and northern Alabama through data gathered from 550 oil well logs and 10 measured sections. Two deltaic depocenters, a carbonate-shelf complex, and a shallow-basin carbonaceous shale unit are the primary depositional systems in the area.

Three genetic intervals have been identified on the basis of thin marine transgressive carbonate units. The lowest (Lewis) interval involves a high-constructive lobate delta system whose axes of maximum sandstone thickness extend southeastward from Lee and Itawamba Counties, Mississippi, as far as Tuscaloosa County, Alabama. Maximum net sandstone thicknesses for individual lobes average 60 ft (18 m). The middle interval includes a western high-destructive wave-dominated delta complex (Evans) centered in Lee and Itawamba Counties, Mississippi and a more easterly high-destructive wave-dominated delta system (Hartselle) in northwestern Alabama. The Hartselle system attains net sandstone thicknesses greater than 160 ft (48 m) along a northwest-southeast trend that extends almost to Birmingham. Evans delta-lobe maxima average about half that thickness. The upper interval is dominated by the thick, multistoried Muldon high-constructive elongate delta system (Rea through Carter sandstone units), centered in Monroe County, Mississippi. On the northeast, and laterally equivalent to the Muldon delta, is the Bangor carbonate shelf.

The Lewis, Evans, and Muldon units represent relatively thin, cratonic deltas whose sandstone provenance is north-northwest of the Black Warrior basin, in perhaps a southeastern Missouri source area. Hartselle terrigenous clastic rocks were transported from the northeast and southeast and probably have an Appalachian source.

BURGESS, WILLIAM J., Omni-Exploration, Inc., Radnor, Pa.

How to Create and Submit a Winning Prospect

The oil and gas energy crisis will last until other sources of energy become available in abundance. For much of its hydrocarbon supply, the United States now relies on countries which may be subject to political instability. Therefore, it would appear that the need for good, drillable prospects within the United States will be present for the next 20 to 30 years, so that the creation and marketing of prospects will continue to be of primary importance to the oil and gas industry and to the country.

The drilling deal or prospect may be discussed in terms of its elements: reserves, risk, and terms. Practical ways of evaluating reserves include simple volumetric analysis and comparison methods. The study of risk inquires about the chances for commercial success of a drilling prospect, and involves the geology. Risk may be studied in terms of the presence or absence of control for the structural and stratigraphic elements of a prospect. The terms of a deal involve cost; the buyer wants to know what he will pay for how much working interest which will yield how much revenue interest.

A "winning" prospect is one that will sell fast and has a high chance of bringing in a producing field. Submittals should include exhibits which represent clearly the geological reasons for the prospect. Unless the exhibits of maps, cross sections, and other representational data are entirely self explanatory a written description of the prospect should also be included.

CASEY, RICHARD, Rice Univ., Houston, Tex., LINDA GUST, Australian National Univ., Canberra, Australia, ANN LEAVESLEY, Cities Service Co., Houston, Tex., DAMON WILLIAMS, Radian Corp., Austin, Tex., RICHARD REYNOLDS, Rice Univ., Houston, Tex., THEO DUIS, Texas A&M Univ., Marine Facility, Galveston, Tex., and JOAN MUSSLER SPAW, Rice Univ., Houston, Tex.

Ecologic Niches of Radiolarians, Planktonic Foraminifers, and Pteropods Inferred from Studies on Living Forms in Gulf of Mexico and Adjacent Waters

Living radiolarians, planktonic foraminifers, and pteropods have been collected during 1972-74 from the waters of the Gulf of Mexico and adjacent seas using Nansen closing nets, DUCA high-speed plankton nets, water bottles, and plankton pumps by micropaleontologists at Rice University. These samples included other shelled microplankton (diatoms, dinoflagellates, silicoflagellates, mollusk larvae, etc), nonshelled microplankton (blue-green algae, dinoflagellates, etc), and larger plankton (e.g., copepods, chaetognaths). Radiolarian, planktonic foraminifer, and pteropod species compositions, diversities, and densities were compared with those of other plankton, and were related to physical and chemical oceanographic parameters. Our studies suggest that certain radiolarian, planktonic foraminifer, and pteropod species may be nannoherbivores, bacterivores, detritivores, and/or associated with symbiotic algae and may be characteristic of eutrophic, mesotrophic, or oligotrophic conditions.

This information can be applied to studies of the fossil record for finer resolution of paleoecologic conditions (e.g., paleoproductivities) and for inference of the presence and nature (abundance and diversities) of certain nonfossilizable planktonic components.

CASEY, RICHARD, Rice Univ., Houston, Tex., KEN MCMILLEN, Univ. Texas, Marine Sci. Inst., Galveston, Tex., RICHARD REYNOLDS, Rice Univ., Houston, Tex., JOAN MUSSLER SPAW, Rice Univ., Houston, Tex., RUDY SCHWARZER, Texas Southern Univ., Houston, Tex., JOEL GEVIRTZ, Tenneco Oil Co., Houston, Tex., and MARY BAUER, Carter Oil Co., Houston, Tex.

Relict and Expatriate Radiolarian Fauna in Gulf of Mexico—Implications

The presence of living specimens of *Spongaster pentas* and related spongadiscid forms, *Buccinosphaera invaginata,* and certain other radiolarians in plankton samples from the Gulf of Mexico is evidence of a unique radiolarian population that is composed in part of relict and/or expatriate forms. These populations may have survived in the Gulf because: (1) the closure of the Tethys seaway by the uplift of the Panamanian block isolated the equatorial and temperate Atlantic waters and blocked radiolarian faunas from entering the Pacific

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.

CASEY, RICHARD, JOAN MUSSLER SPAW, FLORENCE KUNZE, RICHARD REYNOLDS, Rice Univ., Houston, Tex., THEO DUIS, Texas A&M Univ., Marine Facility, Galveston, Tex., and KEN MCMILLEN, Univ. Texas, Geophysical Lab., Galveston, Tex.

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.

CHRISTINA, CARLO C., and KEN G. MARTIN, Martin Exploration Co., Metairie, La.

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.

CHUBER, STEWART, Consultant, Schulenburg, Tex.

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