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DISTRIBUTION OF PALEOZOIC ROCKS BENEATH GREAT ARTESIAN BASIN, QUEENSLAND

The Jurassic-Cretaceous Great Artesian basin occupies most of the interior of eastern Australia. The subsurface geology of this area before 1960 was virtually unknown. Extensive geophysical surveys and wildcat drilling have been undertaken during the past few years, mainly in Queensland and northeastern South Australia. The results of this work, made public under provisions of the Petroleum Search Subsidy Acts of the Commonwealth of Australia, have delineated three new petroliferous provinces: the Surat basin (Permian-Triassic) of southeastern Queensland, Adavale basin (Devonian-Carboniferous) of south-central Queensland, and Cooper Creek basin (Cambrian-Permian) of northeastern South Australia and southwestern Queensland. The subsurface extent of the Drummond basin (Devonian-Carboniferous) and the Lake Galilee basin (Permian) of north-central Queensland has not been delineated fully.

Oil and gas are produced from Permian, Triassic, and Jurassic reservoirs in the Surat basin, and gas has been found in the Middle Devonian of the Adavale basin and in the Permian of the Cooper Creek basin. A fair oil show was found in the Permian(?) of the Lake Galilee basin.

A regular progression in time and space is noted with respect to regional metamorphism across the Great Artesian basin, suggesting eastward shift of the Tasman geosynclinal complex from Proterozoic to Permian time.

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WALL STRUCTURES, CLASSIFICATION, AND EVOLUTION IN PLANKTONIC FORAMINIFERA

Previous classifications and generic determinations of planktonic Foraminifera have been based variously on features of gross test morphology, including chamber shape and arrangement; test shape and ornamentation; and apertural number, form, and position. Certain of these features appear to be convergent adaptations for a planktonic existence, and hence are unreliable for determining natural relations.

Skeletal, chemical, and mineralogical composition, microcrystalline structure, and septal lamellar characters appear not to be environmentally affected, and hence probably best reflect relationships. Planktonic Foraminifera, superfamily Globigerinacea, have perforate tests constructed of radially built calcite crystals, with *c*-axes perpendicular to the test surface. Although the surface texture may be modified by secondarily deposited material (crusts, pustules, and rugosities), the primary texture is determined by three different types of radial microstructure. These characteristic wall features of the enrolled planktonic Foraminifera provide a useful basis for family delineation.

A wall constructed of closely packed identical crystals, resulting in a predominantly smooth surface, is found in the Cretaceous families Planomaliniidae, Schackoiniidae, Rotaliporidae, and Globotruncanidae, and also is characteristic of the Cenozoic Globorotaliidae and Hantkeniniidae. The Cenozoic family Catapsydracidae differs in having thicker rod-like crystals surrounded by finer ones between which occur the

test perforations. In the Globigerinidae, thicker crystals are greatly elongated as spines extending far beyond the general test surface, and very thin crystals surround the crystal spine bases. This characteristic wall structure, distinguishable even where elongate spines are broken, is the latest to appear in the geologic record.

The Globorotaliidae and Catapsydracidae appear to have descended directly from Cretaceous stocks and the Hantkeniniidae from the Globorotaliidae in the Eocene. Cenozoic Globigerinidae are not closely related to the morphologically similar Cretaceous hedbergellids, but were derived from the Catapsydracidae during Eocene time.

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ERA BOUNDARIES RECONSIDERED

During the long history of the evolution of life on earth, boundaries between geologic eras represent time of transition, when character and composition of the biosphere changed more rapidly and markedly than at intersystemic boundaries within eras. Although many causes have been suggested to explain these changes, most workers have attempted to find one common cause for all. More detailed analysis of the nature of the biologic changes that occur at era boundaries, however, support the conclusion that a common cause does not exist.

At the transition from the Precambrian to the Paleozoic Era, life changed from a little-known state in the Precambrian to a state that at least in part resembled life as we know it now. The emergence of Paleozoic life took place during Cambrian and Early Ordovician time, a span of 100 million years. At the Paleozoic-Mesozoic boundary, mass extinctions were common among benthonic marine life. Life on land, both plant and animal, was not so affected. After the mass extinctions it took 20-30 million years until a well-balanced and diversified benthonic fauna was re-established in the seas.

At the Mesozoic-Cenozoic boundary, mass extinctions were widespread among terrestrial animals, especially reptiles, but not among plants. In the sea spectacular extinctions occurred among planktonic organisms such as foraminifers and coccoliths, but not nearly to the same extent among benthonic organisms, including benthonic foraminifers. On the land it took many millions of years to fill the ecologic niches left vacant by the disappearance of the reptiles. In the sea replacement of the extinct forms of planktonic organisms by other types was almost instantaneous.

It seems that the biologic changes that took place at and around the three era boundaries were so different in kind that no single cause can be invoked to explain them all.

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CLAY-MINERAL DISTRIBUTION IN RECENT SEDIMENTS FROM NORTHERN PACIFIC COAST OF MEXICO

The clay-mineral composition of 86 samples from the Northern Pacific coast of Mexico was identified and the relative abundance of each clay mineral was obtained. The known minus 2 μ fraction was analyzed in oriented aggregates using X-ray diffraction. Prior to X-ray, the samples were freed of carbonates, or-