

paper entitled "The Economic Value of Surface Petroleum Manifestations," which appeared in the *Proceedings* of the World Petroleum Congress in 1933, as follows.

An attempt is made in this short paper to show that surface indications of oil are a natural and essential phenomenon connected with oilfields rather than an unusual circumstance, and further that failure to discern such manifestations is either damaging to prospects or a reflection upon our present-day knowledge of detecting signs of the past escape of hydrocarbons.

With the exception of some of the oilfields of the Eastern Mid-continental and Rocky Mountain States of U.S.A., practically all the great oilfields of the world were marked by oil and gas issues near the crests of anticlines or the apices of domes.

George Sawtelle, in a paper entitled "Salt-Dome Statistics" in the A.A.P.G. *Bulletin* of 1936, pointed out that of the 141 salt domes discovered in the Gulf Coast prior to 1936, 75 owed their discovery, in part at least, to the presence of oil or gas seeps or mineralization phenomena. This is a surprisingly large percentage in view of the crude methods of detecting such evidences. Only large gas seeps generally occurring under water could be detected and mineralization measurements depended on the chance location of water wells.

The soil survey method is merely an extension of these older methods in that it makes possible the quantitative measurement of invisible seeps and mineralization phenomena. Furthermore, such measurements may be made at predetermined locations.

Data showing soil surveys in South Texas, West Texas, New Mexico, and Oklahoma were shown. Some interesting theoretical deductions arrived at from the data of soil analysis were dwelt on briefly.

10. W. ARMSTRONG PRICE, consulting geologist, Corpus Christi: Physiographic Mapping of Quaternary Formations in Rio Grande Delta (abstract).

There has been an increasing use of geomorphologic ("physiographic") criteria in the mapping of the Quaternary formations of the northwestern coastal plain of the Gulf of Mexico. Begun by Deussen, the employment of these criteria has been increased and improved by Barton, Doering, Fisk, Howe, R. J. Russell, and the writer. Meanwhile the method has been employed along the North Atlantic coast by Cooke, MacClintock, and others. The last few years has seen a rapid advance in the method through recent studies of deltas using precise topographic data, available for the first time, and by extensive use of soil groupings in the tracing of formation outcrops. Lithologic criteria now fall in second place.

The Rio Grande delta is relatively small and contour maps with one-foot contours and modern soil maps are now available for a strip 30 miles wide across the Texas side of the delta along the Rio Grande. No other Gulf Coast delta is now so thoroughly known. Correlations have been carried from the Rio Grande to the Mississippi delta and to the terraces of the Red and Mississippi. Formations recognized are: Recent, Lake Charles (not present on Rio Grande), Ingleside (two latter replace Beaumont), Lissie, Willis, and the Pliocene Goliad. The Willis is the probable equivalent of the Uvalde and the Reynosa term was brought into use because of calcareous soil-hard-pan deposits (caliche) in the older formations, erroneously grouped into a single formation containing "limestones." The Trowbridge and present U.S.G.S. mappings are entirely replaced.

The coastal plain delta is analyzed and its component parts described.

Downwarping of the thicker coastal areas is balanced by upwarp of the interior parts of the delta plains. Oscillations of sea-level by glacial control caused entrenchment of streams between periods of high sea-level deposition. Continued warping on axes parallel with the Gulf shore lines caused each older plain to slope more steeply gulfward than the next younger one. In the younger plains, slope criteria are secondary to continuity of plains and similar relationship to shore lines traced by continuity.

Shore lines of the Cooke Atlantic coast series are recognizable at 12, 25, 45, and 75 feet above sea in spite of Gulf Coast warping, probably because the warp axes are parallel with the coast line. Higher shore lines may be present. Entrenchment is known to have followed the abandonment of the 12- and 75-foot shorelines. The formations are continued up the Rio Grande valley as terraces. Stream terraces continuous with the intermediate shore lines have not been found.

The subject is presented in outline. Detailed presentation is reserved for publication by the Geological Society of America under a grant from which a part of the work has been done.

PACIFIC SECTION, SIXTEENTH ANNUAL MEETING
NOVEMBER 9-10, 1939. ABSTRACTS

R. M. BARNES
Los Angeles, California

The sixteenth annual meeting of the Pacific Section of the Association was attended by 405 registered members and guests. At the luncheon in the Coccoanut Grove of the Ambassador Hotel on Thursday, November 9, president Ley gave a comprehensive talk on Association affairs and plans before 155 members. The technical sessions on the 9th were attended by nearly 400 persons and on the 10th, approximately 500 attended. High points of the technical program were the talks by Henry A. Ley, A. I. Levorsen, and E. E. Rosaire. An amended constitution was adopted at the business meeting in the afternoon of the 9th. The dinner dance in the Fiesta Room of the Ambassador Hotel in the evening of the 10th was well attended and enjoyable.

New officers of the Section are Albert Gregersen of The Texas Company, succeeding R. M. Barnes as president, and E. J. Bartosh of the Bankline Oil Company, succeeding H. D. Hobson as secretary-treasurer. The Pacific Section of the Society of Economic Paleontologists and Mineralogists elected James M. Hamill, of The Texas Company, president, succeeding W. D. Rankin, and Edward B. Fritz, of the Union Oil Company, was reelected secretary treasurer.

The technical program follows.

1. HENRY A. LEY, president, A.A.P.G., vice-president, Southern Cross Oil Company, San Antonio, Texas: Prospecting in the National Economy (abstract).

In spite of currently large petroleum reserves we should not accept a spirit of smug complacency which would relegate the need of continuing exploration to some future time. Our national economy calls for continuous and widely supported exploration—certainly the maintenance of adequate geological and geophysical arms of the industry.