debris. In turn, this bioclastic member grades upward into calcarenite composed of particles of limestone. Basal arkose of unit D overlies the calcarenite.

Unit B, insofar as exposed, and unit D show this same sequence of rocks, although there are differences in the proportion of red beds.

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MAGNETISM OF THE EARTH'S CRUST AND THE EARTH'S INTERIOR

Power spectrum analyses of the geomagnetic field over the earth's surface show that the field fluctuations of wave lengths shorter than about a thousand kilometers are connected mostly with the geological structure of the earth's crust. Possible interpretations of the relation between geological structure and the surface geomagnetic anomalies are demonstrated by referring to fairly detailed maps of geology, geomagnetic anomaly, and Bouger anomaly of the gravity field over Japan Islands as well as magnetic properties of various rocks. Special attention is drawn to the absolute importance of natural remanent magnetization of rocks for this kind of interpretation.

It seems likely that geomagnetic anomalies of wave lengths from several hundred kilometers to several thousand kilometers are related to the distribution of continents, to the variation of thickness of the earth's crust, and to the undulation of isothermal surfaces in the earth's upper mantle. Geomagnetic field fluctuations of larger scale seem to be attributable to the electric eddy currents just beneath the surface of the earth's core.

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SOME ASPECTS OF LOWER GODAVARI RIVER AND DELTA SEDIMENTS, INDIA

To study the progressive changes along a river and to delineate sedimentary environments based on variations in the litho- and chemo-facies, 400 recent sediments from the fluvio-marine environment of the Godavari were collected in the pre- and post-flood seasons.

The present river morphology is a manifestation of the bed load material. Higher silt-clay ratios increase the degree of sinuosity and decrease the width/depth ratios of the channels. Decrease in the sinuosity of the river course in the last one hundred years is probably a result of the coarsening in the bed load.

Mean size decreases and coefficient of sorting increases progressively along the river course; skewness changes from positive to negative while kurtosis remains constant. These changes are probably attributable to the decrease in the energy levels downstream.

Heavy mineral percentages are directly proportional to the mean size of the sediments. Heavy minerals indicate a predominantly igneous (acidic) and high-grade metamorphic (khondalite, calc-granulite, and amphibolite) provenance. Few authigenic and rounded zircons are considered secondary. Downstream increase of pyroboles and sillimanite, and decrease of opaques and garnets, is apparently due to sorting based on shape and density.

Delineation of sedimentary environments based on conventional size measures has been partially successful. Similarity in the backwater and marine shoal sediments north of the river confluence indicates that the former was a part of the open sea.

Phosphate, uranium, and iron concentrations were determined in the clay fractions. Phosphate and iron are highest in the marshes. Iron concentration decreases in the backwater and is least in the river channels. Preliminary data show higher uranium content in the upper river.

X-ray analyses show illite, chlorite, and Na-montmorillonite increasing and Ca-Na montmorillonite and kaolinite decreasing from the fluvial to the marine environment. Na-montmorillonite is more predominant in the swamps and illite in the backwater.

The hydrographic data collected are being processed to understand the physico-chemical conditions of deposition.

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DIAPIRIC STRUCTURES IN THE DIABLO RANGE, CALIFORNIA

The Diablo Range is one of the northwest-trending central Coast Ranges of California. It is a complexly-faulted, asymmetrical anticlinorium structurally bounded on the west by the San Andreas fault and on the east by the San Joaquin Valley. Its core consists of the Late Jurassic Franciscan Formation and intruding serpentine. These rocks were formed in an extremely deep and narrow eugeosynclinal trough directly on a simatic base. Younger, flanking rocks, locally overturned, are of Early Cretaceous to late Pliocene age. Core rocks crop out (1) as faulted slivers in the San Andreas fault zone and (2) as piercements along the crest of the principal anticlinal axis.

A major diastrophic episode closed the Jurassic period, broad folding took place late in the Cretaceous, and local uplift occurred in late Miocene time. The piercements transected rocks of the anticlinal crest in late Pliocene and early Pleistocene time.

The diapiric structures are the result of intense compression of a thick sedimentary wedge, accompanied by great vertical movements in a series of intermittent orogenies. Sheared serpentine played an important part in final emplacement. In the broad view, these structures are but detail in the great fault features of western California which developed at the continental margin while faulting, folding, and intrusion took place during thrusting of the simatic sea-floor materials under the sialic edge of the continent.

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VISCOUS PROPERTIES AND CREEP OF SALT

Experiments by Nettleton and others to simulate salt dome formation by means of superposed viscous liquids have clearly demonstrated that gravitational instability provides a physically sufficient explanation of the origin of these structures. In the hydrodynamic theory of stability of a layered sequence, exceedingly high viscous parameters must be used. Very few reliable direct measurements of the viscosity of rocks, obtained in the laboratory under realistic conditions of strain rate, pressure, and temperature, are available. The reason is that creep is a complex phenomenon, part of which is of a transient nature. Most creep rates measured for rocks and cited in the literature refer to transient creep and are probably of little value with regard to a determination of rock viscosity. Only the steady-state creep be-