tidal channels, and shoals. Facies D was deposited behind the barrier complex in hypersaline lagoon, evaporitic intertidal-flat, and supratidal-falt environments. Facies E represents deposition on a prograding fluvial plain. A modern analog for the late Miocene barrier-lagoon-tidal flat complex exposed in Sespe Creek area is the coastal zone between San Felipe, Baja California, and the present mouth of the Colorado River.

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Fortescue Field—Stratigraphic Trap in Gippsland Basin, Australia

The Fortescue 1 well, drilled in the Gippsland basin in June 1978, was a dry hole. However, the results of a detailed stratigraphic analysis and interpreted seismic data provided sufficient information to predict the possible occurrence of a stratigraphic trap on the flank of the giant Halibut structure. Three months later, the West Halibut 1 well encountered oil in the Latrobe group 16 m below the depth used as the oil-water contact for the Halibut field. Following wireline testing in both the water- and oil-bearing sandstone units, two separate pressure systems were recognized in the well. Three additional wells, Fortescue 2, 3, and 4, were drilled to delineate the limits of the field, the complex stratigraphy, and the pore fluid contacts. Detailed well log correlations, stratigraphic interpretations, and interpreted seismic data indicated that the Fortescue reservoirs were a discrete set of units stratigraphically younger and separated from those of Halibut and Cobia fields. Analysis of pressures confirmed the presence of two separate pressure systems, proving none of the Fortescue reservoirs were being produced from the Halibut platform. Geochemical analysis of oils from both accumulations supported the above results, with indications that no mixing of oils has occurred. Because the Fortescue field is interpreted as a hydrocarbon accumulation which is completely separated from both Halibut and Cobia fields, and was not discovered prior to September 17, 1975, it qualified as new oil under the federal government's existing crude oil pricing policy.

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Mass-Movement Processes in Fine-Grained, Hemipelagic Basin: Santa Barbara Basin, California Borderland

Mass-movement features defined by high-resolution and air gun seismic profiling are located at nine specific sites in silty clays and clayey silts on slope and slope apron settings. Two basic scales of processes occur: eight small-scale mud flows and slumps 2 to 8 m thick and 4 to 15 sq km in area extent; and a large compound feature about 100 sq km in areal extent and 2 to 25 m thick in the northeast part of the central basin. Mud flow and slump deposits sampled with box and piston cores have liquid limits (% dry basis) of 50 to 120, plasticity indices of 15 to 60, and water contents (wwb) of 40 to 65%. The compound feature has liquid limits of 75 to 105, plasticity indices of 25 to 45 and water contents of 55 to 85%. Envelopes of values of plasticity indices versus liquid limits for different mud flows, slumps, and the compound feature show good separation, perhaps indicative of varying sedimentation rates. Mud flows and slumps exhibit a swirled x-radiography signature, fluid escape features, inclined and folded layers, and dramatic matrix-supported random fabrics with round clasts as large as 4 cm. Distorted laminations, minor faults, small folds, and homogeneous sections typify different areas of the large compound feature. Suspended sediment transport, centered on the compound mass movement feature, provides faster sedimentation rates which may partly explain the feature. Only a relatively small part of the basin, the deep flat area which slopes gradually to the south, is somewhat immune to mass movement.

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Organic Maturity and its Geologic Bearing in Tertiary of Spitsbergen

Vitrinite reflectance measurements on coals and dispersed organic matter in the Spitsbergen Tertiary are reported. Maturity profiles through the Tertiary sequence (950 m) show gradual increase ranging from R_O = 0.40 at the top to R_O = 0.68 at the base. The maturity level along the economically important coal horizon at the base of the Tertiary sequence shows considerable regional variation ranging from R_O = 0.41 to R_O = 1.1. Maturity is highest in central and southern parts of the basin and decreases toward the western and eastern flanks.

Isoreflectance lines are interpreted in terms of isopachs. The main conclusions are: the area of greatest sediment-accumulation migrated eastward during deposition owing to tectonic activity related to the early opening of the Norwegian-Greenland sea. During the subsequent post-orogene uplift and denudation of Spitsbergen, approximately 1.0 to 1.5 km of the Tertiary deposits were eroded.

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Sedimentary Facies Analysis, El Dorado Field, Kansas, Micellar Chemical Pilot Project

The Permian 650-ft sand, one of several productive sands in the El Dorado field, has yielded 36.5 million bbl by primary and secondary methods, with 71 million bbl remaining. During initial stages of the micellar-polymer tertiary recovery pilot project drilling in 1974, a Phase I geologic analysis, using seven cores, identified distributary channels and associated smaller splay channels as productive facies. The western edge of the pilot area was determined to have the best channel sandstone development. A two-layer geologic facies model was proposed.

Oriented cores were included in the drilling of 24 wells in Phase II. North and northeast flow directions were indicated for the channel sandstones. The influence of intertidal redistribtuion of sands, particularly in the northern lease area, was recognized, as were inactive channel fill mud plugs which reduced the total thickness of the channel sandstone reservoir.

During Phase III four observation wells were cored. These wells were drilled at intervals of 90 ft (27 m) diagonally from earlier wells in the north and south block. Micellar injection for the pilot was completed in early 1979 and polymer injection followed.

Limited computer simulation tests suggested that a one-layer model yielded fluid flow results similar to a multi-layer model and also indicated that the oil bank would bypass one of the observation wells. Cores analyzed in Phase III indicated no reason to expect that the observation well should not produce the amounts of hydrocarbons indicated by log analysis. Detailed description of cores and construction of cross sections in

Phase III have confirmed the complex nature of the oil-bearing facies. Furthermore, SEM and thin section analyses have determined additional controls on fluid flow, mainly reduction in permeability by ductile rock fragment deformation and intergranular clay and mica.

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Uranium Industry Outlook from a Banker's Perspective

This paper will discuss the technical fundamentals underlying the uranium industry: reserves, supply vs demand, and the geographic changes anticipated in the industry to the year 1995. Particular emphasis is placed on the economics of the uranium industry including the price outlook for U-308. Given this outlook, a brief outline of the various criteria important in financing uranium producers rounds out the banker's viewpoint on the viability of the industry.

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Distribution of Paleocene-Eocene Benthic Foraminifera in Atlantic

A study of Paleocene-Eocene deep sea benthic foraminifera from DSDP sites in the Atlantic, Caribbean, and the Gulf of Mexico, reveals two major faunas: (1) a Paleocene fauna dominated by Cretaceous relict species, and (2) an Eocene fauna characterized by many new faunal elements. An abrupt faunal turnover, resulting in the extinction of almost all Cretaceous species, occurs during the latest Paleocene (Zone P6a). Using the "backtracking" method of Berger, the relative plate motions of Phillips and Forsyth, and the paleomagnetic data of McElhinny, the paleobathymetric and paleolatitudinal distribution of benthic forams was studied. A principal component analysis identifies three distinct Paleocene and four Eocene assemblages. A *Gavelinella beccariiformis* assemblage, with a wide bathymetric range during the early Paleocene, becomes restricted to shallower water during the late Paleocene before becoming extinct in Zone P6a. A deep water *Nuttallides* assemblage, consisting of long-range taxa, follows this trend, occurring at intermediate depths during the latest Paleocene. A third assemblage, with predominantly *Nuttallides crassaformis* and various buliminids, is restricted to the low-middle latitudes. In the Eocene the *Nuttallides* (mainly *N. truempyi)* becomes restricted to deep water prior to its extinction in the late Eocene, when it is replaced by a previously shallow assemblage characterized by *Cibicidoides ungerianus* (2). A second trend discriminates between a shallow assemblage (3) with *Lenticulina, Osangularia mexicana,* and various buliminids, which is most prominent during the middle Eocene, and a deep assemblage (4) with *Globocassidulina subglobosa, Gyroidinoides, C. ungerianus, Stilostomella aculeata,* and *Oridorsalis umbonatus,* which is most prominent during the middle and late Eocene.

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Triassic Paleogeography, Evaporites, and Stromatolites of Southwest Britain

During Triassic time, northwest Europe was subjected to tensional stresses which resulted in the formation of a complex system of rapidly subsiding grabens and wrench-faulted basins. This pattern of regional crustal extension, which is part of the Mesozoic breakup of the Pangean megacontinent, is related to the Triassic opening of the Tethys ocean in southern Europe and rifting in the Arctic/North Atlantic, and is a prelude to the Jurassic opening of the southern North Atlantic. Great thicknesses of chiefly continental (non-volcanic) sediments accumulated within the Triassic basins. Within western Britain, a complex series of fault-bounded basins extended from the western approach and channel area, northward to the Irish Sea.

Sediments within the Triassic basins of southwest Britain generally conform to a pattern. In the basin center, haline and marls predominate, and toward the basin margin halite gives way to gypsum-anhydrite (commonly replaced by quartz, dolomite, and calcite). Where highland regions occur at basin margins, alluvial fan sequences are developed and interdigitate down-fan with marls. Beach breccias and shore-flat deposits occur in some marginal areas, as well as wave-cut platforms carbed into Carboniferous limestone bedrock. At times the fault-bounded basins contained substantial water bodies ("lakes") from which the halite was precipitated, and around which beaches developed. Contraction of the lakes produced polygonal structures in the halite and calcretes within basin margin deposits. A rare but interesting marginal facies is that of a hyposaline limestone containing fine stromatolites, fenestral fabrics, and tepees.

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Influence of Time Dependent Thermal Histories on Conversion of Kerogen to Petroleum

The conversion of kerogen to petroleum is a thermally activated process. Many alternative forms of the rate equations have been proposed. Usually it is assumed that the present geothermal gradient has been unchanged in the past and the fractional conversion is determined. In this paper three limiting examples of time dependent thermal histories are considered: (1) a sedimentary basin is formed by thermal subsidence on initially hot lithosphere; (2) isothermal (cold) sediments are deposited instantaneously on crust with a constant (time independent) thermal gradient; and (3) a transient thermal event, i.e., a volcanic sill or dike, heats cool sediments. In each example, the conversion of kerogen to petroleum is determined and is compared with the steady state hypothesis.

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Model for Barrier Island–Tidal Inlet Stratigraphy

A three-dimensional stratigraphic model for a tidal inlet-barrier island facies was constructed through examination of 37 vibracores and 10 auger drill holes on Capers and Dewees Islands, South Carolina. Two cycles of southerly inlet migration and subsequent abandonment resulted in beach ridge truncation on the northern ends of the barriers. The inefficiency of overextended migrating inlet channels caused shorter northerly oriented channels to breach the ebb-tidal delta. Inlet reorientation allowed a large wave-formed swash bar to migrate landward, attach to the barrier, and close the former inlet channel.

Price Inlet formed during the onset of the Holocene transgression by submerging the ancestral Pliocene-Pleistocene