Miocene to Pliocene. They are overlain by a blanket of Pliocene-Pleistocene sands. The Bruce Creek Formation is the oldest of the three units (middle Miocene) and rests upon the Suwannee Limestone which is generally considered Oligocene in age.

The Bruce Creek, St. Joe, and Intracoastal units thicken southward down the paleoslope and pinch out toward the north. The Coastal Group extends laterally across Bay County and into neighboring counties to the east and west. Their full lateral extent is not known.

The St. Joe and Bruce Creek are fairly fossiliferous micrites which contain some quartz sand. The Intracoastal changes from a micrite in the west to a sandy clay in the east. The Intracoastal contains a large percentage of planktonic and benthic Foraminifera.

Biostratigraphic analysis of the Neogene of Bay County based on planktonic Foraminifera shows the Intracoastal Limestone to be Pliocene in the western part of the county (*Globorotalia margaritae* Zone) whereas it is significantly older in the east (*G. fohsi fohsi* Zone). The Bay County planktonic Foraminifera assemblages are somewhat unusual in that the presence of biostratigraphically useful planktonic Foraminifera assemblages in the nearshore Neogene sediments of the Gulf Coast is rare. The zonation schemes of Blow and Bolli which were developed in tropical sediments can be used only with difficulty in the temperate water sediments of the Florida Panhandle.

DE VOTO, RICHARD H., Colorado School of Mines, Golden, Colo.

Nuclear Power and Geology of Uranium

Nuclear and coal-fueled power plants are the only economically viable large-scale sources of new electrical energy available to man in the next several decades. Even without the ERA-required "best-available technology" of stack-gas scrubbers for coal-fired power plants, the total cost to produce electricity from nuclear power plants is clearly less expensive than from coal-fired power plants at most locations in the United States. Current "economic equivalency" of electrical-generating costs between coal and nuclear would support a nuclear fuel cost of approximately \$100/lb of U_3O_8 (the 1979 price is \$43/lb of U_3O_8).

The present domestic worldwide supply-demand relations indicate a continued strong need for successful uranium exploration and development programs through the next several decades. The economic realities would cause the price of uranium to rise to permit the development of low-grade uranium resources (100 to 500 ppm U_3O_8) competitively with coal should the discoveries of higher grade uranium resources be insufficient to fulfill the increased demand.

Historically (1950s to 1978), the bulk of the world's uranium has been produced from: (1) lower Proterozoic uraninite placer deposits in quartz-pebble conglomerates of braided-river systems, (2) epigenetic uranium deposits in sandstones located at or near groundwater oxidation-reduction interfaces, commonly in close association with organic material in fluvial sandstones, and (3) hydrothermal vein uranium deposits. These three distinctly different geologic environments continue to be important exploration targets in the search for new uranium deposits.

Exploration for economic uranium deposits has expanded to many geologic environments which have generally been overlooked in the past. Most notable among these are: (1) granitic uranium deposits (commonly anatectic), (2) alkalic igneous-hydrothermal uraniferous environments, (3) altered acidic or alkalic volcanic ash, ash flow, or volcaniclastic environments, (4) metamorphic-hosted uranium deposits, variously interpreted as a metamorphic-hydrothermal or unconformity-related environment, (5) calcrete uranium deposits in evaporative, desert groundwater environments, and (6) unconformity-related environments. Significant uranium deposits have been discovered in each of these geologic environments in the 1970s.

The expanded search for economically viable uranium resources and the improved market and technology factors have caused exploration and development efforts to advance far in recent years. Low-grade uranium resources that have been long known and ignored, such as uraniferous, black, organic-rich shales and marine phosphorites are currently being developed for uranium production. In-situ solution-mining activities have permitted economic exploration of uranium deposits that heretofore have been uneconomic because of their small size, low grade, or depth. Exploration drilling and development activities are expanding to greater depths.

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Clasticity Index—Key to Correlating Depositional and Diagenetic Environments of Smackover Reservoirs, Oaks Field, Claiborne Parish, Louisiana

Oaks field is a stratigraphically trapped Smackover field which produces from at least three separate reservoirs. Individual reservoirs are shoaling-upward carbon-