

creases with depth, due to over-all thinning in a southeasterly direction, to a point of minimum section at about the NW.  $\frac{1}{4}$  of Sec. 9, 32-24. The southwest flanks of the folds are locally oversteepened, without resultant shift of axes, suggestive of similar folding. A probable fault, referred to as the "Maguire" fault, separates the old "Maguire" sand pool from the "27-B" pool. The "Maguire" sand is considered to be the southeastern extension of the "27-B" sand.

The assignation of the "27-B" sand to the Etchegoin (Pliocene) is considered erroneous. Conclusive faunal evidence is lacking, but from other evidence available at present, a Pliocene-Miocene break is preferred above the "27-B" sands.

A maximum net sand thickness of about 110 feet occurs in Sec. 36, 31-23. The individual sand lenses (E<sub>1</sub>-E<sub>4</sub>) pinch out not far down dip on the northeast flank of the hills, at higher structural elevations than is the case on the southwest flank. This is the apparent reason for the much higher water table on the northeast flanks,—a case of water entrapment against a permeability barrier. Edge water on the southwest flank is found to be 300 feet structurally lower than the structural spill point. This is explained by pinch-out of the individual sand lenses in the W.  $\frac{1}{2}$  of Sec. 28, 31-23.

At the peak of the war demand the pool produced at average rates as high as 40,275 barrels per day. The current maximum efficient rate is set at 25,000 barrels per day, which permits top wells a daily production of 180 barrels, subject to a gas restriction in the case where a well produces gas at rates in excess of 600 cubic feet per barrel.

The absence of a water drive will probably require some form of pressure maintenance for maximum oil recovery.

JOSEPH HOLLISTER, consultant, Gaviota, California. Geology of Tierra del Fuego, South America.

The paper is a brief résumé of the stratigraphy and structure of that part of Chile. The presence of a Cretaceous-Tertiary basin, 20,000 feet or more deep, east of the main Cordillera, is pointed out and the suggestion made that a landmass lay on the west as well as one on the east of this basin during late Mesozoic and Tertiary time.

THOMAS CLEMENTS, University of Southern California, Los Angeles. Stratigraphic Section East of Bogotá, Colombia.

A geologic traverse was made by the author in 1939 along the road from Bogotá to Villavicencio, a distance of 122 kilometers. The purpose was to attempt to correlate the rocks of the little known east side of the Cordillera Oriental with the better known formations of the Magdalena Valley on the west side of the mountains.

The rocks exposed along the traverse are sedimentary and metamorphic, and range in age from possible Cambrian to Pleistocene; only the Cretaceous rocks yielded abundant fossils. Igneous rocks reported to occur both north and south of the line of traverse were not encountered in this particular section, although the basal conglomerate of the Cretaceous contains fragments of granite.

The formations observed along the road, with their respective ages, are the following: Quetame, Cambrian (?); Vinculo, Devonian (?); Pipiral, Carboniferous (?); Colorado, Permian (?); La Argentina, Cretaceous (?); Cáqueza, Cretaceous (Lower Valanginian); Villeta, Cretaceous (Upper Valanginian, Hauterivian, Barremian, and Aptian); Guadalupe, Cretaceous (Middle Albian and Cenomanian); Buena Vista, Tertiary (?); Guaduas, Tertiary, Eocene (?); terraces, Pleistocene.

The principal structural features are the Bogotá fault, an overthrust to the west; the Cáqueza fault, an overthrust to the east; the San Martín fault, normal, with the westerly block downthrown; the Argentina fault, normal, with the easterly block downthrown; and the Cientoquince fault, an overthrust to the east. In addition, the Guada-

lupe formation is folded into a large, gentle syncline, and all the rocks show a very great number of small folds.

R. A. STIRTON, University of California, Berkeley. The First Oligocene Mammalian Fauna from Northern South America.

Fossil vertebrate remains were found on the northwest limb of the San José anticline south of the Rio Tetuán and approximately 10 kilometers northeast of Chaparral, Tolima, in the upper Magdalena region, Colombia. They were discovered in a thin lense of bone breccia within a blue-gray clay member (La Cira zone) of the Gualanday (Brazalosa) series.

The type La Cira from the middle Magdalena was called upper Oligocene by A. A. Olsson as based on a fresh-water invertebrate fauna. The mammal remains from Chaparral indicate a relationship close to the Deseado lower Oligocene of Argentina.

Tentative faunal list: Chelonian, crocodylian, ground-sloth, toxodont (? *Proudi-  
notherium*), liptoptern (? *Prothesodon*), astrapothere (near *Uruguaytherium*), and ? condylarth.

JOHN C. REED, United States Geological Survey, Washington, D. C. Recent Investigations by the Geological Survey of Alaska Petroleum Possibilities.

Because of the acute national situation in regard to oil during the war, the Geological Survey initiated detailed examinations in the summer season of 1944 in a number of the areas that, on the basis of considerable reconnaissance work over nearly half a century were considered most likely to contain petroleum. In 1944 these studies were undertaken in five widely separated localities and similar investigations were continued in 1945. From them and the earlier more general examinations, three large areas are indicated as of most immediate significance. These may be designated as the Gulf of Alaska area, the Alaska Peninsula-Cook Inlet area, and northern Alaska. In each of these regions are a number of structures or other indications regarded as favorable for the possible accumulation of petroleum and that therefore seem worthy of intensive investigation.

In the Gulf of Alaska area the oil possibilities are confined to rocks of Tertiary age. Farther west in the Alaska Peninsula-Cook Inlet region, Jurassic rocks overlie a Triassic limestone that is presumed to be a possible oil source. In northern Alaska, the Navy Department is exploring the oil possibilities of Naval Petroleum Reserve No. 4 that lies in an extensive tract underlain for the most part by gently folded Cretaceous rocks. The Geological Survey is playing a part in the exploration program of the Navy Department.

Much additional information must be gathered before it is possible to estimate in quantitative terms the potential petroleum resources of Alaska. The determination of the value of these latent resources presents a challenge and the prospective returns well warrant tackling the job of determining the pertinent facts.

HORACE D. THOMAS, University of Wyoming, Laramie.

MAX L. KRUEGER, Union Oil Company of California. Late Paleozoic and Early Mesozoic Strata of the Uinta Mountains, Utah.

At the western end of the Uinta Mountains, Triassic rocks rest unconformably on the Permian Park City formation. From the base upward the Triassic rocks are (1) red Woodside shale, (2) marine Thaynes limestone, (3) Ankareh redbeds, and (4) a conglomerate and overlying sandstones and shales. The conglomerate, sandstones and shales were classed as basal Nugget sandstone, Jurassic, by Boutwell (1912), but were excluded from the Nugget (Navajo) by Heaton (1939), leaving them without a name. The Thaynes thins and tongues out eastward, and east of its edge the Woodside and the Ankareh can not be differentiated.

At the eastern end of the mountains, Woodside redbeds rest on the Pennsylvanian