producing fields and distribution of potentially productive trends.

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RECENT DELTAIC DEPOSITS OF MISSISSIPPI RIVER: THEIR DEVELOPMENT AND CHRONOLOGY

Fifteen separate delta lobes have been formed by the Mississippi River in the past 6,000 years. Fourteen are included in the Teche, St. Bernard, and Lafourche deltaic complexes; the fifteenth includes the present birdfoot delta, which is an extension of the initial lobe of the Plaquemines-Modern complex. Each deltaic complex is genetically related to a major Mississippi River trunk stream, whereas delta lobes within each complex are the result of different distributary networks extending from the trunk stream.

The delta lobes were defined by detailed facies analyses of sediment cores from hundreds of shallow borings combined with lithologic and faunal data from several hundred additional borings. Each lobe consists of a basal fine-grained prodelta facies, an overlying sandy delta-front facies, and an uppermost fine-grained delta-plain facies. The latter deposits include peat accumulations and nonorganic flood-basin and natural-levee deposits.

More than 100 radiocarbon age determinations have been used to establish the chronology of major deltaic complexes and their subsidiary delta lobes. These data, together with the facies relations, indicate that growth of each deltaic complex was sporadic; progradational phases were interrupted by transgressions resulting from local shifting of sediment influx and from subsidence.

Similar deltaic sequences, prevalent in Tertiary outcrops along the northern flank of the Gulf Coast geosyncline, extend basinward as massive subsurface clastic wedges, which constitute a major part of the peripheral basin fill.

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A LOCAL GEOLOGIST TRIES TO EXPLAIN SAN ANTONIO

(No abstract submitted)

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HIDDEN TRENDS AND FEATURES

Most of the easy-to-find accumulations of petroleum in this country have been found. As a result our domestic exploratory successes during the past decade have been declining not only in numbers of fields found annually, but also in quality or economic worth.

This has come about because the petroleum industry is still confining most of its exploratory efforts to the search for the obvious types of traps which it *knows* are becoming more scarce and thus harder to find.

Geologists have made relatively little effort to search purposefully for the obscure traps—stratigraphic or paleogeomorphic—because of (1) a motivation to continue looking for structures which can be found with present-day tools and ideas, and (2) the pressure exerted on explorationists by their knowledge that anticlines, domes, and fault structures are more acceptable and saleable to management.

Hidden trends may occur below unconformities, at undrilled depths in productive trends, and in relatively unexplored regions. Hidden features may be ancestral anticlines and domes, faults, stratigraphic traps, and buried geomorphic features. The differences between these hidden and the obvious type features is that the former are *not obvious* to present-day exploratory methods and thinking. Many of these probably can now be found, but only if we point our methods and thinking toward them, not around them.

The large domestic reserves required for the future are contained in hidden trends and features. If we are to succeed in finding them, geologists and management will have to place greater emphasis on the search for the obscure trap. In this search, the geologist will be required to emphasize greater study and research on stratigraphy, paleogeomorphology, paleogeography, and paleostructure. Management, on the other hand, will have to be reoriented in its exploration thinking and policies so that the geologist will be encouraged to look for the obscure as well as the obvious trap; also the explorationist must be assured by management that to search for the subtle trap will be welcomed instead of discouraged.

The Gulf Coastal Province contains many geological environments which offer possibilities for production from subtle or hidden traps—among these are (1) sand pinchouts in the lagoonal environment of the Frio (Oligocene) of South Texas, (2) buried structures and sand buildups in the Hackberry embayment (Oligocene) of southeast Texas and southwest Louisiana, (3) possibilities for localized favorable sand distribution patterns in the downdip Wilcox (Eocene) in an area extending from Mexico to Alabama, (4) buried, undiscovered accumulations of petroleum in ancient traps around salt domes which were formed when the domes were shaped or positioned differently than at the present time, and (5) in the entire Gulf Coastal Province where there is no doubt that paleogeomorphological features exist.

The time has come when domestic explorationists must make a turn in the direction of *purposefully* looking for the obscure trap. Since the start in that direction necessarily must begin through management, who must be convinced that the search for the subtle hidden trap is necessary to the future welfare of the industry and the national economy, it is up to the geologist and geophysicist to sell management on the idea of directing a sizeable portion of the exploration effort toward the less obvious traps. If management exploratory policies can be oriented in this direction, the industry will be rewarded with a new era of successful exploration

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CALCAREOUS NANNOPLANKTON ZONATION OF CENOZOIC OF GULF COAST AND CARIBBEAN-ANTILLEAN AREA, AND TRANSOCEANIC CORRELATION

Calcareous nannoplankton organisms evolved rapidly during the Cenozoic, and are of great value as stratigraphic indicators. Many species exhibit world-wide distribution, so that this group of fossils is very useful in transoceanic correlation. Many calcareous nannofossils may be recovered from relatively shallow-water sediments, permitting the zonation established in pelagic sediments to be used in shelf deposits.

The event which ended the Cretaceous almost anni-