

*Tuesday Morning, April 25*

JOINT SESSION WITH SEPM

Honors, Awards, Presidential Addresses:

BEN H. PARKER, AAPG

WILLIAM M. FURNISH, JR., SEPM

ORLO E. CHILDS, RMS

Distinguished Guest Speaker: IRA H. CRAM, "Impact of Soviet Oil"

*Tuesday Afternoon, April 25*

*Presiding:* W. E. HUMPHREY, CLARK MILLISON

7. Tectonics of Antarctica: WARREN HAMILTON, U. S. Geological Survey, Denver, Colorado

Antarctica has long been considered to consist simply of a large Precambrian shield, flanked on one side by the circum-Pacific belt of Mesozoic and Cenozoic orogeny. The great amount of geologic information obtained during recent years indicates that between shield and circum-Pacific belt are belts of Paleozoic orogeny.

The continent is probably crossed by a late Precambrian and Early Cambrian miogeosyncline whose contents were metamorphosed and intruded by batholiths during the Middle (?) Cambrian. Erratics bearing Lower Cambrian plesponges, like those characterizing the Adelaide geosyncline of South Australia, have been found in four places; K/Ar dates suggest crystallization about 500 million years ago; and the distinctive granites are remarkably similar to those of Middle Cambrian age in South Australia. This orogen crosses the Antarctic coast between 145° and 160° E., and flanks the Ross Sea and Ross Ice Shelf, and possibly Filchner Shelf and Weddell Sea, as a continuous system of high mountains. These mountains have long been termed the "Great Antarctic horst," thought to be of old Precambrian rocks; the horst concept was based on a misinterpretation of structures near McMurdo Sound, where the broad structure of the present range is anticlinal. At least in the 1,100-mile segment from Terra Nova Bay to the Horlick Mountains, the crystalline rocks are metasedimentary rocks whose structures are subparallel with the mountain system, and distinctive granitic rocks of a composite batholith. Rocks of the orogen are overlain by little-deformed Devonian to Triassic sedimentary strata.

Northeastern Victoria Land, west of the Ross Sea, is composed of metasedimentary rocks, striking generally west-northwestward, whose metamorphism and intrusion by granites occurred about 350-400 million years ago. On strike across the Ross Sea, and trending toward the Weddell Sea at least to the region of 90° W., 82° S., are metasedimentary rocks intruded by distinctive granites which contain relatively large trace amounts of tin. These rocks are undated, but are unlike the Mesozoic crystallines of Palmer Peninsula; a middle Paleozoic age is likely. It may be significant that Devonian granites of eastern Australia are also relatively rich in tin.

The coast between 35° and 165° E. is characterized by charnockites, granulites, and gneisses, in part polymetamorphic, and by varied younger crystalline rocks. The rocks resemble those of the Precambrian K/Ar ages. As has long been recognized, this is part of a Precambrian shield, which may extend farther toward the Weddell Sea, and which presumably extends far toward the South Pole also.

The Palmer Peninsula belongs to the circum-Pacific orogen, as has long been known, and the Thurston Peninsula also may belong to it.

This revised pattern of Antarctic tectonics is essen-

tially that required by Du Toit's reassembly of the southern hemisphere continents before post-Paleozoic continental drift.

8. Andes of West Argentina: ABEL HERRERO-DUCLoux, DeGolyer and MacNaughton, Inc., Dallas, Texas

The Andes constitute Argentina's western boundary with Chile from Latitude 22°30' South to Latitude 50°48' South. The mountain belt of western Argentina consists of a series of sub-parallel meridional chains, which decrease in number, width, and elevation from north to south. Although the Andes may be considered as a single geographic unit, they are formed by several different morpho-structural elements oriented from north-northwest to south-southeast, and therefore oblique to the trend of the continental divide.

The various morpho-structural elements which, from north to south, constitute the Chilean-Argentinian Andes, are as follows: (1) the high plateau of the Puna de Atacama, followed toward the east by the Eastern Cordilleras (Prepuna) and the Subandean ranges, (2) the Pampean ranges, (3) the Precordillera of La Rioja, San Juan, and Mendoza, (4) the Cordillera Frontal, (5) the Cordillera Principal, and (6) the Patagonian Cordillera.

The extension and main stratigraphical and structural features of the different morpho-structural elements, as well as the geologic evolution of western Argentina, are summarily described.

9. Cordillera of Chile, South America: ROBERT N. WILLIAMS, Consultant, Santa Barbara, California

Chile, 2,600 miles long and 100 miles wide, extends from the arid deserts of the North to the cold, windy pampas of the South. It occupies the area from the crest of the Andes to the Pacific Ocean. Geologically, it occupies a long, mobile belt lying west of the stable shield area. Through a series of orogenies it has developed the present Cordilleras. This Andean geosyncline has been a zone of weakness from Precambrian time to the present.

The Andean Cordillera, one of the highest mountain chains in the world, is complicated geologically and tectonically. Two principal provinces can be described, the Eastern and Western, separated by the great central valley of Chile, in which lies the capital, Santiago. The Western Cordillera, the older, represents an extensive batholith of continental character, and is largely granitic in character. Normal block faulting and folding occur. The principal uplift occurred in the Upper Mesozoic. The Eastern Cordillera is composed principally of metamorphic and sedimentary rocks, although evidences of its crystalline core are common. Structurally they show block faulting, with some evidence of thrusting toward the east. Principal uplift occurred during the Tertiary and Quaternary.

Close inshore in the Pacific are troughs 23,000 feet deep. Recent vulcanism is common. At the southern end of Chile the Andes make a strong eastward swing and thence, by an island arc very similar to the Caribbean Island Arc, join the Andes to the mountains of the Palmer Peninsula of the Antarctic, 600 miles south.

10. Bolivia and the Andes—A Geological Sketch: FRANK P. SONNENBERG, Chaco Petroleum, S. A., Cochabamba, Bolivia

Landlocked Bolivia, fourth largest country in South America with an area of 420,000 square miles, extends from approximately 10° to 22° south of the equator and from 58° to 70° west of Greenwich.