ABSTRACTS OF TECHNICAL PAPERS
1965-1966

October 25, 1965

R. L. CAMPBELL, JR.
Schlumberger, Tulsa

"Paleozoic Sand Trends Defined by Dipmeter Data"

Recently developed dipmeter techniques provide improved stratigraphic control for isopach projection of Paleozoic sands. These techniques, involving short-interval dip computation and a statistical approach to interpretation of the data, are extensions to the stratigraphic interpretation methods now widely used in Tertiary formations along the Gulf Coast.

Paleozoic sands, such as in the Pennsylvanian section of the Anadarko basin, have often been deposited over wide areas on underlying surfaces of low dip and low topographic relief. Lithologic unit boundaries are almost parallel, providing little information with which to predict the direction of improved sand development. Here, cross-stratification causes most of the anomalies from which dips are computed.

Because cross-bedded sedimentary units are relatively thin, correlation intervals used must be short, leading to computed dips for every few feet of formation.

These dips are the result of many factors, including the attitude of the underlying surface at the time of deposition and any post-depositional tilting. However, dips due to cross-stratification, comprising the large majority of those computed, primarily reflect the direction of sediment transport, although random variations in sedimentation confuse a superficial study of the computed data.

To emphasize trends and minimize random events, statistical methods are used.

Dip-direction frequency diagrams and modified Schmidt plots indicate the direction of sediment transport, show the direction of interval thickening, identify present structural dip, and enable greater accuracy and confidence in predicting sand development.

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November 1, 1965

MICHEL T. HALBOUTY, Consultant and Independent Producer, Houston

"Economics — The New Dimension in Geological Thinking"

The current problems of expensive exploration, imports, overcapacity in production and refining, and the continued loss of investment capital through increased government control have brought about reduced margins of profits and steady declines in drilling, discoveries, reserves and employment to the United States petroleum industry in recent years. The average petroleum geologist knows little about these matters. He has limited his interest to geology — period! The geologist has not concerned himself with these complexities and, therefore, knows very little of the many difficulties the petroleum industry continually faces.

The geologist must come out of hibernation and look at the industry as a whole. His knowledge must expand beyond his own science. He has to broaden his thinking into the area of economics more than ever before. The geologist must keep up with the changes in every phase of the industry.

The geologist must look outward — not just straight ahead but in all directions. He must be aware of what is happening in today's new technology, the ever-changing economic conditions, new political concepts, the intense fuel competition, world petroleum outlook and world markets — but above all, he must learn what significance all of these things have on his industry, his company, and on his own future as an explorationist.

The geologist should realize that the petroleum industry must prosper within all of its phases if he, himself, is to prosper. He, therefore, must take a more direct and positive interest in the four dominant problems which constantly confront the industry: geological, technological, economic and political. The geologist has an inherent knowledge of the first, knows a little about the second and is completely oblivious of the third and fourth. To become more effective as an explorer or developer he must become more involved and astute in all of these challenges.

The economic factor is the most important to management, therefore, the geologist must begin to make economics the new dimension in his geological thinking. The growing pressure on management to

produce profits demands that the geologist prepare a comprehensive economic assessment of his exploratory planning, efforts, and recommendations. Such appraisals will surely sharpen and upgrade the exploratory effort and will do much toward bringing about greater success in the explorer's search for petroleum to meet the demands of the future.

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November 8, 1965

A. A. MEYERHOFF, American Association of Petroleum Geologists, Tulsa

"A.A.P.G. Bulletin — Facts and Fancies"

The future of the A.A.P.G. *Bulletin* depends on the health of the petroleum industry, the willingness of geologists to submit papers to the *Bulletin*, the types of papers that are submitted and published, and the editorial policies of A.A.P.G. It is no longer enough for the *Bulletin* to publish what it gets; the *Bulletin* must recognize the needs of its members, and go out to get some of what is published. The *Bulletin's* reputation for "stuffiness" has, in some cases, been deserved, and this reputation, if it exists, must be put to rest.

Bulletin policies are general and flexible. The *Bulletin* publishes all types of articles that may be related to hydrocarbon exploration. Field studies are encouraged, provided that the lessons to be learned from the field in question have more than just local application. Case histories, including engineering data, are welcome.

Controversial articles, discussions, and book reviews will receive sympathetic consideration, provided that they are written constructively. The *Bulletin* also reprints articles that are highly recommended by local societies. Moreover, color reproduction is now a fact, provided the writer can pay the cost difference between black-and-white and color reproduction.

Members who know of good articles should encourage the authors of such papers to submit them to the *Bulletin*.

Manuscripts take time to process. After receival in Tulsa, they go to reviewers and then to the elected editor. They are next accepted, recommended for revision, or rejected. The speed at which an article is processed depends on the length of time the reviewer has the paper and on the author's willingness to revise promptly, where revisions are needed. The editor and managing editor's jobs are to work with and encourage the authors of the manuscripts. This task may not always be pleasant, but it is always rewarding, if for no other reason than the fact that it is *people* who are being helped.

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November 29, 1965

GORDON I. ATWATER, Atwater, Cowan & Assoc., New Orleans

"The Effect of Decrease in Porosity with Depth on Oil and Gas Reserves in Sandstone Reservoirs"

Geologists and engineers have frequently made the premise that the amount of gas in place per unit volume increases as greater depths are penetrated, because of the attendant higher reservoir pressures. In order to test the validity of this premise, a study was made of the effect of depth of burial upon the other variables in the standard formula used to calculate the amount of oil and gas in place.

Sandstone porosity data were obtained for more than 17,000 samples of conventional cores, including samples from 101 fields of South Louisiana. A curve constructed from these data demonstrates that the amount of void space per unit volume available for the accumulation of oil and gas decreases with increasing depth. This decrease in porosity, 1.285 per cent of total volume per 1,000 feet of burial, is the most important single factor controlling the amount of oil or gas in place per unit volume of sandstone reservoir rock. Exploration and development management should be conscious of the diminishing returns to be anticipated as greater depths are explored.

Porosities associated with abnormally pressured reservoirs were studied, as was the incidence of abnormally pressured reservoirs in South Louisiana as a function of depth burial. The porosities of the abnormally pressured reservoirs, averaged by 1,000 foot depth increments, fit a straight line plot of porosities from all reservoirs.

It appears to be a reasonable hypothesis that the observed decrease in sandstone porosities with depth provides the mechanism creating the abnormal pressures so frequently encountered in oil and gas reservoirs of South Louisiana.

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December 6, 1965

DONALD C. SWANSON, Humble Oil & Refining, Oklahoma City

"Major Controlling Factors in the Accumulation of Oil and Gas in the Anadarko Basin"