tion is an unusual rapakivi-textured quartz-latite porphyry. A tertiary volcanic field, located about 169 mi (240 km) southeast of the Mint Canyon Formation in the northern Chocolate Mountains east of the San Andreas fault, contains the same variety of volcanic rock types as those that occur as clasts in the Mint Canyon Formation, including the unusual rapakivi-textured porphyry. Chemical analysis and isotope ratios of volcanic clasts from the Mint Canyon Formation and rocks from the volcanic field show them to be strikingly similar.

These data indicate that the Mint Canyon Formation is offset from the volcanic source by about 169 mi (240 km) of right slip along the San Andreas fault.

EPSTEIN, SAMUEL A., Cities Service Co., Houston, TX, and QUAY L. NARY, Getty Oil Co.

Correlations Between the Onshore and Offshore Santa Maria Basins — A Dilemma

In an unexplored basin, extrapolation from known hydrocarbon-producing trends is ideal. However, along transform margins such extrapolations are difficult, owing to lateral displacement between individual blocks on both regional and local scales. An example of this is the relationship between the onshore and offshore Santa Maria basins, which are separated by the Hosgri fault.

Stratigraphic packages have been used widely to approximate amounts of displacement. Lower Miocene volcanics in the offshore Santa Maria P-060-Oceano well may correlate with onshore outcrops, located across the Hosgri fault, 30 mi (48 km) to the east and 45 mi (72 km) to the south, near Point Arguello. Additionally, lower Miocene volcanics also are present in two exploratory wells across the Hosgri fault, 10 mi (16 km) to the east and 25 mi (40 km) to the north, near Point Buchon. These are the Honolulu-Tidewater U. S. L. Heller Lease 1, with 4,722 ft (1,440 m) thickness of volcanics, and the Tidewater Motadoro 1, with 3,873 ft (1,180 m) of lower Miocene volcanics. These wells provide two volcanic sections onshore to tie with the offshore volcanics.

Originally, the lower Miocene volcanics now situated in the northern and southern extremities of the Santa Maria area, may have been joined near the midpoint of their present positions. As the onshore basin pulled apart, the volcanics were divided and transported in opposite directions. Synchronous pull-apart movements occurring in the offshore kept pace with the adjacent onshore. Alternatively, significant intrusive pathways may have opened in the later stage of basin development, allowing igneous material to migrate vertically. These pathways have been termed "leaky" transforms in the literature. Neither of these models necessitates significant lateral displacement once the onshore and offshore basins formed.

Onshore the middle Miocene Monterey Formation and upper Miocene to Pliocene Sisquoc Formation correlate well with equivalent chronostratigraphic units in the offshore P-060-Oceano well, implying that relatively minor lateral displacement has occurred since the middle Miocene. If the offshore basin history is similar to that of the onshore its petroleum potential may approximate that of the onshore, which has been projected to produce 900 million bbl of oil.

FIFE, DONALD L., and MARK E. BRYANT, Converse Consultants, Anaheim, CA

Significance of Neogene Phosphorites in Capistrano Embayment, Southern California

The post-Relizian Monterey, Capistrano, and Niguel Formations comprise about 3,280 ft (1,000 m) of phosphorite-bearing marine sediments. Primary deposition appears to have been as pelletal and nodular phosphorite forming phosphoritic shales with occasional high-grade zones ranging up to 20 to 40% P_2O_5 and individual beds ranging up to 7 ft (2 m) or more in thickness. Most high-grade shale beds, however, are less than 3 ft (1 m) thick and average 20 to 25% P_2O_5. Some of the best exposures are in Aliso and Oso Canyons within the San Juan Capistrano quadrangle. Excavations for construction have exhumed weathered phosphorites at and below the water table exposing remobilized phosphate which is readily recognizable as vivianite [$Fe_3(PO_4)_2).8H_20$]. The purple (azurite colored) vivianite oxidizes on drying to a brownish color within a few weeks, thus it is rarely identified during conventional field mapping.

Large-scale landsliding within the Monterey and Capistrano Formations has commonly fractured phosphorite-bearing beds and allowed mobilization and redeposition of the original phosphorite as vivianite above the basal shear plane of block-glide landslides and downstream. Water in downstream drainages has the potential for being misidentified as a pollutant from septic systems. This suggests that geochemical techniques might provide valuable methods of exploration for certain phosphate occurrences.

Of several phosphorite basal conglomerates within or between the Monterey, Capistrano, and Niguel Formations, the best exposed and one of the best developed lies along the angular unconformity between the Monterey Formation and the overlying Niguel Formation on the east flank of the San Joaquin Hills, immediately north of the U.S. Geological Survey office at Laguna Niguel. This resistant phosphorite bed is composed of what appears to be nodules derived from the underlying Monterey Formation. They have been redeposited in and just below the littoral zone. Some of the phosphorite is concentrated in downslope channels within the neritic zone.

Additional exploration within the Capistrano embayment would probably yield economic amounts of phosphate rock. Rapid urban expansion in this part of southern California will probably preclude further exploration and development. However, as the Neogene phosphorite-bearing formations of the Pacific slope become better known, there may be substantial incentive for exploration and development in other areas. California is one of the largest consumers of phosphate in the United States and imports almost 100% of its supply from Florida, Idaho, and other areas. Potentially, millions of dollars could be saved annually in transportation costs and a strategic commodity (petroleum) would be conserved, if local deposits could supply the California market.

FINGER, KENNETH L., Chevron Oil Field Research Co., La Habra, CA

Biostratigraphy and Paleoecology of a New Ostracode Fauna from Rincon Formation (Oligocene-Miocene), Los Sauces Creek, California

An ostracode fauna consisting of 10 new species occurs in the uppermost Zemorrian and lowermost Saucesian sections of the lower Rincon Formation, Los Sauces Creek, Ventura County, California. *Paracosta* and *Buntonia* dominate the assemblage, which is also represented by *"Paijenborchella," Loxoconcha, Acanthocythereis, Asymmetricythere, Cytherura, Xestoleberis,* and a new genus.

A predominance of complete carapaces infilled with pyrite and calcite indicates rapid burial in a slightly basic and reducing