in initiating new approaches or techniques in commercial enterprises. The broad, general fields of geochemical and electrical prospecting are believed to afford the best opportunity of developing new stratigraphic oil exploration methods. The breadth of the geochemical field is illustrated by examples of the use of geochemical measurements in oil exploration. In the field of electrical methods, several promising, undeveloped techniques are briefly discussed. The technical material in this paper is offered only to show the unexploited possibilities inherent in geochemical and electrical methods of petroleum prospecting and to indicate the depth of our ignorance in these fields.

February 11, 1963

Norman F. Williams, Arkansas Geological and Conservation Commission, Little Rock, Arkansas

"Recent Petroleum Exploration in Eastern Arkansas"

February 18, 1963

Richard A. Geyer, Geophysical Surveys Inc., Dallas, Texas

"Use of Combined Gravity and Magnetics as Oil Finding Tools"

Abstract

The resolving power of gravity and magnetic surveys can be markedly increased under certain geologic conditions when data from both types of surveys are available. A number of theoretical as well as actual examples are discussed as they apply to the solution of both regional as well as local exploration problems. A discussion of the basic principles of these two methods and their application to interpretation techniques is also presented.

February 25, 1963

Ralph W. Disney, Sinclair Oil & Gas Co., Tulsa, Oklahoma

"Basin Development, Mountain Building, and the Accretion of Continents"

Abstract

The modus operandi for the origin of continents is a recurring, integrated geological process; first, basin development, second, mountain building, and third, granitization producing marginal, external additions to the continent. It is hypothesized that the continents (shields, cratons, mountain belts, and continental shelves) with their underpinnings of granite were not a part of the original crust but have continually formed, accretion by accretion, throughout geologic time, with much of this process occurring during the long history of the Precambrian.

The keystone of this concept is found among the results of recent high pressure, high temperature experiments being carried on by George C. Kennedy, Gordon J. F. MacDonald, and others; namely the Mohorovicic discontinuity is a phase change.

The M discontinuity is dynamic in character; its depth is controlled by pressure-temperature relationships. Through seismic investigations it is known to be deepest under mountain ranges, intermediate under the continents, and shallowest under the sea floor. Mineralogy of the rocks differs on either side of the M discontinuity, but not the chemical composition. Most important is that the gabbroid rocks above have a mean density of approximately 2.8 and the eclogitic rocks below, 3.2.