south of the hinge-line, contains a thick Miocene-Eocene section deposited in a saucer-shape basin unconformably overlying Upper Cretaceous sediments. Production in the Rio Vista basin is predominantly from "blanket" type Eocene sands on structural anomalies. North of the Sacramento hinge-line, the majority of the gas production, which is firmly established over this broad area, is stratigraphically entrapped in erratic lenticular Upper Cretaceous sands.

It is anticipated that extensive Upper Cretaceous production present north of the Sacramento hinge-line will be found in the Rio Vista basin and the Northern San Joaquin Valley. The economic depth limit for testing the Cretaceous will be effectively lowered as the intrinsic value of gas increases.

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SUBMICRONIC STRUCTURE OF FOSSIL COCCOLITHOPHORIDS

Electron photomicrographs of replicated surfaces of fossil Coccolithophorids reveal a wealth of minute structural detail. The complex nature of large coccoliths has been suspected from features which can be seen in a light microscope. However, most of the minute structures are visible only in the electron microscope.

Discoliths consist of about 100 radially arranged peripherally branching platelets, each about 1/5 micron wide. Rhabdoliths are extremely complex. The "basal plate" is in reality made up of about 50 wedge-shape platelets arranged in an imbricate fashion. The stem also appears to be made of thin imbricate platelets. *Coccolithites gammation* possesses a complex circular ridge surrounding the central pore. About nine widely spaced shallow grooves, which may represent sutures, are present on the distal surface of this species. The margin is finely dentate, the individual denticles being only about 1/40 micron across. Broken edges of pentaliths of *Braarudosphaera* show an apparent laminar structure; however, no traces of fine structure have yet been observed on the surface of the pentaliths.

Discoasterids appear to be much more coarsely constructed than coccoliths, confirming observations made with the light microscope.

Analysis of submicronic structure will be of major importance in establishing a genetic classification of the Coccolithophorids and related nannoplankton.

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PALYNOLOGY AND TIME-STRATIGRAPHIC DETERMINATIONS

The determination of time horizons is difficult because of the comparatively slight amount of information collected to date; because many palynomorph-bearing sediments are devoid of other fossils which may permit accurate dating; and because many lithologic strata are known to transgress time.

Complications to accurate dating involve recognition of following facts.

1. There are no finite boundaries based on evolution of plants alone. Unless an unconformity is present all horizons involve more or less gradual change.

2. Sediments may be carried into a basin from different directions, resulting in a mixing of suites of palynomorphs from dissimilar floral provinces.

3. River transport may carry a suite of fossils different from those by air transport from the same floral province as well as from a different province.

4. Circulation (coriolus or other currents) can reorient and partially re-distribute fossils after they have arrived within a basin of deposition.

At the present time, the general boundaries (worldwide) such as the Mio-Oligocene, Pennsylvanian-Permian, and Mississippian-Devonian are recognized. Absolute determination has yet to be made, in most instances. Such boundaries are largely theoretical and have to be established and extended as each new fossil province is studied. However, time lines, within an individual depositional basin, can be established palynologically, with reliability and confidence. If palynomorphs are present in sediments of a basin, time-stratigraphic determinations can be made and correlations established.

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RECENT PETROLEUM DEVELOPMENTS IN OREGON AND WASHINGTON

There are five exploration basins in Oregon and Washington, two west and three east of the Cascade Mountains. Exploration has been cyclic; much of the exploration during the high period of the last cycle (1955-1957) was concentrated in the eastern basins.

During 1961, exploration emphasis swung to the offshore parts of the western basins where five companies conducted marine geophysical operations in Washington and Oregon, and a sixth in Canadian waters adjacent to Washington; in addition, offshore aeromagnetic surveys were conducted.

Onshore exploration consisted of seismic operations on Whidbey Island in Washington, and a gravity survey in the Willamette Valley of Oregon. Eleven dry, new-field wildcats totalling 45,000 feet, all located in the Western Columbia Basin of Washington, were drilled during 1961.

During 1961, legislation was passed in Oregon which provides for the leasing of offshore State lands.

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PROGRESS REPORT ON LATE TERTIARY AND QUATERNARY OSTRACOD FAUNAS OF CARIBBEAN

The lower Miocene ostracod fauna of the Caribbean area (the Gulf Coast, Central America, northern South America, the Antilles, and the Bahamas can be divided into four units: Gulf Coast, the "*ashermani*"-fauna (*Hulingsina, Actinocythereis, Protocytheretta*); Central Caribbean, the "*antillea*"-fauna (*Loxoconcha antillea, Hemicythere antillea, Costa* spp.); northern South American, the "*navis*"-fauna (*Cativella, Caudites, Basslerites, Pellucistoma*), and the more wide-spread "*deformis*"-fauna (*Aurila, Hermanites, Jugosocythereis*). These are all shallow-water assemblages. The "*ashermani*"-fauna spread to the south during Miocene time whereas the "*antillea*"-and "*navis*"-fauna moved northward to effect a mixing of the faunas in the Cuban and Guatemalan latitudes. The "*ashermani*"-fauna did not extend far south of these, and in the Quaternary withdrew northward. The "southern" faunas spread farther north, with the "*antillea*" element reaching Florida in the upper Miocene, and later withdrawing. The "*navis*"-fauna extended to the Carolinas, and at present dominates the entire region.

Relative movements of these faunas are governed by many factors, including currents, temperature, water-depth, salinity, and bottom sediment among others,