from the mainland through the Greater Antilles. This mobile belt separates the Gulf and Caribbean regions, and the forelands to the bordering basins were in the Gulf of Mexico and Atlantic Ocean. The initial and main period of geosynclinal subsidence and sedimentation is Mesozoic in age; however, thick deposits were laid down during the Tertiary in the Chapayal basin and eastward in various island areas.

In nuclear Central America the sediments were derived, primarily, from the south and from an important older Paleozoic mobile belt and its subsequent ancient Maya Mountains-Cayman Basin landmass lying on the northwest flank of the Caribbean. The partly foundered northwest Caribbean hinterland, and the arcing of the Late Paleozoic-Mesozoic and Late Mesozoic mobile belt (which incorrectly suggest a foundered craton and surrounding rim syncline in the Antillean-Caribbean region) provide the basic framework for the tectonic relationships betweeen North and South America. It is highly questionable that the Lesser Antilles is related in time with the earlier Late Paleozoic-Mesozoic mobile belt, but is more likely late Cretaceous and early Tertiary. The foundering of the Gulf craton occurred with the beginning of the Mesozoic, and the initial deposits of the Gulf Embayment are the red-bed clastics and associated sediments of Triassic-Jurassic age.

The older and partly metamorphosed sediments in nuclear Central America and its environs include undifferentiated Carboniferous and older Paleozoic, and possible Precambrian. Younger unmetamorphosed sedimentary rocks are Permian, Triassic (?), Jurassic, Cretaceous, lower Eocene, Oligocene, and Late Tertiary in age and include one of the thickest Mesozoic evaporite sequences known in the world. Important orogenies are reflected in the sediments during all the major diastrophic events and during the early Oligocene. Intended as a principal contribution to the geology of the region is the introduction here of a supporting stratigraphic chart showing those formation names and ages which are accepted in Guatemala by the local Stratigraphic Nomenclature Committee.

A late Tertiary and Quaternary volcanic belt follows the Sierra Madre axis for a short distance in eastern Mexico and Guatemala and diverges southeastward through the remainder of Central America, forming the physiographic Rocky Mountain backbone.

No more than two dozen wells have been drilled for oil or gas in all northern Central America. Although the results have been negative, numerous encouraging shows indicate a future petroleum province. Evaporitic deposits in the Cretaceous and Jurassic limit the potential section of reservoir porosity. This poses no insurmountable problem, however, for explorationists utilizing thorough regional stratigraphic and tectonic studies.

16. Outline of Tectonic History of Mexico: EDUARDO J. GUZMÁN and ZOLTÁN DE CSERNA, Petróleos Mexicanos and Instituto de Geologia, México, D.F., Mexico

The principal morphotectonic provinces of Mexico are: (1) Sierra Madre del Sur composed of middle Paleozoic metamorphics, (2) Sierra Madre Oriental made up of folded Mesozoic carbonates resting on folded Paleozoic sediments overlying Precambrian crystallines, (3) Gulf Coastal Plain and Yucatán Peninsula consisting of Tertiary marine sediments affected locally by salt tectonics and resting on folded Mesozoic sediments and Paleozoic metamorphics, (4) Sierra Madre Occidental consisting of flat-lying Tertiary lavas and pyroclastics which rest on folded Mesozoic sediments and Paleozoic metamorphics, (5) Trans-Mexico Volcanic Belt of late Tertiary and Quaternary age, (6) Sonoran Basin and Range Province comprising folded and faulted Paleozoic and Mesozoic sediments and volcanics, and (7) Baja California Peninsula composed of Cretaceous granitic batholiths and Mesozoic and Tertiary clastics and volcanics.

Present structure and resultant physiography developed from the consolidation of three orthogeosynclines into as many structural belts, two of which bordered the southern peninsular extension of the Precambrian hedreocraton of North America and underwent regional metamorphism and granitic emplacement during the middle Paleozoic orogeny at the end of the Paleozoic and block-faulting with accompanying volcanic activity during early Mesozoic time.

The third structural belt of Mesozoic-Tertiary age developed from an orthogeosyncline which covered the entire country from south to north and was affected by regional metamorphism and granitic emplacement in its western part toward the end of the Cretaceous and by orogeny mainly in its eastern part during early Tertiary time. This orogeny, which formed the Sierra Madre Oriental, was followed in the western two-thirds of the country by block-faulting and extensive volcanism during the remainder of the Tertiary, whereas east of the present Sierra Madre front deltaic deposits filled the molasse basins grading eastward into finer clastics of the Gulf Coast. During Pleistocene and Recent time a chain of basaltic volcanoes developed along a belt crossing the country from east to west at the latitude of Mexico City.

To date, commercial oil production has only been established in the Coastal Plain of the Gulf of Mexico; in the northern and southern districts, production is obtained from Tertiary clastics filling the molasse basins, whereas in the central district it comes from carbonates of the late Jurassic and Cretaceous miogeosyncline.

17. Tectonic Framework of Southwestern United States, and Possible Continental Rifting: CHAS. B. HUNT, U. S. Geological Survey, Denver, Colorado

Major structural features in southwestern United States mostly trend northerly, but a study of the seismic, gravity, and geologic maps of the region suggests there may be four or more southeast-trending structures obliquely crossing and largely obscured by the northerly ones. The most southwesterly of these is conspicuous enough, the San Andreas rift. Displacement on this fault system is right-lateral and has been estimated as great as 350 miles.

Another structure parallel with the San Andreas rift is 150 miles northeast. In part, it coincides with the front of the Sierra Nevada, but the gravity and seismic maps suggest it may continue northwestward across the center of northern California and southeastward across the southwest corner of Arizona.

A third parallel structure is about 100 miles farther northeast and in part coincides with the southwest edge of the Colorado Plateau. The seismic, gravity, and geologic maps show it extending northwestward across Nevada. It is lost in southwestern New Mexico, but the structurally disturbed Trans-Pecos Texas area is aligned with it as are a few scattered epicenters.

The fourth southeast-trending structure is represented by the well known late Paleozoic troughs and highlands that extend diagonally across the Rocky Mountains. This alignment extends southeastward across the Panhandle of Texas to the Wichita Mountains in southwestern Oklahoma. If these structures have right-lateral displacement comparable with that along the San Andreas rift, an aggregate displacement of 1,200–1,500 miles is indicated.