laterally traceable beds composed of 1–5μ anhedral and a few euhedral stacked crystals. Two newly discovered occurrences of dolomite are as a minor constituent disseminated in unlithified carbonates and in a carbonate crust in the uppermost layer of a blue-green algal mat. The mat is growing today in a hypersaline lagoon adjacent to Baffin Bay, and the dolomite seems to be penecontemporaneous. The dolomite occurs with other carbonates which are forming as lithified grains embedded in the organic mat material.

With the exception of the lithified aragonite flakes and the lithified carbonate grains in the algal mat, all the lithified carbonates are found at core depths greater than 350 cm.

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CHARACTERISTICS OF BASINS WITH GIANT FIELDS

Approximately 270 giant fields located in 60 basins account for the principal world energy sources. To compare the geologic and historical development characteristics of giant fields, one of several possible basin classifications has been proposed. Three general basin types based on the different crustal thicknesses in *cratons, oceans,* and zones *intermediate* between the two are the basis of a classification of 8 types of basins. There appears to be a relation between the classified basin types and both their hydrocarbon characteristics and, to some extent, their historical development patterns.

Cratonic basins are typified by taphrogenetic, block structures out to the mobile zone where the intermediate crustal zone basins are developed. In general, cratonic basins have high-gravity, low sulfur crude and contain over three fourths of the world's gas and the great majority of known Paleozoic hydrocarbons. They have moderate oil recovery per cubic mile of sediments and are relatively predictable in hydrocarbon character. Intermediate basins are more or less directly related to "sea-floor spreading" and commonly display structural trends at angles to cratonic trends. Depending on the tectonics of the various leading edges of worldwide plates these basins are either intensely or relatively moderately deformed. They are commonly subject to high heat flow, at some time during their development. As a result of their tectonic history they are less predictable and their hydrocarbon characteristics are much more variable than those of cratonic basins. Ocean basins are little known and in water too deep for commercial prospect at present.

Normally accepted geologic conditions for the formation of hydrocarbons are enhanced by several special factors including the presence of evaporites, unconformities, regional arches, and suitable geothermal gradients resulting in giant and supergiant accumulations. The lack of significant reserves in Paleozoic rocks may be related to the advent of post-Permian "sea-floor spreading."

When the history of the world's oil basin development patterns over the last 100 years is analyzed it is noted that: (1) more producing basins are being found, but the industry is experiencing a lower success rate in its search; (2) although half of the producing basins contain giant fields, the odds are that only 1 of 5 or 6 basins have prospects of major reserves; (3) the time required to discover oil and develop it in a basin appears to be related to when it was explored, its size, and its geologic character. These factors are modified by terrain and market relations; (4) there has been a tendency to develop basins more rapidly in recent years.

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NEW LIGHT ON PETROLEUM POSSIBILITIES OF THE BASIN AND RANGE PROVINCE, ARIZONA

In 1947, in his presidential address, Earl Noble cited 6 masks that hamper explorationists in their search for oil: water, overthrust blocks, multiple unconformities, high-velocity limestones, younger volcanics, and thick deposits of relatively young clastics. Improved technology, courage, and success have removed some of these masks in many areas of worldwide exploration, but these masks continue to hinder the search in other areas.

Relatively thick sections of valley fill and volcanic cover have been the chief deterrents to exploration in the basins of southern Arizona. Meager geologic information, poor maps, and the public land situation have added to the negative attitude of companies and individuals. But new data are changing the picture.

Although Edwin McKee pointed out 25 years ago that Paleozoic seaways covered most of southern Arizona and that petroliferous rocks may be present in the intermontane valleys, only in recent years has field work by the U.S. Geological Survey confirmed the presence of Paleozoic rocks in some of the upfaulted mountain blocks. Oil and gas shows in thick Paleozoic sections in southwestern New Mexico and northern Mexico have added to the attractiveness of southeastern Arizona.

Other Survey geologists have developed information indicating a marine embayment of Pliocene age, extending into southwestern Arizona and southeastern California and covering about 15,000 sq mi. It may be larger. More surprising has been the discovery that salt domes exist in Arizona and that salt deposits may extend nearly 350 mi along the northern edge of the Basin-Range province. North of Kingman the salt is more than 4,100 ft thick. Near Phoenix several wells have proved the existence of a dome underlying a gravity minimum. Salt thickness is well over 3,600 ft. Near Florence, palynologists date a caprock core overlying salt as Pliocene(?).

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EFFECTS OF DEPOSITIONAL ENVIRONMENT AND POST-DEPOSITIONAL HISTORY ON CHEMICAL COMPOSITION OF LOWER TUSCALOOSA OILS

The crude oils in lower Tuscaloosa Cretaceous reservoirs in Mississippi and Alabama can be divided into groups on the basis of their chemical compositions. One of these groups appears indigenous to the lower Tuscaloosa interval. The oils in this group, all in unfaulted structural and stratigraphic traps, are located in south-central and southwestern Mississippi, where the lower Tuscaloosa has been subjected to the deepest burial and greatest diagenetic influence. The remaining group of oils in the lower Tuscaloosa are commonly contained by faulted structures. They are situated