The Steep Rock group lies unconformably on a granite complex. The basal unit is a conglomerate succeeded by the Dolomite, Orezone and Ashrock formations. Intense deformation is indicated by steep dips, brecciation, shear folds, and numerous faults and dikes, but thermal effects are negligible, and Precambrian limonite and bauxite have remained unaltered.

The Orezone formation has three members. The lowermost of these, the Manganiferous Paint member, is up to 1,000 feet thick, is mainly below ore grade, and represents a residuum derived from the Dolomite formation which it overlies disconformably. The middle, or Goethite, member is up to 300 feet thick, is dominantly goethitic iron ore, but includes minor aluminous and cherty sediments and, in a few places, lenses of ferruginous bauxite. The uppermost, or Pyrite, member occurs sporadically along and near the contact of the Orezone with the overlying Ashrock formation. Microcolloform structures in the pyrite, paucity of trace elements, and association with carbon and banded chert indicate a sedimentary origin for this member.

Valency changes in iron and manganese within the Steep Rock group suggest that deposition spanned a critical period in atmospheric evolution about 2 billion years ago.

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SIZE AND DISTRIBUTION OF OIL AND GAS FIELDS

In any decision concerned with the strategy and tactics of oil and gas exploration, a key variable is the *size* of hydrocarbon deposits in barrels of oil or in MCF of gas. The size of pool or field discovered in a particular wildcat venture determines the degree to which the venture is an economic success. Since the pool or field size that will be discovered is almost always unknown before a prospect is drilled, an important question is: What functional form should be used to characterize the probability distribution of field sizes in a petroleum province? By "functional form" we mean a mathematical formula which defines a family of distribution functions.

Two types of functional forms are particularly adapted to use in this context—the Lognormal and Pareto-Levy—for several reasons: (1) because they give a good empirical fit to histograms of reported field sizes in barrels of oil or MCF of gas; (2) because they are in concordance with some concepts of the origin of mineral deposits; (3) because stochastic models of the discovery process built on reasonable assumptions about the process lead to these functional forms; and (4) because the Lognormal distribution in particular is analytically tractable and rich enough to capture most reasonable oilmen's quantitative judgments about reported field size.

The Lognormal distribution is highly suited for use in analysis of exploration decision problems, for a particular Lognormal density function is fully specified by only two numbers.

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PRIMARY STRUCTURES IN THE MIDDLE JURASSIC GREAT OÖLITE SERIES, SOUTHERN ENGLAND

Primary structures observed in the Great Oölite Series include planar, wedge-shape and lenticular cross-stratification, current and interference ripples, micro cross-lamination, dunes, pseudonodules, loadcasts, graded bedding, mudcracks, groove casts, current lineation, prod marks, and bounce casts. These structures are grouped into two environmental and petrographic combinations.

High-energy, channelled, shelly-oölitic limestones (grainstones) are characterized by vertical sequences consisting of a basal zone of imbricated shell fragments, a middle zone of thick sets of planar and lenticular cross-stratification, and an upper zone of interference and current ripples and wavy beds. The cross-strata show two dip directional maxima which are 180° apart, possess a high dip angle (26° average) and contain thin (1–1.5 in.) graded beds. These graded cross-strata consist of a shell chip zone which grades upward into coarse-grained oölite and fine-grained oölite. The shelly base of such a graded bed thickens and increases in particle size downslope. The oölites were deposited by normal flow in a lower flow regime, whereas the shell chips were deposited by counter eddies eroding the basal channel shell lag concentrate. The primary structures in the channelled limestone were formed in a lower flow regime operating in intertidal zone channels.

Low-energy, even-bedded, oölitic clayey limestone (packestone and wackestone) are characterized by thick (1–5 ft.) graded beds, load casts and cross-stratified grainstone lenses. These cross-strata are low angle (average dip is 18°) and are current lineated if the limestone contains 15–25% quartz sand. The graded beds grade upward from coarse-grained oölite to clay-size carbonate particles. The top of each graded bed is bored and plastered with oyster shells in life position. These graded beds were formed by periodic sea-level oscillations which transgressed subtidal deposits across low and then high tidal flats. The cross-stratified grainstone lenses represent a beach or barrier bar marginal to the intertidal zone.

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PETROLOGY OF THE SIMSBORO FORMATION (EOCENE) OF NORTHEAST CENTRAL TEXAS*

The lower Eocene Simsboro formation of the Wilcox group, between the Trinity and Brazos Rivers, Texas, was deposited as a braided stream-floodplain complex. It consists of: (a) very fine-grained to medium-grained sand: immature, clay pellet-bearing subgraywacke bordering on an orthoquartzite; (2) illitic-kaolinitic, silty clay; (3) fine sandstone: siliceous, bimodally mature orthoquartzite; and (4) kaolinitic, silty clay.

The fine- to medium-grained, kaolinitic, clay pellet-bearing subgraywacke occurs as channel deposits and exhibits pronounced trough or festoon cross-bedding. The round kaolinitic clay pellets are detrital. The matrix consists of particles of kaolinite worn from the clay pellets and pellets mashed by the harder detrital grains. Thinly laminated (5–20 mm.) silty clay, in lenticular beds up to 20 feet thick, is laterally associated with the festoon cross-bedded channel deposits. Angular pebbles, cobbles, and boulders of this clay, derived from the nearby flood-plain, are locally incorporated within these channel sands. Hard, siliceous orthoquarzite, consisting of fine-grained quartz in a matrix of quartz silt, forms a massive ledge 2–20 feet thick throughout the area. The exact relation of the orthoquartzite to the rest of the Simsboro is not known. A persistent bed of thinly (1 mm.) laminated, white, kaolinitic, silty clay 20 feet thick occurs at the top of the formation.

Orthoclase and microcline grains severely weathered

* Publication authorized by the director of the Bureau of Economic Geology, The University of Texas, Austin.