Abstract

Sea floor spreading is envisioned as the fundamental process creating continents and ocean basins. Accordingly, the sea floor moves out in opposite directions from the mid-ocean rises. The gap is filled by new strips of sea floor created from the ultra-basic mantle. By this giant conveyor-belt action proto-continental rock is eventually piled up as rafts of sial; continental islands in the world encircling sima. Thermal convection cells in the mantle provide the fundamental driving force and the mid-ocean rises mark their divergence while the continents tend to lie over the convergences. The principle novelty of this concept is that no fixed layer separates the sea floor from the convection process; rather the ocean bottom is the exposed and outcropping limbs of this convection. Accordingly, it is useful to consider the supra-mantle substance beneath the ocean (serpentine and spilite plus sediment) as only a "rind". In contrast the bouyant sialic continents ride above this convection and are not invaded by it so that they alone are the true crust.

Although perhaps alarming at first thought, sea floor spreading is an orderly, evolutionary and actualistic process consonant with geologic history. Continents grow in area and thickness with time, and the volume of the ocean basins increase as well to accommodate juvenile water. The continents are domains of compression and the ocean basins domains of tension; but the earth as a whole neither contracts or expands. Contiental drift occurs with the continents tending to move to convergence zones. The apparent youth of the sea floor is explained by the destruction of the old floor and replacement by new sea floor. A new rationale is offered for the development of geosynclines, to explain continental slopes, etc.

November 12, 1962

J. C. Sproule, Consultant, Calgary, Alberta, Canada and President, American Association of Petroleum Geologists

"Geology and Oil Prospects Of The Canadian Artic Islands"

Abstract

The main presentation consists of a showing of colour slides taken in the Canadian Arctic Islands. The subject material in these slides bears on the geology itself and also on an understanding of the terrain and access and other operational problems, which is basic to any consideration of the geology and related oil prospects.

The sedimentary basin described is over 1,100 miles long in a northeast-southwest direction by about 450 miles wide. The land area that is potentially oil-bearing amounts to one hundred million acres or more. The geology is exceptionally well exposed, as a result of which, by studying the geology, it should be possible to carry the preliminary phases of an exploration program far beyond the state at which drilling for oil normally commences. It is, therefore, hoped that Industry will be able to take advantage of the excellent rock exposures by selecting drilling sites that are more promising than is normal to areas that are covered with glacial drift, alluvium and other superficial material.

The present situation is that numerous oil indications are known and that structures capable of reservoiring oil are widespread, numerous and varied. The prospects of these basins are, therefore, promising, assuming transportation facilities and satisfactory markets for the oil.

The principal potential outlets for Arctic Islands oil are European and Montreal, Canada, markets. The latter is presently satisfied from foreign offshore crudes.

A large part of the Central Islands area can be reached by surface craft for about three months of the year and the Eastern Islands area for about eight months. Improvements in ice-breaker facilities or submarine tankage are both matters of engineering rather than scientific advances, and it is believed transportation problems could be solved with relatively little effort, given the necessary incentive.

November 19, 1962

Donald R. Seely*, Jersey Production Research Co., Tulsa, Oklahoma

"New Work Pertaining To Structural And Stratigraphic Problems of the Ouachita Mountains"

Abstract

EXTENSION OF FAULT BELT INTO ARKANSAS

For many years interpreters of Ouachita structure have struggled with the problem presented by the presence of a fault belt north of the Windingstair Fault on Oklahoma geologic maps and the absence of its eastward extension on Arkansas geologic maps. The recent work of Reinemund and Danilchik, the writer, and graduate students working under the direction of L. M. Cline indicates that the belt does continue into Arkansas and contains several major thrusts. It is probable that the belt will eventually be found to be continuous along the Ouachita front from near Atoka, Oklahoma to Little Rock, Arkansas. The possibility of the belt's extension into Arkansas was recognized by some early workers according to H. D. Miser. Much of the geology along its course in Arkansas was originally mapped by reconnaissance methods for inclusion on the Geologic Map of Arkansas (1929).

LLANORIA

In 1921 H. D. Miser published a paper summarizing the evidence that had been accumulated by various workers which pointed to a southern source ("Llanoria") for Ouachita sediments. This evidence included a southward and southeastward thickening of the Jackfork, Stanley, Blaylock, and Blakely, a southward increase in the sand-shale ratio of the Stanley and Jackfork, the presence of small (1/4 inch) quartz pebbles in the lower Jackfork on the southern border of the Ouachitas, and a southern derivation of the Johns Valley erratics from a southeastward extension of the Arbuckle Uplift. Work completed since 1921 has improved our understanding of Ouachita stratigraphy in Oklahoma, and some of this earlier evidence is now questionable.

Jackfork Thickness Variation in Oklahoma

According to L. M. Cline, thicknesses of the Jackfork are 5650 feet in the Tuskahoma syncline; 5600 feet and 5800 feet in the Lynn Mountain syncline. O. B. Shelborne gives a thickness range of 5400 feet to 6500 feet in Boktukola syncline with the greater thickness to the east. The writer's work in Rich

*Ideas presented herein are outgrowths of work done to complete the writer's PH. D. dissertation at the University of Oklahoma.