into Montana. The dimensions are 1,065 miles in length and an average width of 80 miles. Structurally, and thus scenically, they are unique as compared to the Mackenzie Mountains to the north and the central and southern Rockies to the south; this striking difference is principally due to an origin of extreme shortening by means of a series of flat, superimposed thrust faults as opposed to an origin dominated by vertical uplift both to the north and to the south.

The age of the Rocky Mountains has been determined as Eocene-Oligocene on the basis of very extensive studies of the derived sediments. By comparison, the age of the plutonization of the Western Cordillera is principally Jurassic-Cretaceous transition on the basis of recorded geological relationships or 100 plus or minus 10 m. y. on the basis of extensive radioactive dating.

The Rockies are made up of shelf sediments aggregating 20,000 feet at their eastern edge; by contrast, the Western Cordillera is typified by extensive plutonization of the thick sediments and volcanics of a eugeosyncline.

Shortening of the shelf sediments across the southern part of the Canadian Rockies is probably in excess of 100 miles, which has been accomplished by stacking of sediments on a rather uniform system of superimposed thrust faults, but without disrupting the underlying shield to any known extent. The restoration of these sediments to their pre-Laramide position requires that the adjacent plutonized complex of the Western Cordillera must also be restored a somewhat similar distance to the west. Such a restoration sets back the indented western continental margin of Canada and the Alaska panhandle and puts it into alignment with the western continental margin of the United States. The realization of such differential movement along the western continental margin of North America in the Tertiary and the attendant tensional junctions explains many anomalous conditions in the northwestern states and southern Alaska. The cause of such differential movement is much more speculative. An acceptable explanation appears to be that the rigid, simatic Pacific plate has underthrust the continental margin of the United States whereas it has pushed the continental margin of Canada ahead of it.

The eastern slope or "Foothills" of the Canadian Rockies has been an active exploration area for oil and gas since the turn of the century. Western Canada's "original" oil discovery of 1902 was made in Waterton National Park. The historic Turner Valley oil and gas field was Canada's first major discovery. Since then more than 20 gas and condensate discoveries have made the Foothills one of Canada's main gas supply areas, and as a consequence of the more than 60 years of exploration, an unusual amount of factual, three-dimensional information can be applied to structural interpretation.

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December 14, 1964

EDWARD F. HAYE, Photogravity Co., Inc., Houston

"Photography and Geophysics"

There are many ways in which surface geology can be useful to geophysics, not only as an aid to structural interpretation, but in refining the accuracy and improving the efficiency of geophysical methods. That the vast majority of geophysical work has been accomplished in relative ignorance of the surface geology is unfortunate. Many specific examples of misinterpretation and waste can be attributed to a lack of consideration of surface geology. Because of this historical lack of surface geologic consideration, there is a large reservoir of data which can be high-graded and refined inexpensively. Photogeology is by far the most rapid, effective and inexpensive way to obtain surface geology.

Possibly the geophysical tool most critically affected by the surface geology is gravity. Newton's first Inverse Square Law states that density changes closest to the gravimeter affect it most critically. Practical ways in which gravity and seismic data can be refined by coordination with photogeology are cited and slides used to demonstrate the problems.

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January 4, 1965

WILLIAM H. McGUIRE, Consultant, Lexington

"Recent Developments in Eastern and Central Kentucky"

The renewed interest of the oil industry in deeper possibilities of the Appalachian basin, and the discovery of Cambrian production in Ohio, have resulted in leasing and drilling activity in Kentucky. The amount of acreage already under lease in-