tions, *etc.*), these data are providing useful information relative to the mapping of regional structure, joint patterns, drainage patterns, fault traces, and rock types.

Remote sensing should never be considered as a panacea for studying geoscience problems, but should be treated as a developing tool which will provide additional information for a multifaceted scientific approach to studying the earth and other planets. Remotely sensed data, especially that acquired from space, provides synoptic coverage of large areas and of environmental factors, not perceived by the unaided eye or during field observation. These environmental phenomena include surface distribution of heat, moisture, snow, open water, viable vegetation, and cultural features. Synoptic images and temporal change illustrated by sequential coverage are useful for teaching, research, and exploration in geoscience. Specific examples of remote sensing applications are described, including the recognition of several previously unrecognized faults on the Appalachian Plateau.

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NATURE AND SIGNIFICANCE OF BORINGS AND OTHER STRUCTURES ON AND WITHIN OOLITE ALLOCHEMS

A combination of scanning electron microscopy, light microscopy, decalcification, staining with malachite green, and a Lakeside-70 impregnation-decalcification technique shows that biogenic and inferred biogenic structures are present on and within all types of allochems in samples from 12 oolites ranging in age from Holocene to Silurian. The types of structures include borings, mucilaginous filaments, pits, irregular depressions, and globules. The most abundant and best preserved of the structures are in Holocene samples.

Borings are the commonest structure in all types of allochems, regardless of the age of the sample, and appear to be due to blue-green algae and to a lesser extent to fungi. Borings may consist of a single straight or anastomosing structure, or may have a ramiform structure. More commonly, borings form complex reticular, clotted, spongy, or polygonal structures.

In the samples studied, no systematic relation exists between the nature, abundance, and distribution of borings and the development of micrite envelopes in ooids. Most ooids which contain abundant borings do not display any sign of a micrite envelope. Also, borings may be as abundant in ooids as they are in peloids. These new findings support ideas presented previously by Bathurst and by Purdy that either decomposition of organic matter by bacterial activity, or the metabolic activity of the original borer, or both, play a more important role than the borings themselves in the development of micrite envelopes and of recrystallization in ooids.

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STRUCTURE AND STRATIGRAPHY OF RHARB BASIN AND RELATION TO PLATE-MARGIN TECTONICS

The Rharb basin is an east-west-trending trough in northwest Morocco. It separates Cenozoic Rif sedimentary sequences from older, pre-Cenozoic platform rocks. These platform deposits are relatively undisturbed; the Rif sequence is greatly deformed.

Timing of the filling of the Rharb basin suggests 3 separate and distinct events. These are: (1) pre-Rif sedimentary sequences related to the early Tertiary uplifting, folding, and faulting on the north; (2) emplacement of the Miocene "prerifaine nappe," with consequent deformation; and (3) deposition of younger, relatively undisturbed, late Miocene to Holocene sediments.

Seismic, subsurface, and surface data suggest, in addition, that nappe emplacement was severely affected by preexisting topographic highs on the rapidly subsiding pre-Cenozoic platform. One consequence of this tectonic style of deformation was the formation of a series of large faults and fault-controlled mountains (Jebel Kafs, Jebel Zerhoun, *etc.*). Displacement along faults locally may exceed 1,000 m; possible lateral movement could be more than several kilometers.

A strong positive arch in the eastern Rharb basin has had great effect on the structural patterns of the Rharb basin, the Sais basin on the east, and the Djfarra basin and contiguous mountains. This arch acted as a resistant buttress to laterally moving thrust sheets and the Miocene nappe. It also acted as a source for much of the Miocene sediment in the contiguous basin areas. Once stripped of sediment, the high began foundering and the tectonic patterns that already were established continued or were accentuated.

The relation of the African plate to the plate margins suggests only mild downwarping with no active zone of igneous activity. No well-developed fractures were observed. Several small oil fields are associated with the nappe; these produce from relatively weakly defined structures or structural traps.

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INTERACTION OF AQUEOUS Mg^{2+} WITH GROWING CALCITE CRYSTALS AND ITS EFFECT ON THE ARAGONITE → CALCITE TRANSFORMATION BETWEEN 25 and 90 DEGREES CELSIUS

The interaction of aqueous Mg^{2+} ions with growing calcite crystals was studied by closed system recrystallization of aragonite to calcite in the presence of aqueous $CaCl_2$-$MgCl_2$ solutions at 25-90°C. The measured heterogeneous distribution coefficients for Mg^{2+} between calcite and solution ($\lambda\, {}^{C}_{Mg}2+$) are independent of the solution's composition and rate of recrystallization. They are strongly dependent on temperature, being 0.0573 ± 0.0017 at 25°C, 0.0681 ± 0.0019 at 35°C, 0.0778 ± 0.0022 at 50°C, 0.0973 ± 0.0021 at 70°C, and 0.1163 ± 0.0034 at 90°C. If, as reported in literature, calcite containing 12-16 mole % magnesium has the same solubility as that of aragonite, the new λ^{C}_{Mg} values exclude its formation directly from sea water. However, in closed systems isolated from seawater, the transformation of aragonite to calcite should start spontaneously once the magnesium-calcium ratio of the interstitial fluids drops from 5 to 2 or less, no freshwater intervention in this process being necessary.

The kinetics of recrystallization in the absence of Mg^{2+} at 25 and 35°C are strictly diffusion controlled and are, thus, markedly affected by the mass of aragonite per unit-volume of solution taking part in the process. The kinetic effect of Mg^{2+} is still under study.

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GEOTHERMAL EXPLORATION AT SUMMIT OF KILAUEA VOLCANO

An area of anomalously low resistivity, associated with high microearthquake activity at depths of 1-3 km, has been mapped near the summit of Kilauea Volcano, Hawaii. In view of the volcanic activity in the area, one possible explanation of this feature would be that a convection cell of warm water is present above the magma chamber feeding the volcano. To test this possibility, a hole has been drilled and cored in the center of the anomaly. Physical properties and temperatures have been determined in the well bore using standard geophysical logging techniques.