older sediments where morphology and sedimentary structures are less well preserved, and where the effects of weathering are more severe.

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PALEOCURRENT PATTERNS ALONG CONTINENTAL MARGIN OF CENTRAL CALIFORNIA DURING CRETACEOUS TIME

Cretaceous turbidites exhibiting numerous paleocurrent features crop out across a 300 sq mi area long the northeastern flank of the Diablo Range in central-western California. More than 400 pieces of data on sole marks, sandstone and conglomerate grain fabrics, carbonaceous fragment orientation, and parting lineation were used to deduce the trend and sense of the ancient turbidity currents which deposited the beds.

In the northern part of the area the sense of current movement was from northwest to southeast (same as Ojakangas farther north in the Sacramento Valley), though some data indicate an opposite sense of movement. In the central part of the area the sense of movement was northeast-southwest and southeast-northwest. In the southern part of the area the sense of current movement was northwest-southeast and northeast-southwest.

Possible source areas include an ancient craton on the east and an offshore island arc, such as that visualized by Kay, or possibly Klamath Island, Mohavia, and Salinia as visualized by Reed. Coalescing submarine fans with apexes pointing north, east, and southeast toward an ancient craton seem to fit best the observed paleocurrent pattern. The paleocurrent data provide no evidence for a Cretaceous source area, such as Salinia or an island arc, west or southwest of present-day central-western California.

The sequence of beds studied is more than 20,000 ft thick, and ranges in age from Aptian to Maestrichtian; older strata may be present. Current trends show little variation with stratigraphic position.

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GEOLOGY OF VENTURA BASIN, CALIFORNIA, AS AN APPROACH TO EXPLORATION OF CONTINENTAL MARGIN

Although present water depths locally exceed 6,000 ft, the tectonic and stratigraphic history of the southern California continental margin is related more closely to that of the mainland than to the oceanic basin. The exploratory approach presently used in the Ventura basin can be expected to be a model for exploration of the rest of the offshore borderland. Such an approach was used to prepare for the 1968 Federal offshore lease sale. A totally integrated exploration program was required, and included stratigraphic tests, modern geophysical surveys for purposes other than, but including structural mapping, paleontologic studies, onshore surface-geologic mapping, and ocean-floor geologic mapping and sampling by divers and diving submersibles.

The Ventura basin, two thirds of which is offshore, is an east-west-trending synclinal trough containing 40,000–50,000 ft of principally Tertiary marine clastic rocks. Structurally, it is characterized by major east-west thrust faults and tightly folded anticlinal trends. Although anticlinal accumulations provide the largest part of the Ventura basin petroleum, significant reserves occur in a wide variety of traps, including stratigraphic, fault, unconformity, and combination traps. Pliocene turbidite sandstone is the principal reservoir in the eastern part of the basin, and has yielded approximately 1 billion bbl of oil from onshore fields. Miocene, Oligocene, and Eocene marine to nonmarine clastic rocks are objectives on the west.

On February 6, 1968, industry bid a record $1.3 billion and spent $603 million for 383,341 acres; 50% of the acreage is in water deeper than 600 ft. Deep-water drilling technology is advancing rapidly as evaluation is underway.

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DELTAIC ENVIRONMENTS

Deltas are zones of interaction between fluvial and marine processes, and their deposits are transitional between terrestrial-alluvial and open-marine sediments. Initial inspection of a deltaic sedimentary wedge suggests the presence of a hopelessly complex interfingering sequence of beds; however, closer examination reveals an orderly arrangement of environmentally determined facies. In vertical sequence predictable progradational and transgressive sequences can be recognized and related to cyclic growth and deterioration of the delta system. Areal distribution of facies can be related best to three major components of the delta: the upper deltaic plain, lower deltaic plain, and subaqueous delta. Marginal deltaic basins and marginal deltaic plains also may be developed as "appendices" to the delta. Within this gross framework distinctive facies assemblages are recognizable, reflecting different environmental conditions in both modern and ancient deltas; *i.e.*, the assemblage of environments and resulting lithofacies and biofacies within any major component is different in each delta and depends on such factors as climate, tectonic activity, nature and quantity of transported load, tidal influence, sea-state conditions, *etc.* With this working concept it is no longer essential to search for modern analogs to each deltaic sequence found in ancient rocks, but rather a flexible delta model may be developed which will accommodate all variations in nature and intensity of processes acting on the delta. Utilizing such a process-form model, examples of modern deltaic facies and ancient rock counterparts can be analyzed.

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PETROLEUM PROSPECTS OF AUSTRALIAN CONTINENTAL SHELF

The presence of several large areas of thick sediments has been established on the Australian continental shelf by aeromagnetic surveys and reconnaissance seismic surveys. The more significant areas are seaward extensions of onshore sedimentary basins, but they include large thicknesses of Tertiary and Mesozoic sediments. These areas—the Gippsland, Bass, and Otway basins between Victoria and Tasmania, the Perth, Carnarvon, and Canning basins off Western Australia, the Bonaparte Gulf basin off Western Australia and Northern Territory, the Papuan basin in the Gulf of Papua, and the Sydney basin off New South Wales—include an area of about 250,000 sq mi and a sediment volume of more than 650,000 cu mi.