3. Unconformably on the Miocene are estimated 500+ feet of extremely fossiliferous Pliocene silts and sandstones.

4. Fossiliferous marine Pleistocene terrace deposits are faulted and gently tilted on the mainland. Emerged wave-cut benches are prominent on the islands.

5. The dominant structural pattern is a series of large northwest-trending faults separating the region into strips of older and younger rocks. Some faults have shear zones hundreds of feet wide containing a remarkable assemblage of more or less serpentinized basement rocks, most of which are not found in outcrops elsewhere. Four episodes of deformation can be differentiated; the earliest is pre-Miocene and the latest post-Pleistocene.

6. The San Benito Islands share in the northwest structural grain but lack the Miocene and younger rocks. Glaucophane schists, red cherts, graywackes, altered basic volcanics, and serpentine are highly sheared and suggest that these islands may be entirely within a large northwest-trending fault zone.

JOSEPH LIPSON, JACK EVERNDEN, AND GARNISS CURTIS, University of California, Berkeley, California

Potassium-Argon Dating of Sedimentary and Igneous Rocks

This laboratory has developed techniques for dating samples of low radiogenic argon content. Results of three principle lines of study utilizing these techniques will be reported. (1) Ages of a series of well classified glauconites from New Zealand ranging from the Cretaceous (55 million years) to the Miocene (20 million years). (2) Ages of two near surface igneous micas from Sutter Buttes, California, less than two million years in age. (3) Ages of a series of related plutonic igneous micas from the Sierra Nevada around 90 million years in age.

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Hydrodynamics—Practical Exploration Tool

Those effects of hydrodynamics which result in tilted oil pools have been known for some time, but the problem has been whether or not a practical application of these effects could be used in exploration. What is not commonly realized is that hydrodynamics plays a very important part in stratigraphic, fault, and unconformity oil accumulations which do not exhibit a noticeably tilted oil/water contact.

In tilted oil pools the tilt of the oil/water contact for a potentiometric surface increases as the gravity of the oil decreases. This tilt is accomplished, not by rapid movement of water through the aquifer past the oil/water interface, but rather by the pressure drop across the area of the oil accumulation due to extremely slow movement of the water through the pores of the aquifer.

Under static conditions, the size of an oil accumulation below a pinch-out or against a fault is dependent solely on the entry pressure of the barrier. If hydrodynamic conditions exist, however—and this appears to be almost universal—the size of the accumulation is increased or decreased from what would normally be expected, according to the direction of hydrodynamic force. This can result in very large oil accumulations or barren "traps" under what appear to be the same structural and stratigraphic conditions.

The practical application of hydrodynamics begins with the mapping of the potentiometric surface of the various reservoirs of interest. The map is then used in conjunction with the geology of the prospects to be evaluated and the gravity of the oil expected in the trap.

The application of hydrodynamics is developing into a very important exploration tool.

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Tertiary Sequence on Northeast Coast of Gulf of Alaska

Sedimentary rocks of Tertiary age exceeding 25,000 feet in composite thickness are intermittently exposed in a lowland and foothills belt 300 miles long and 2–40 miles wide on the northeast coast of the Gulf of Alaska. Three major subdivisions of the Tertiary sequence are recognized: (1) interbedded and intertonguing non-marine, brackish-water, and shallow-water marine strata that contain a tropical to warm-temperate flora and marine invertebrate fauna of late Eocene age and include the Stillwater, Kushtaka, and Tokun formations in the Katalla district and an unnamed formation in the Yakataga and Malaspina districts; (2) shallow- to deep-water marine strata that contain a warm-temperate to subtropical invertebrate fauna of Oligocene and early Miocene age and include the lower part of the Katalla formation in the Katalla district, the Poul Creek formation in the Yakataga district, and the basal part of the exposed Tertiary sequence in the Lituya district; (3) shallow-water marine strata, in part marine tillite, that contain a cool-temperate to sub-boreal invertebrate fauna of late Miocene and Pliocene age and include the upper part of the Katalla formation in the Katalla district, the Yakataga formation in the Yakataga and Malaspina districts, and the upper part of the Tertiary sequence in the Lituya district. Oil seeps and other indications of petroleum are associated mainly with the two lowest subdivisions of the Tertiary sequence.

Remains of marine mammals have been found in the upper part of the Poul Creek formation in association with Mollusca and Foraminifera that indicate correlation with the Blakeley formation