24. FRANCIS F. CAMPBELL,[1] Amerada Petroleum Corporation, Tulsa, Oklahoma

FAULT CRITERIA[2]

Examples of six criteria for fault interpretation of seismic data in East Texas and the Gulf Coast are presented on a series of maps and cross sections. The six criteria are: (1) *correlation* of reflection horizons which bracket the producing objective; (2) *projection* of a fault from a shallow bed with correlatable reflections to a deep producing objective; (3) *variation* between geological correlations and geophysical dips; (4) *misclosure* around a grid unit of seismic control; (5) *dip pattern* along several lines of control; and (6) *diffraction*. The diffraction example includes results of fault-model experiments in the laboratory. Although each example was selected as a particularly clear illustration of one criterion, fault interpretation generally depends on a combination of several criteria. Additional criteria for fault interpretation may be used. The criteria presented are not infallible and they do not detect very small faults.

25. E. D. BURDINE, Sunray DX Oil Company, Lafayette, Louisiana, W. R. PAINE, University of Southwestern Louisiana, Lafayette, Louisiana, AND J. C. WIRE, Sunray DX Oil Company, Lafayette, Louisiana

ENVIRONMENTAL OBSERVATIONS IN GRANDE ISLE—GRANDE TERRE AREA OF SOUTH LOUISIANA

The environmental complexes of the longshore islands and cheniers of southern Louisiana were examined during the spring of 1965 as an aid to the interpretation of their subsurface counterparts.

Three major observations resulted from these studies: (1) extreme local and regional variation of environmental conditions exist through a wide area in sediments of the same age; (2) sparsity of recent sand deposition in offshore and lagoonal areas adjacent to the present Mississippi delta; and (3) rapidity of the westward migration of existing sands as a result of longshore currents.

Published data on recent depositional environments have been applied in identification of similar complexes in the subsurface. However, actual observation of existing environments is a much greater aid in reconstructing the depositional history of southern Louisiana.

26. WALTER A. ANDERSON, Texaco Inc., Houston, Texas

INTRODUCTION TO DELTA SYMPOSIUM

The definition, development, and geometry of deltas have recently experienced a crescendo of interest in many areas of geological investigations. The importance of deltas, their sedimentary processes, and the association of petroleum with deltaic sediments are recognized by workers in both basic and applied research.

Data must be collected and compiled before any conclusions can be made about deltas. To enhance knowledge of deltaic sedimentation and to encourage further work in this field, the Research and Study Committee of the Houston Geological Society is engaged in a threefold program. (1) A Delta Study Group is compiling from published sources, in easily usable format, data on the modern deltas of the world. The format will include geologic, hydrologic, climatologic, and biologic characteristics of each delta. (2) Papers have been solicited for a volume devoted to both ancient and modern deltas, unrestricted as to location. (3) The Houston Geological Society is sponsoring this symposium which is concerned with Gulf Coast deltas.

27. CHARLES R. KOLB, U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, AND JACK R. VAN LOPIK, Texas Instruments Inc., Dallas, Texas

DEPOSITIONAL ENVIRONMENTS OF MISSISSIPPI RIVER DELTAIC PLAIN—SOUTHEASTERN LOUISIANA

Seaward progradation of the land surface by the present and former Mississippi River deltas has created the Recent deltaic plain of southeastern Louisiana. Each time the Mississippi has advanced a major deltaic lobe seaward, subsequent abandonment of the overly extended river course in favor of a shorter, more direct route to the Gulf has occurred. These course changes and accompanying shifts in centers of deposition have resulted in the distribution of deltaic sediments along a 200-mile arc in coastal Louisiana. As soon as a depositional center or delta is abandoned, marine transgression begins. This process is aided by subsidence of the deltaic plain resulting from tectonism and gradual consolidation of deltaic deposits. Nevertheless, the net result of the struggle between the advancing deltas and the encroaching sea has been an overall increase in the size of the Recent deltaic plain.

The sediments of four major depositional environments are complexly interfingered in the deltaic plain: (1) *fluvial*—natural levee, point bar, abandoned course, and abandoned distributary sediments deposited in fresh to brackish water, principally in inland areas within and along streams; (2) *fluvial-marine*—prodelta, intradelta, and interdistributary sediments laid down near the mouths of distributary channels in brackish to marine water; (3) *paludal*—marsh, swamp, tidal channel, and lacustrine deposits formed primarily *in situ;* and (4) *marine*—bay-sound, reef, beach, and nearshore Gulf sediments formed by erosion and deposition in marine water. Processes active within each environment and the distribution and physical properties of associated deposits or soil types are of vital interest in investigations of engineering geologists.

28. JACK L. GREGORY, Tenneco Oil Company, Corpus Christi, Texas

STUDY OF VICKSBURG DELTA OF HARRIS AND FT. BEND COUNTIES, TEXAS

(No abstract)

29. A. H. WADSWORTH, JR., Independent geologist and producer, Houston, Texas

RECENT DELTATION OF COLORADO RIVER DELTA, TEXAS

The modern delta of the Colorado River is unique among Gulf coastal plain deltas because of the remarkable speed with which it was deposited. Rapid deltation was caused by the removal of a log jam, or raft, that choked the river from its mouth to a point 46 miles upstream. The earliest survey of the delta was in 1908 when it comprised about 45 acres. Removal of the raft began in 1925 and by 1929 a pilot channel was completed through it. That year a flood swept much of the raft and the sediments impounded by it into Matagorda Bay. Rapid deltaic growth resulted, and in 1930 the delta covered 1,780 acres. By 1936 the delta extended across the bay to Matagorda Peninsula, and by 1941 it covered 7,098 acres.

[1] All of the data have been drawn from exploration programs of Amerada Petroleum Corporation and have been released through the courtesy of K. M. Lawrence.

[2] This paper will be published in *Geophysics*, v. 30, no. 6, December, 1965.

Two earlier river channels of the Colorado River are known. One flowed into Matagorda Bay in the vicinity of Tres Palacios Creek. The other flowed, together with the Brazos River, into a large bay that occupied eastern Matagorda and western Brazoria Counties, Texas. Extensive deposition by these two rivers filled this bay and their combined delta advanced into the Gulf in the vicinity of Freeport. Any barrier beaches that were in front of the bay were buried by these sediments.

30. WILLIAM F. TANNER, Florida State University, Tallahassee, Florida

HISTORY OF APALACHICOLA RIVER DELTA AREA, FLORIDA

The Apalachicola River and its tributaries have delivered significant quantities of sediment into the northeastern corner of the Gulf of Mexico since early Tertiary time. The location of a major drainage outlet in the Alabama-Florida-Georgia tri-state area must be a matter of structural control, inasmuch as well-developed Cretaceous cuestas across southern Alabama and Georgia divert important drainages either toward the east (Atlantic Ocean) or the west (Alabama River system, draining into Mobile Bay). The early Tertiary predecessor of the Apalachicola River may have been located about 75 km. east of the present river.

The modern gorge of the Apalachicola has been occupied since perhaps middle Miocene time, when a previous estuary (in an important graben or half-graben) was completely filled with sediment. The Mio-Pliocene river built three or four cuspate deltas, at elevations of about 80, 50, 35, and perhaps 25 m. Three of these still exhibit relic offshore-flat, barrier-island, and drained lagoon topography.

Clear evidence is present in the area for Pleistocene sea-levels at 9, 6, 0, and -2 m. During the Pleistocene, the Apalachicola dammed the mouth of the Chipola River with sediment, forming Dead Lake, and almost completely filled a large estuary near the village of Apalachicola, leaving Lake Wimico and East Bay as remnants. Many of the features of the modern cuspate delta (including offshore shoals) have been formed, and reworked, as sea-level moved up and down during the Pleistocene. One of these features, an as yet inadequately explored and filled channel perhaps 35–40 m. deep, is under the present course of the river.

The low wave-energy level in the northeastern corner of the Gulf of Mexico—much like that along geosynclinal coasts of the past—is responsible for preservation of many delta characteristics which probably would have been eliminated if breaker heights had been typical of an open ocean.

Subtle structural deformation, still continuing in the delta area, partly controls the overall delta outline as well as many of the details. The prime structural trend in the area is N. 50° E.; there is less evidence for linears striking approximately N. 70° W.

ABSTRACTS OF PACIFIC SECTION PAPERS

April 9 and 10, 1964, Los Angeles, California

THOMAS A. BALDWIN, Humble Oil and Refining Company, Los Angeles, California

ISLAND OF FREEDOM

A dilemma faces geologists in the scientific societies. How can we cope with our need for improved professional status without tending to destroy scientific freedom through increased regulation? Members of the Association of Engineering Geologists have vigorously sponsored a state licensing law to regulate their field. Geologists in the other specialties feel that this legislation would divide the profession and hinder free scientific opportunity. Several Societies have condemned the proposed bill. The Pacific Section A.A.P.G. has led these groups toward more forceful action. The facilities of our Society have been used to organize an inter-society committee for the purpose of writing a registration law acceptable to all geologists. After the new committee was operative the Pacific Section stepped out of the picture and invited the American Institute of Professional Geologists to sponsor the activity.

These Pacific Section actions were necessary under the stringent circumstances, but the result of the action will be a regrettable increase in regulation. Disassociation from this activity was accomplished at the earliest possible moment. Long-continued or often-repeated professional activity would invite surveillance and regulation of our scientific society by governmental and corporate bodies. Many leaders of the Pacific Section feel that professional activities may occasionally be necessary but are always regrettable.

We should strive to keep the American Association of Petroleum Geologists an island of scientific freedom in the sea of professional regulation.

ORVILLE L. BANDY AND KELVIN S. RODOLFO, University of Southern California, Los Angeles, California

DISTRIBUTION OF FORAMINIFERA AND SEDIMENTS, PERU-CHILE TRENCH AREA.[1]

Nineteen trawl samples and 13 trigger cores were collected between depths of 179 and 6,250 m. in the Peru-Chile trench area off the western coast of South America. Sediments are mainly olive-green silt, clay, and colloidal material; however, four cores contain significant amounts of either sand-size Foraminifera or shale fragments, and one of these cores is mainly white volcanic ash. Values for organic carbon and nitrogen are much higher in the bathyal than in the abyssal zone. Sediment grain sizes do not exhibit definitive trends with either water depth or distance from shore.

Calcium carbonate content decreases sharply below 3,500 m., reflecting reduced quantities of calcareous Foraminifera in the trench. Deeper than 1,500 m., radiolarians are commonly more than twice as abundant as Foraminifera. Foraminifera larger than 0.5 mm. were concentrated in the trawl samples and below 1,000 m. are dominantly arenaceous. Among smaller Foraminifera, calcareous forms predominate down to 2,000 m.; at greater depths calcareous- arenaceous ratios fluctuate greatly. Planktonic foraminiferal tests are most abundant in the bathyal zone.

Bathymetric foraminiferal zonation is based upon upper limits of occurrence for both the larger live

[1] This work was supported by N.S.F. Grant No. G-19497, a part of the U. S. Antarctic Research Program of the National Science Foundation.