region may have been derived from mountain glaciation on these ranges and have been ice rafted into the flysch of Johns Valley. Surely glaciation in the Himalayas and Andes is causing widespread deposition and markings that in time could be taken as evidence of continental glaciation.

To counteract the evidence of paleomagnetic data that continental drift has occurred requires showing that the geomagnetic and geographic axes need not approach coincidence. Evidence is increasing that the earth's core is liquid and that a mechanism exists associated with it which does not require this coincidence.

In connection with the origin of oil, it has recently been proposed that pre-Tertiary oil fields have paleolatitudes of less than 20° and that, therefore, drilling for Paleozoic and Mesozoic oil should be preceded by paleolatitude studies. This theory is further tied up with the concept of the continental origin of hydrocarbons which has been expressed as the official view of the Soviet Academy of Science.

April 1, 1963

John F. Grayson, Pan American Research Corp., Tulsa, Oklahoma

"Palynology - The New Frontier"

Abstract

After a brief sketch of the development of palynology and the amount of activity in this field at present, some of the basic principles of palynology are presented and examined in detail. While discussing these principles, their potential value to the field of geology will be illustrated. Among the important problems facing exploration geologists are the following:

1. Age dating of sediments.
2. Correlation of contemporaneously deposited sediments
3. Depositional environment of sediments.

Palynology can give information in all three of these areas. Emphasis is placed on some of the recent correlations established on the basis of palynological work. Because palynology is such a young field, some of the problems confronting palynologists are discussed as well as certain areas of this field that are relatively unexplored.

April 8, 1963

John Woncik, Apache Oil Company, Tulsa, Oklahoma

"Geology of the Kinta Gas Field"

Abstract

The Kinta gas field is located in the Arkoma Basin of Southeastern, Oklahoma. It comprises portions of Tw. 7 and 8N., and Rs. 19-20E in Haskell County. First gas production was established from the Hartshorne in 1916. The depth of Hartshorne is approximately 1600 feet. A large surface anticline is present. Detailed surface work was done by Oakes and Knechtel in 1948.

The first deep test drilled to the Ordovician was in 1937 by Conoco in Section. 33, T.8N., R.20E. This well tested 2 million cubic feet of gas from the Basal Atoka sand. The well was plugged as being non-commercial.

No drilling took place from the time of Conoco's plugging of their well un-

til Superior drilled the No. 1 Allred in 1951. Since that time there have been forty wells drilled in search of the basal Atoka and Cromwell gas. At present there are 30 producing wells, 10 dry holes, and 1 drilling well. Of these 30 producers, 17 are single zone basal Atoka wells; two are single zone Cromwell, and 11 dually completed Cromwell and basal Atoka. Development was at its maximum during 1961, when 11 wells were drilled. Air drilling was introduced to the area during 1960. This type of drilling has greatly reduced drilling costs and has accelerated development.

The total gas produced to date from the basal Atoka and Cromwell is 11.2 billion cubic feet. Recovery per acre foot from the basal Atoka is expected to be about 400,000 cubic feet of gas. The Cromwell is expected to have recovery factor on the order of 300,000 cubic feet of gas per acre foot. Based on 30 wells with an average of five billion cubic feet of gas per well, the total reserves developed to date in the basal Atoka is in excess of 150 billion cubic feet of gas; 50 billion appears to be in undrilled locations, so a total of 200 billion cubic feet of gas is the probable ultimate reserves in the basal Atoka.

The Cromwell produces from only 15 wells and probably averages five billion cubic feet gas per well, or a developed reserve of 75 billion. Proved locations should result in another 25 billion or a total of 100 billion ultimate reserves in the Cromwell.

The estimated ultimate recovery from both the basal Atoka and Cromwell gas zones should exceed 300 billion cubic feet of gas. Character of the gas from the two zones is almost identical; both have a BTU rating 980 and a specific gravity of .58.

April 15, 1963

Thomas A. Hendricks, U. S. Geological Survey, Denver, Colorado

"Petroleum Geology of the United States"[1]

Abstract

Crude oil originally in place in the United States and adjoining continental shelf is estimated at 1,600 billion barrels. One thousand billion barrels of this oil will be found by exploration, and 400 billion barrels will be economically producible. The remaining 1,200 billion barrels is in undiscovered pools too costly to find or is residual oil in proved reservoirs.

The estimate of the amount of oil originally in place is based on: a) exploratory footage already drilled, together with past production and proved reserves; b) the fraction of the total volume of sedimentary rocks that has been explored; and c) the relative attractiveness of the explored rocks to those as yet unexplored.

It is emphasized that these figures are for resources and not for reserves. In order for the oil that constitutes these resources to be promoted to the status of reserves, about 6 billion feet of additional exploratory drilling must be done and the economics of production of the oil must be consistent with demand.

[1]Abstracted from a manuscript on "World potential of oil, gas, and natural gas liquids," by A. D. Zapp, T. A. Hendricks, and J. F. Pepper.