March 2, 1964

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"Whither the Ouachitas?"

The Ouachita system includes a long sinuous belt of sedimentary rocks of distinctive facies and of generally congruent Appalachian-type structures. However, foreland facies rocks occur within the structural belt in the two major salients and locally along the structural front. Two major tectonic zones—a frontal or exterior zone marginal to the foreland and an interior zone—have been mapped. The course of the belt is known from borehole data and geophysical evidence from southwest Alabama to the U.S.-Mexico border. Geophysical evidence suggests a southeast extension beneath southern Florida. In Mexico, scattered outcrops and boreholes indicate that the system strikes south for some hundreds of miles, but data are insufficient to map tectonic divisions. Deformation occurred later or lasted longer in the southern part of the system.

One hypothesis to explain the deep foundering of the Ouachita system below the Gulf Coastal Plain is based on the apparent lack of large volumes of stabilizing granite in this part of the crust, which in turn may be due to a relatively small volume of clastic sediments deposited in the interior part of the pre-existing geosyncline. Following this hypothesis, large volumes of clastic sediments were restricted to the Ouachita Mountains and Marathon salients and to other concealed frontal basins. In Mexico. where evidence indicates granitic terranes in the interior part of the belt, the interior part of the system has not subsided as deeply as it has to the north.

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March 9, 1964

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"The Petroleum Potential of the Undrilled Areas of the USA"

If we are to continue the current rates of petroleum demand and production, it will be necessary to obtain more petroleum during the next 37 years, or by 2000 A.D., than during the past 100 years. And if discovery of new deposits is to continue as the most important source of petroleum, then the question becomes: "Is there oil of that magnitude yet to be discovered within the United States?" This is a geological question.

Two approaches to the problem are considered. Both are based on the fact that as so often in the past, one or more of the chief ingredients for discovery may lie staring us in the face for years before being put into the discovery recipe.

The first may be thought of as a way of thinking. The petroleum industry has gradually developed a great many fine geological administrators who deal in reports from highly trained specialists—but these administrators move farther and farther away from the rocks, and the specialists become more specialized and more microscopic in their outlook. Needed are more experienced geologists, in between, who are still with the rocks and able to integrate the various specialized elements of structure, stratigraphy, and fluids into a recipe for discovery.

One integrated-type prospect consists of an arched, updip wedge of a potential reservoir rock, coupled with a downdip flow of the reservoir water. The flanks of every fold, large and small, from the surface to the basement, and in every sedimentary area, both productive and non-productive, offer innumerable opportunities for such petroleum discovery.

The second approach lies in the simple fact that many oil fields and oil provinces —including some of the largest—occur in close association with truncated reservoir rocks. Large volumes of potential reservoir rocks, with many unconformities, well known and staring us in the face, but as yet unexplored, are cited as potentially productive on a large scale.

The answer from this "Peek at the Deep" seems to be, "There is enough potential favorable geology to supply a normal expected demand, large though it may be." The big question that remains is, "Will there be sufficient incentive to do the exploring?" And this is in the realm of economics and politics.

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March 16, 1964

W. J. BURGESS, Sinclair, Tulsa

"Dolomitization"

As most dolomites are alteration products of limestones a brief review of the nature of limestones is given in which it is shown that the deposition of limestones is analogous to the deposition of terrigenous rocks in that primary textures are determined largely by environmental conditions at the site of deposition. Limestones, however, are usually local or intrabasinal in origin and depend on organic activity for accumulation. The resultant lime coquinas, sands, silts and muds, as well as the indurated equivalents, are subject to alteration, either in the form of "straight" recrystallization (calcite to calcite) or in the form of dolomitization.