abrasion by thick algal coatings acquired before introduction into the high-energy oolitic environment. The fauna is robust (not dwarfed, as is common in oolites) and is taxonomically diverse. The ooliths formed in association with small bryozoan-algal banks on a shallow subtidal shelf. Mountainous regions to the south, and lowlands to the northeast and southeast, provided terrigenous sediments to the study area through deltaic processes before, during, and after Drum deposition.

Diagenetic alteration of the oolite has created much moldic and oomoldic porosity, but isolation of the molds has resulted in extremely low permeabilities. Wholesale leaching and cementation began (1) when deltaic distributaries eroded into the oolite soon after its deposition, allowing fresh water into the pore system of the oolite; and (2) perhaps when the oolite shoaled and formed islands which may have served as conduits for fresh rainwater. Similar rocks with higher permeabilities, resulting from less cementation or late fracturing, would be well-suited for hydrocarbon accumulation.

Because many modern and ancient oolites have thickened by upward shoaling and accentuation of preexisting topography, potential oolitic petroleum reservoirs in the subsurface have been sought on paleobathymetric highs. Oolitic accumulations in paleobathymetric lows should not be neglected in the search for petroleum.

STOUT, JOHN, and RETA BRADLEY, Petroleum Information, Denver, CO

United States Province Overviews

Basin folios which compile computerized well data, updated biannually, serve as a ready reference in the event of a new discovery.

Folios are available for the following basins: Appalachian, Arkoma, Black Warrior, Denver-Julesburg, Bend–Fort Worth–Strawn, South Georgia–North Florida, Great Basin and Range, Green River, Overthrust, Powder River, San Juan, Williston, and Lower Great Lakes.

In each folio is a list of exploratory wells with basic information and geologic tops, including a statistical analysis of formations penetrated in the basin. Additional statistics include the discovery-success percentage and hydrocarbon shows tabulated by formation name. An index map shows the states and counties included in the geologic province accompanied by a computer-posted and contoured map to represent the productive horizon of the basin. A thickness or structural datum corrected to sea level is given with each control point.

STOW, DORRIK A. V., STEPHEN J. MILLS, and CLIVE D. BISHOP, British Natl. Oil Corp., Glasgow, Scotland

Fan Models for Hydrocarbon Exploration with Examples from the North Sea

Important hydrocarbon discoveries have been made in submarine fan facies of Devonian to Tertiary age. A large number of controls on fan development include the nature of the sediment source and supply systems, tectonic style and activity, sea-level variation, oceanic conditions, and internal fan geometry. Several fan models have been proposed; the four best-documented models are outlined and then compared with North Sea fans.

Upper Jurassic objectives are important in the North Sea and include both nearshore sandstone and submarine-fan reservoirs. The submarine fans commonly developed close to the active fault-controlled margins of small basins and overlapped laterally to form a base-of-slope sediment apron. Jurassic intervals of the Brae field are believed to be of this type.

Detailed core, electric log, dipmeter, and seismic data from the Brae field have been examined. Conglomerates and poorly sorted sandstones and mudstones are arranged in fining-upward cycles and megacycles and appear to have been deposited by gravity-flow mechanisms in a marine environment. There is no evidence of a single feeder canyon or radial-channel pattern. The Jurassic fan of the Brae field differs in certain respects from the classic fan models but is closely analogous to Upper Jurassic shallow-water fans from east Greenland.

STUCKLESS, JOHN S., U.S. Geol. Survey, Denver, CO

Interpretation of Thorium to Uranium Ratios in Granitic Rocks and Implications for Uranium Exploration

Ratios of thorium to uranium for granitic rocks within the range of 3 to 5 are generally thought to be normal. Possible economic significance has been attached to granitic rocks that have thorium to uranium ratios either higher or lower than the normal range. Interpretations are commonly based on measurements of surface or shallow bore-hole samples that may have been affected by near-surface processes, such as uranium loss by leaching. The thorium to uranium ratios that existed prior to changes produced by near-surface processes can be calculated from lead isotope data, provided that certain limitations and boundary conditions are met, such as closed-system behavior and large ratios of thorium and uranium to lead relative to the age of the system.

Lead isotope analyses for several suites of Precambrian peraluminous granites and granite gneisses show that the calculated thorium to uranium ratios for most of the suites are in the range of 1 to 3. The range of calculated thorium to uranium ratios within each suite is generally smaller than the range of measured values. The mean thorium to uranium value for the measured ratios is generally larger, in some places by more than an order of magnitude. The difference between measured and calculated thorium to uranium ratios tends to increase with increasing thorium. Finally, the difference between calculated and measured thorium to uranium ratios is smallest in the granite gneisses.

The difference between calculated and measured thorium to uranium ratios is interpreted to be the result of recent and variable uranium loss in response to incipient weathering. By analogy, other peraluminous granite suites with large and variable thorium to uranium ratios are possible sources for low-temperature uranium deposits. Peraluminous suites with small and uniform thorium to uranium ratios are unlikely sources for low-tem-