THURSDAY MORNING, APRIL 29
S.E.P.M.—Sedimentary Environments
Presiding:
F. B. VAN HOUTEN, S. S. WINTERS

38. D. E. FERAY: Factors influencing sedimentation in the shallow neritic environment
39. H. G. GOODELL: Environmental geometry: its effect on, and interaction with sedimentation
40. R. D. WOODS: Modern role of paleontology in basin geology
41. W. H. KANES, D. WELLS, A. C. DONALDSON: Facies and development of the Colorado River delta in Texas
42. J. D. HAUN: Cretaceous deltas in the Denver Basin and relationship to petroleum
43. W. M. JORDAN: Regional environmental study of the Nugget and Navajo Sandstones
44. G. H. KELLER: Sedimentary environments in the Malacca Strait, Malaysia
45. W. C. KRUEGER: Mineralogical composition and textural properties of river sediments from British Honduras
46. A. S. NAIDU, C. B. RAO: Some aspects of lower Godavari River and delta sediments, India
47. J. E. SANDERS: Nearshore sands off southeastern Virginia

THURSDAY MORNING, APRIL 29
S.E.P.M.—Paleoecology and Paleontology
Presiding:
J. E. ADAMS, L. D. TOULMIN

48. A. T. CROSS, B. L. SHAFFER: Palynology of modern sediments, Gulf of California and environs
49. H. A. LOWENSTAM: Biological and ecological information from physical and chemical properties of skeletal carbonates
50. R. C. HARRISS: Disequilibrium precipitation of molluscan skeletal material and its implications regarding the use of trace elements in fossil shells as paleoecological indicators
51. J. H. JOHNSON: Lower Cretaceous algae from south Texas
52. RICHARD REZAK: Environmental significance of fossil algae
53. K. H. WOLF: Depositional and stratigraphic features of littoral and algal bioherms and basin facies

THURSDAY AFTERNOON, APRIL 29
S.E.P.M.—Sedimentation and Sedimentary Petrology
Presiding:
W. K. HAMBLIN, S. L. SCHLANGER

54. F. B. VAN HOUTEN: Origin of sodium-rich Triassic lacustrine deposits, New Jersey and Pennsylvania
55. C. M. THOMAS: Origin of pisolites
56. R. J. DUNHAM: Vadose pisolite in the Capitan Reef
57. J. N. WEBER, E. G. WILLIAMS: Chemical composition of siderite nodules in the environmental classification of shales
58. H. P. TRETTIN: Silurian and Devonian arenites of the Franklinian eugeosyncline
59. R. C. MORRIS: A depositional model for the Jackfork (Mississippian) Group of Arkansas
60. J. C. FERM, ROBERT EHRLICH: Tectonic chronology of Pennsylvanian borderlands
61. R. M. FLORES: Genetic types of some sandstones in the Allegheny Formation of Ohio
62. W. D. MARTIN, BERNARD HENNIGER: The Hockingport and Waynesburg Sandstones (Pennsylvanian and Permian) of the Dunkard Group
63. RODGER G. WALKER: Submarine fan deposits and the transition from turbidite to shallow water sediments in the upper Carboniferous of northern England

THURSDAY AFTERNOON, APRIL 29
S.E.P.M.—Paleoecology and Biostratigraphy
Presiding:
H. J. HOWE, H. C. SKINNER

64. R. K. OLSSON: Planktonic Foraminifera, paleoecology, paleogeography, and correlation.
65. J. W. HARBAUGH, JAY WOODS: Mathematical simulation of sediment—organism community interactions with an IBM 7090 computer
66. H. Y. LING, D. J. ECHOLS: A micro-organic and ecologic investigation of Recent sediments from two Gulf Coast cores
67. F. R. SULLIVAN, D. W. WEAVER: Age of some California Coast Range lower Tertiary marine red beds
68. C. H. OMAN, L. D. TOULMIN: Faunal zones of the Paleocene and Eocene geologic section along Chattahoochee River, Alabama
69. M. C. MOUND: Conodonts from the Wabamun Group (Upper Devonian) from the Canadian subsurface
70. M. K. ELIAS: Cycleology—a discipline concomitant to paleoecology
71. J. D. MCLEAN: An application of electronic data-processing techniques to paleontology and stratigraphy (By title)

ABSTRACTS OF A.A.P.G.-S.E.P.M. PAPERS

NEW ORLEANS, LOUISIANA, APRIL 26–29, 1965

AFFLECK, JAMES, and HODGSON, ROBERT A., Gulf Research and Development Company, Pittsburgh, Pennsylvania

MAGNETIC EXPRESSION OF CRUSTAL TECTONICS

Use of magnetic data is an important technique in the investigation and interpretation of both local and regional crustal structure. Several examples demonstrate close correspondence between discrete tectonic features and specific types of magnetic anomalies.

A large area in Wyoming is used to demonstrate application of magnetic data to the interpretation of

regional crustal structure. Aeromagnetic and surface geologic surveys have been made of the exposed Precambrian basement rocks of the Big Horn Mountains, an area of about 1,100 square miles. Age determinations and measurements of magnetizations were made for a number of igneous and metamorphic samples. Significant relations were established between these various data. These, together with evidence of magnetic and geologic continuity from the mountains into the basins, permit an interpretation of large-order crustal structures in the Big Horn and Powder River Basins, and to a lesser extent, in the Wind River Basin.

Specifically, this regional study gives the following results:

(1) Both mountains and basins consist of one or more large crustal block units which are defined by magnetic character.
(2) The continuity of magnetic features from the Big Horn Mountains into adjacent basins, and the remarkable similarity of magnetic anomalies, indicate that the buried basement is lithologically and structurally equivalent to that studied in outcrop. The basement in the basins is interpreted as consisting of gneisses and metamorphosed granites, probably ranging in age from 2 to 3 billion years, or early Precambrian.
(3) Several long magnetic-geologic lineaments are defined. Some of these lineaments are thought to be related to fundamental crustal fracture systems similar to lineamental features recognized in the Pacific and Atlantic Oceans.
(4) Tectonic elements of Laramide age are clearly developed along structural lines established in Precambrian time in the basement rocks.

Regional magnetic and geologic data from other parts of the North American continent show a variety of magnetic characteristics, each of which suggests a particular type of tectonic origin. These supplement the Wyoming example and demonstrate the applicability of magnetics to the solution of controversial problems in crustal tectonics.

ALLEN, J. R. L., University of Reading, United Kingdom

ENVIRONMENTS AND SEDIMENTS OF THE LATE QUATERNARY NIGER DELTA, WEST AFRICA

Sediments of the Late Quaternary Niger delta comprise the youngest layer of a thick sedimentary sequence, which has accumulated in the Nigerian Coastal Plain geosyncline since Cretaceous time. Many of the geosynclinal sediments can be assigned a shallow marine or deltaic origin, and the Late Quaternary delta is of interest as a possible model for the interpretation of earlier events.

The Late Quaternary delta is large in size and arcuate in form, lying in the tropics on the edge of a major ocean. The forces at work at sea have strongly influenced delta shape and growth. Sedimentation is taking place within a complex of environments: river floodplain, brackish mangrove swamp, beach and shoreface, river mouth bar, delta-front platform, prodelta slope, and open continental shelf. A further important environment in the offshore portion of the delta is non-depositional in character, and corresponds in area to outcrops on the sea bed of transgressive sands dating from the last eustatic rise of the sea. Bordering the delta proper are further environmental complexes: barrier islands and lagoons on the west, and estuaries with mangrove swamps on the east.

The deltaic sediments range from very coarse sands to silty clays. They become finer grained from the river floodplain, where sands predominate, to the open shelf, where silty clays are mainly found, and from the axis of symmetry of the delta to the delta flanks. Only in the broadest sense is there correspondence between environment and lithofacies boundaries. The nature of lithofacies deposited in a given environment is a function of factors operating *within* the environment and of the *materials supplied* to the environment from without. Sediment is dispersed in both down-delta and across-delta directions. For a depositional environment to be ascertained from lithofacies, in many cases a knowledge of position within the delta is also required.

Like many other Late Quaternary deltas, the Niger delta shows a two-fold stratigraphic division. The unit first formed is a thin but widespread sheet of sand, moulded locally into barrier complexes now drowned that accumulated as a strand-plain deposit during the last eustatic rise of the sea. The later unit, built out over but not yet completely covering the transgressive sands, comprises regressive delta deposits formed in the environments listed.

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SEDIMENTARY-TECTONIC RELATIONS IN THE MESOZOIC OF THE NORTH-CENTRAL GULF COASTAL PLAIN

Jurassic and Triassic units of the northern Gulf Coast do not crop out, and Cretaceous units do so only along narrow discontinuous belts, comprising small fractions of their known extent. Nevertheless, our thinking concerning stratigraphy sedimentation, and geological history has been dominated by surface-oriented concepts of such nearshore phenomena as onlap, offlap, and shoreline position. A much broader, more truly three-dimensional view of geological history is possible through the use of much more extensive subsurface control.

"Peripheral" tectonic elements (e.g., Ouachitas and "Ouachita-Monroe Trend"), on the landward edge of the Mesozoic depositional area, affected nearshore clastic distribution, shoreline relations, etc. "Shelf" tectonic trends, particularly at the Gulfward edge ("shelf-edge"), strongly affected deposition in offshore areas by controlling marine circulation, direction and competency of currents, etc. Both types of structures have variously combined to produce such phenomena as: 1) trends of porous limestone or massive sandstone; 2) evaporite lagoons; and 3) "direct-source" and "indirect-source" facies patterns, i.e., Gulfward and landward decrease, respectively, in grain size and clastic-ratio.

A tectofacies classification is proposed to show the effect of structural patterns on sedimentary environments. Greater weight is placed on lithofacies data (reflecting water depth, and position in reference to dominant tectonic trends) than on thickness, *per se.* Four tectotopes are recognized in Gulfward sequence, each with its own characteristics: backshelf, foreshelf, shelfedge, and basin. The shelfedge migrated, commonly by shifting from one structural trend to another, as depositional cycles progressed. Each "stand" of the shelfedge produced a characteristic environmental regime. A tectofacies map of each of these regimes would produce an episodal history of the Mesozoic of the Gulf Coastal Plain.