The following hypothesis is proposed to explain these facts: during orogenesis, the miogeosynclinal carbonates were detached from the underlying evaporites, crushed between the median welt and platform, and overridden locally by the eugeosyncline. After middle Eocene time, the diapirs intruded along deep faults and reached the surface with fragments from the overridden facies belts. The latest diapiric movements are post-Miocene. The small number of diapirs probably is related to the great competence of the thick, overlying post-evaporite carbonate section.

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DENSITY CURRENTS EXPERIMENTS

An extensive series of experiments on density currents of salt water, or muddy water flowing under fresh water, have been performed by engineers. The author has verified some of the results reported by earlier workers. Some new results have been obtained, using the small flume described by Bell (1942). A "specific law of saline fronts" was described by Keulegan (1958) who found that the movement of the head of a density current "surge" across a flat bottom could be described (for high Reynolds Numbers) by the equation

$$v = C\frac{\sqrt{\Delta_p d g}}{\rho}$$

where v is the velocity of advance of the head, C is a constant, Δ_p is the density difference between the two fluids, ρ is the mean density of the two fluids, d is the thickness of the current behind the head of the current, and g is the acceleration due to gravity. The author's experiments reveal a similar law for density currents flowing down a slope, with the exception that C depends on the slope. It is found that the ratio v/u, where u is the average velocity of uniform flow down the same slope (after the passage of the head), also depends on the slope, and is close to unity only for very low slopes. These results may have considerable significance for interpreting the behavior of turbidity currents.

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DEPOSITION ACCOMPANYING LARAMIDE TECTONICS, RED DESERT (GREAT DIVIDE) BASIN, WYOMING

The last major invasion of the sea in the northern Rocky Mountains is known from the distribution of the Upper Cretaceous Lewis Shale. Electric log correlation of key marine beds within the Lewis Shale provides reference horizons that facilitate the measurement of the subsequent structural deformation and accompanying terrestrial deposition during the Laramide orogeny.

Structural subsidence of the basin was contemporaneous with the accumulation of paludal, lacustrine, and fluvial deposits observed in 4,000 feet of the Upper Cretaceous Lance Formation. Post-Cretaceous erosion leveled the margins of the basin. Isopachous maps of the Lance interval, from the unconformity to the key beds, reveal areas of local uplift that are coincident in several places with hydrocarbon accumulations in the underlying Mesaverde Formation along the east flank of the Rock Springs uplift.

Periodic subsidence continued during the Paleocene and was accompanied by large scale normal and reverse faulting along the northern margin. Fort Union arkosic conglomerate, sandstone, and silty mudstone, derived from adjacent source areas, accumulated in and around the embryonic basin. Three lithologic facies that define the detritus related to each period of structural change are recognized. Lateral expansion of the basin is revealed by the onlapping relationship of the "basal" conglomerate and the distribution of the associated basin facies. The stratigraphy of the "basal" conglomerate is poorly understood from fossil evidence.

More than 6,000 feet of Paleocene Fort Union, and Eocene Battle Springs, Wasatch, and Green River strata in the subsurface have been correlated with the surface section recently described by George Pipiringos of the United States Geological Survey.

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CRUSTAL SHEAR PATTERNS AND OROGENESIS

Major crustal shears of North America, Europe, and Africa are shown and analyzed, and it is concluded that two orthogonal primary compressional shear sets, which are essentially wrench fault zones, exist world-wide. These sets are thought to have been generated by meridional and equatorial compressive stresses; the meridional and equatorial shear systems for the world are shown.

Major fault zones of the earth's regmatic shear pattern are considered to exercise fundamental control on orogenesis. These major fault zones probably extend downward to a discontinuity which may be the Mohorovicic discontinuity at the base of the crust, or may be deeper. It is thought that "continental drift" occurs by translation (with very little, if any, rotation) of the polygonal crustal blocks, which derive from the regmatic shear pattern, moving above this discontinuity. Ultimate driving forces are to be sought in relation to the earth's translation and rotation in space, and in sub-crustal (sub-Moho) convection currents; the result of these forces is omnipresent lateral compression in the crust.

Orogenesis results from the interaction of the crustal blocks as they move and yield in response to the lateral-compression stress field and the earth's gravitational field. On this basis, tectonic mountains are classified into: (a) linear uplifts with longitudinal wrench fault zones and related thrusting, (b) autochthonous fold belts, (c) vertically uplifted or tilted fault blocks, (d) domal uplifts, and (e) volcanic chains. Secondary effects of orogenesis include metamorphism and magmatic activity related to frictional heat from movement in major shear zones; and erosion, glaciation, and gravity sliding resulting from vertical components of movement along major faults.

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CONTINUOUS REFLECTION STUDIES OF MARGINAL BASIN SEDIMENTATION

Marginal basins include those within the body of the continental terrace (shelf and slope basins) and those flanking the terrace where it is separated from the deep sea by intervening topographic highs. Geographically widespread investigations with continuous reflection profilers suggest that continental slope basins are more common than previously suspected, particularly in tectonically active regions. Because of well-known topography and surface-sediment distributions, selected California continental borderland basins can be used as natural laboratories to study details of internal structures of basin deposits. These are compared with records