

# FIELD & LABORATORY

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## OIL PROVINCES OF COLOMBIA AND VENEZUELA

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Colombia and Venezuela, the two northernmost countries of South America lie east of most of continental United States. Bogotá, the capitol of Colombia, situated just west of the 75th meridian has practically the same longitude as New York City. Both countries are entirely within the tropics, Colombia extending from 4° south to 12° north latitude, and Venezuela from 1° north to 12° north latitude. The air distance from either Bogota, Colombia, or Caracas, Venezuela, to Dallas, Texas, is approximately 2,500 miles. These capital cities are approximately the same distance from Rio de Janeiro, Brazil, and about 3,000 miles from Buenos Aires, Argentina.

Colombia and Venezuela are by far the most important oil producing countries of South America. In 1938, Venezuela ranked third among the oil producing countries of the world, with a yield of 190,000,000 barrels. Only the United States (1,265,000,000 barrels), and Russia (210,000,000 barrels) outrank that country. Colombia, with 22,000,000 barrels was ninth among the petroleum producing countries of the world.

The writer has made numerous trips to both countries, and by means of airplanes and pack trains has visited most of the oil fields mentioned in this paper.

### Geomorphology

In the southern part of Colombia, at the Nudo de Pasto, the Andes divide into three distinct ranges. The western Cordillera extends northward along the Pacific Coast toward Panama, and is separated from the Central range by the Cauca River, a large tributary of the Magdalena. The Central range disappears beneath the surface near the junction of these two rivers. The Eastern range, separated from the Central range by the Magdalena River valley, continues northward to the Venezuela boundary where it again divides into a western range known as the Sierra de Perija that extends to the end of the Goajira peninsula; and an eastern branch that becomes the Sierra de Merida along the eastern side of Lake Maracaibo and the Maritime Andes of the Coast of Venezuela. This range terminates in the island of Trinidad.

In the southern part of Venezuela south of the Orinoco River are found the Guiana Highlands. These continue as a mass of crystalline rocks of moderate elevation southwestward across southern Colombia and into Ecuador.

Between these mountain masses lie synclinal valleys containing thick sediments. The deposits of Pleistocene gravels and sands in these valleys have so obscured the attitudes of the underlying beds that the use of geophysical methods in the search for petroleum has become necessary.

### Oil Provinces

The oil provinces of Colombia include: (1) the Magdalena River basin, containing the producing Infantas field of the Tropical Oil Company; (2) the Catatumbo River basin, now under active development; (3) the Llanos, extending from the foot of the eastern Cordillera toward the Orinoco River; (4) the Caribbean coastal plains, with oil possibilities despite unsuccessful exploratory drilling; and (5) the southern Pacific coastal region, a continuation of the oil zones of Peru and Ecuador. The oil provinces of Venezuela are: (1) the Maracaibo Basin, with enormous production and new areas being prospected; (2) the coastal area in Falcon, with

some production; and (3) the Llanos which extends from the Atlantic Ocean westward into Colombia. This latter area, 150 miles wide and 1,200 miles long has a large and constantly increasing production, and is the scene of intense exploration activity.

The producing fields of the Maracaibo Basin which are among the most prolific of the world, have interesting structural features. La Rosa field, discovered in 1917, has produced to date a total of 2,000,000,000 barrels of oil, its production in 1926 being 21,000,000 barrels greater than the total Colombian production in 1938, and greater also than that of the East Texas field. Other fields on the east side of the lake are the Ambrosio, Lagunillas, Punta Benitez, Bachaquero, and Mene Grande. On the west side of the lake is the Concepcion field, and to the southwest the Tarra and associated fields. All production in the Maracaibo Basin is from the Miocene and upper Oligocene series. In the Falcon area the Tumarebo and El Mene fields are the only ones of any importance.

The Llanos region of eastern Venezuela the Quiriquire field is most important. Other recently discovered fields of commercial importance are the Temblador, Oficina, Merey, El Tigre, El Salto, Santa Ana, San Juquin, and El Roble. Production from these fields is estimated in excess of 50,000 barrels per day.

The most active areas for exploration are in the Llanos of eastern and central Venezuela, and in Colombia along the base of the eastern Cordillera. The next most active area is the Magdalena River Valley. From a drilling standpoint the Magdalena and Catatumbo River basins in Colombia and the southern Lake Maracaibo and eastern Llanos basins in Venezuela are most active. Drilling activity will soon extend westward into the Llanos and other river valley areas of Colombia.

### **Transportation**

The rugged nature of the terrain in most of Venezuela and Colombia has greatly retarded the development of transportation. Automobile roads are scarce in Colombia and poor in Venezuela although the Inter-Andean Highway

connects the two capitol cities. There are few railroads in Venezuela and only very poor ones in Colombia. As a result airlines operate to all principal towns in both Venezuela and Colombia. The Aeropostal of Venezuela boasts one of the best records in air transportation to date—eighteen months without even a minor accident. The Scadta Line of Colombia, operating between the north coast and Bogotá, is the oldest airline in South America and second oldest in the world, having begun its scheduled flights in 1919.