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Physiographic features, Trans-Pecos region

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PHYSIOGRAPHIC FEATURES, TRANS-PECOS REGION

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The summit of Eagle Peak, 2,285 m above sea level, the highest point in Hudspeth County and the eighth highest peak in Texas, affords an unexcelled view of vast parts of Trans-Pecos Texas and northern Chihuahua, Mexico.

The Indio Mountains, which extend southward from the Eagle Mountains to the Rio Grande, are composed largely of marine strata of Cretaceous age. Tertiary volcanic rocks cover a large area in the southern part of the mountains; intrusive rocks are volumetrically minor and occur only in the northern Indios.

North- to northwest-trending thrust faults are prominent in Devil Ridge and in the Indio Mountains. The southwestward and westward movement of the overthrust block along some of the faults in the Indio Mountains is opposite to the northeastward movement of the overthrust blocks along the faults in the Devil Ridge area. Late Tertiary normal faulting and subsequent erosion are responsible for the present topography.

To the north, Guadalupe Peak, the highest point in Texas with an elevation above sea level of 2,668 m, and El Capitan, only 152 m lower, are both remnants of the massive Permian Capitan barrier reef that bordered the Delaware Basin. These lofty limestone masses provide the background for the Diablo Plateau, which stretches away to the north and northwest at an elevation of 1,525 to 1,830 m, and separates Hueco Bolson to the west from Salt Basin to the east. Sierra Diablo, a north-trending range along the eastern margin of the Diablo Plateau, overlooks Salt Basin to the east and contains the most nearly complete rock record in the region. In these mountains, rocks ranging in age from Precambrian through Cretaceous, except those of Cambrian, Triassic, and Jurassic age, are well exposed. Northwest of Sierra Diablo is a distinctive rocky and angular peak, Sierra Prieta (Black Mountain), composed of porphyritic alkalic igneous rock, that rises a thousand feet above the Diablo Plateau.

Salt Basin is a remarkably smooth-floored depression more than 160 km long, averaging 32 km wide, into which water drains from all directions. This closed basin, the easternmost of those of the Basin and Range province, is a long, narrow north-trending half-graben, bordered on the west by the Sierra Diablo and on the east by the Delaware and Apache Mountains, which compose the distant northeast skyline.

The Delaware Mountains are an elongate north-northwest-trending fault block in which Permian sandstone and shale of the Delaware Basin facies have been uplifted and exposed. In contrast, the Apache Mountains are an exposed northwest-trending part of the ancient Capitan barrier reef. The sharp notch in the northeast skyline is Seven Heart Gap, a pass between the Delaware and the Apache Mountains.

Much nearer and just north of Van Horn are the Beach and Baylor Mountains, relatively small fault blocks composed largely of rocks of Precambrian, Ordovician, and Permian age. Just west of Van Horn and bordering Eagle Flat on the northeast are the Carrizo Mountains in which metamorphosed sedimentary and volcanic rocks of Precambrian age predominate. Bass Canyon, marked by the well-defined depression in the profile of the southern Carrizo Mountains, is the pass through which an old stage road runs,

which in the mid-nineteenth century connected San Antonio and San Diego.

The broad, flat lowland just west of the Carrizo Mountains and immediately north of the Eagles is Eagle Flat, the drainage of which flows southeastward into Salt Basin through a water gap between the Carrizo and Van Horn Mountains.

The eastern skyline is formed by the Davis Mountains, a vast Tertiary volcanic field of alkalic igneous rocks. The sharp, triangular summit of Mt. Livermore, the jagged silhouette of Sawtooth, and the rugged north-facing prominence of Gomez Peak are all distinctive features, even at a distance of 80 to 95 km from Eagle Peak.

In the foreground, dividing the southern end of Salt Basin into Michigan Flat on the east and Lobo Flat on the west, are the Wylie Mountains, a horst block composed largely of Permian and Cretaceous rocks. Just south of the main block of the Wylies, the Three Sisters (three small buttes of volcanic rock), Canning Ridge (quartz monzonite intrusion), and Chispa Peak (composed of volcanic rock) are prominent features along the east margin of Lobo Flat.

Just beyond Green River to the east and southeast are the Van Horn Mountains in which High Lonesome, elevation 1,714 m above sea level, is the high volcanic rock mass at the north end. On the distant southeastern skyline, displaying a distinctive angular silhouette, is Sierra Vieja, or the Rim Rock Mountains, composed of a sequence of Tertiary flow and pyroclastic rocks. Still farther south and east and plainly visible on clear days are the Chinati Mountains near Ruidosa, Texas, some 120 km away.

The view southward into Chihuahua is no less impressive. In this region the Rio Grande, in its path toward the Gulf of Mexico, wanders alternately through broad open valleys and deep, steep-walled canyons cut into rugged highlands. South of the Indio Mountains, beyond where the Rio Grande cuts through the range, are, in order, the Sierra Pilaes, Sierra Ventana, Sierra de la Parra, and Sierra Grande. This range, which extends 160 km south-southeastward to the vicinity of Ojinaga, Chihuahua, is composed largely of folded Cretaceous rocks.

Far to the south, west of the southern Sierra Pilaes and Sierra de Ventana, is Bolson del Cuervo. Just west, in succession are the northwest-trending Sierra del Alambre and the high Sierra del Pino, which compose the distant southwest skyline. In the near foreground and extending northward to the Rio Grande is the Sierra de la Cieneguilla, a low range of overturned Cretaceous rocks. The Quitman Mountains make the peculiarly uneven skyline to the west and northwest. Folded and thrust-faulted Cretaceous rocks compose the southern part of the mountains, and Tertiary intrusive and flow rocks make up most of the northern Quitmans. The low point of the skyline is Quitman Gap, the canyon that separates the two segments of the range. The old stage road went through this pass and on west about 14 km to Fort Quitman, near the Rio Grande.

Just north of the Quitmans and near the western margin of the Diablo Plateau is easily the most distinctive feature of this panorama. Sierra Blanca, "White Mountain," a laccolith of light-colored intrusive rock with convex slopes sweeping gracefully to a summit 2,134 m above sea level, is a magnificent landmark.

The Malone and Finlay Mountains, low ranges farther west and northwest on the western margin of the Diablo Plateau, contain gently folded rocks, largely of Permian and Cretaceous age. The Malone Mountains contain the only outcrop in Texas of marine strata of Jurassic age.

The Hueco and Cornudas Mountains, some 80 to 95 km north-west and north-northwest, respectively, are relatively low-lying masses that extend northward into New Mexico. The Hueco Mountains, along the northwest margin of the Diablo Plateau and the east margin of the Hueco Bolson, is a barren range composed primarily of sedimentary rocks of Paleozoic age. Along the southern margin of the mountains there are scattered small outcrops of red granite which have been assigned a Precambrian age; to the north near the state line there are Tertiary alkalic intrusive rocks. Hueco Tanks, an old Indian campsite and later a station on the Butterfield stage route, are natural rock cisterns in low knobs of these intrusive rocks.

The Cornudas Mountains, some 32 km east of the Huecos and also along the New Mexico border, are composed of Cretaceous

sedimentary rocks intruded by Tertiary alkalic igneous rocks similar to those in the Hueco Mountains. Also to the north-northwest but much nearer are the Pump Station Hills—low, rounded, poorly exposed outcrops of red rhyolite porphyry of Precambrian age.

This geologically spectacular region thus exposes a rock record that spans more than a billion years of earth history and that varies from the scattered exposures of the very old Texas craton to the alluvium that was deposited by the most recent flood of the Rio Grande.

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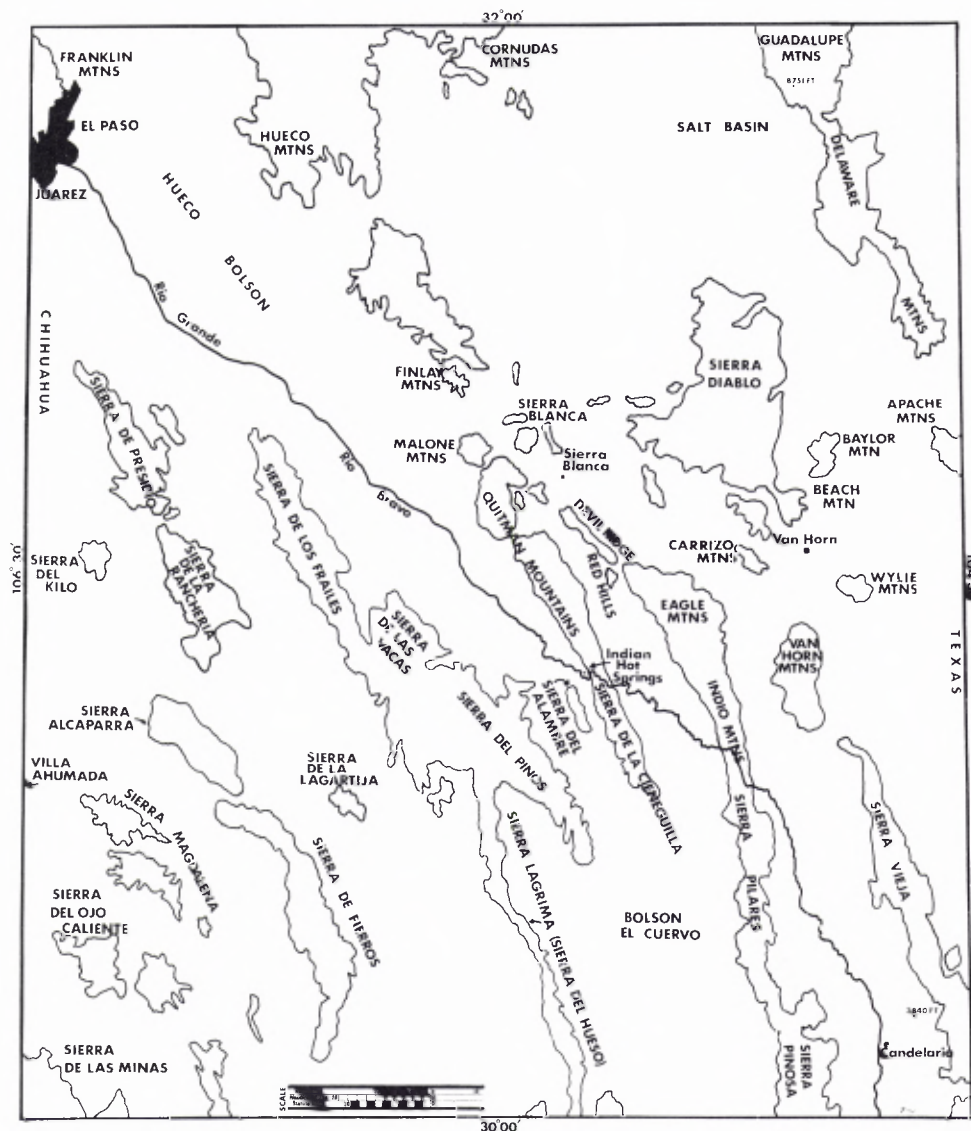


Figure 1. Physiographic sketch of Trans-Pecos Texas and northern Chihuahua, based on Coast and Geodetic Survey, El Paso Sectional Aeronautical Chart, 1965 (courtesy of D. H. Campbell).