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Beds (passage to Xilitla?). It is light brown, rich in benzine, and of density 0,796. The well flowed 30—40 barrels per day.

San Pedro No. 1 was the second best. High-grade oil was found in the San Felipe from 3650 to 4000 ft. In July 1925, drilling was continued at 4155 ft. Samples of San Felipe type-beds with green shale were collected by the writer.

Guerrero No. 1, on the Rio Tamuin, started in Mendez Beds. According to MUIR (1936, pp. 64—65) the base of the underlying San Felipe occurs at about 2421—2450 ft and the top of the grey cherty Tamaulipas Limestone at 2813 ft.

Rodriguez. In this well, 10 km NNW of Guerrero, MUIR (1936, p. 43) records a mixed facies of Tamabra, at 1906 ft below sea-level, at a distance of 8 km east of the Sierra del Abra.

Origin of Oil.

Practically all the oil in the Tampico Fields comes from the Tamabra, Xilitla and San Felipe Formations. The last, however, is non-porous and only a horizon of secondary impregnation, the oil from below filling cracks. As stated above, the Xilitla is regarded as a typical source-rock. But no locality is known where important production comes definitely from the Xilitla. Possibly the light oil in the San Felipe of San Pedro originates in the Xilitla Flags.

It has long been known that the major production in the Tampico region comes from the Tamabra Limestone. But the primary source of the oil is not definitely decided on by oil-geologists. The writer's view of 1925, at the time much contested, that the primary source is the Tamabra itself seems to be adopted by MUIR (1934). Under specially favourable conditions of non-oxidation, its organisms were transformed into oil. Along the border of the Front Ranges (Sierra del Abra), however, the greater part of the organic substances has been oxidised and evaporated, or has been transformed into carbon.

Accumulation is generally anticlinal, but is also connected with faults or igneous intrusions. The initial production of one well on the anticline of the Southern Fields is only rivalled in the Caucasus. (Total production of Potrero del Llano No. 4, 1910—1928, over 100000000 barrels.) This enormous accumulation is due to primary porosity and cavities in the rudistid-limestone. In the Northern Fields, however, the Tamaulipas-facies prevails and practically the only space within this dense limestone is related to fissures and fracturing (induced porosity of MUIR). What organisms have been transformed into oil in the Pánuco Fields and from what horizon remains an open question.

VII. Appendix.

Notes on the Inner Ranges west of Victoria.

The road from Jaumave, on the Rio Guayalejo SW of Huizachal, to Palmillas crosses a double anticline of the Sierra de los Ebanos, with its eastern limb overturned (Textfig. 9—10). At Paradita, on the western limb, we find beds, 1—2 m thick, of more or less oolitic Tamabra limestone, formed largely of fragments of algae resembling *Lithothamnium*. A second anticline is crossed east of Palmillas, the great westerly dipping walls of Tamabra forming a mountain-range. They are joined, according to W. S. ADKINS, by vertical San Felipe Beds

at the western foot. The next Tamabra Anticline rises 7 km NNW of Palmillas. It is replaced southwards by a brachy-anticline which crosses the road to Tula 6 km west of Palmillas, where oolitic, algal rock, rich in rudistids is seen. This fold is 10 km long and plunges to north and south. Farther west the road passes a long (Tamabra?) range and there are two more such folds between Tula and Bustamente. All these anticlines strike N-S.

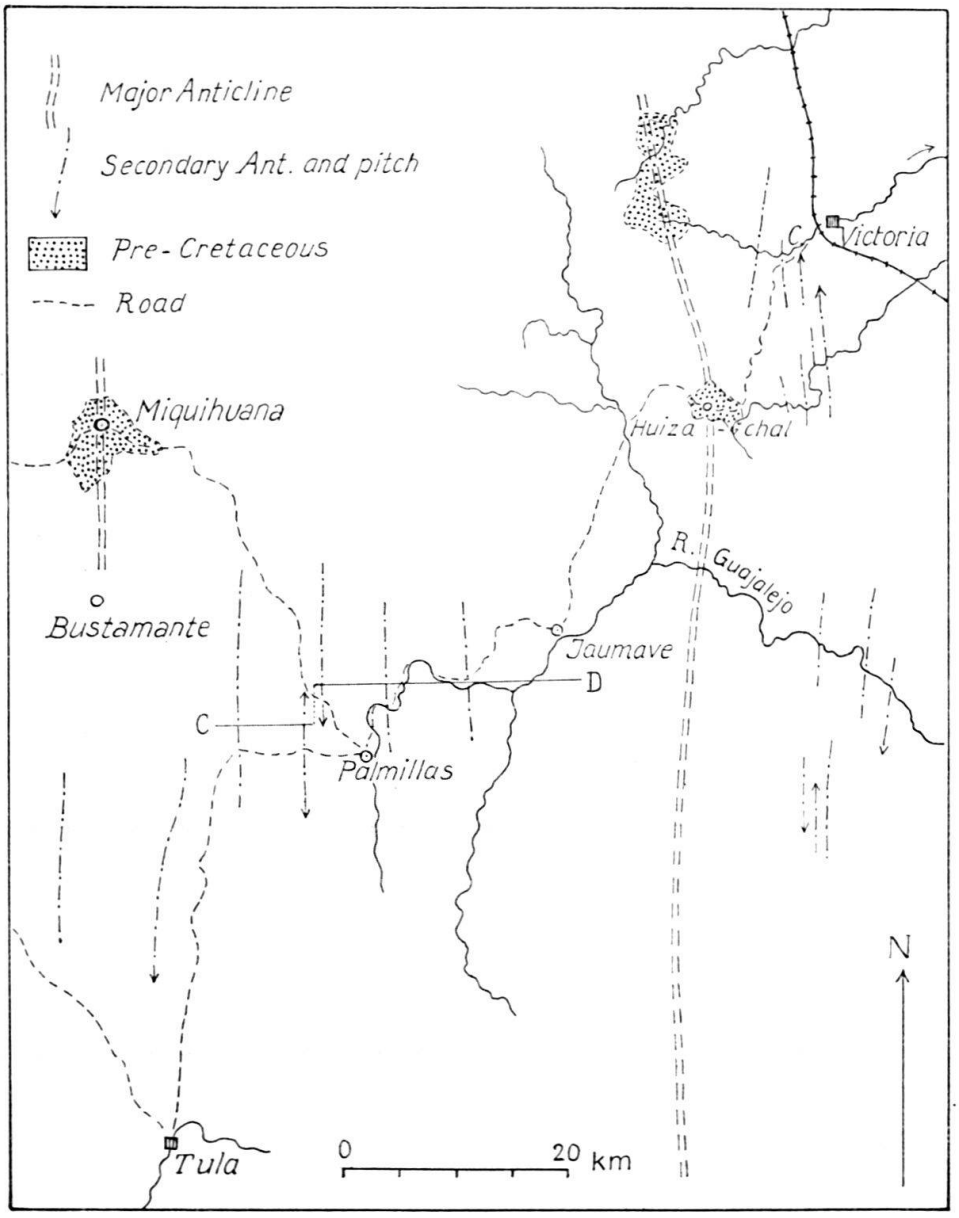

Fig. 9. *Sketch-Map of the Region between Victoria, Tula and Miquihuana.*

At Miquihuana, 55 km west of Huizachal, pre-Cretaceous rocks appear in the core of a great N-S anticline, 15—20 km broad and 3—4 km high. Here the following section was found:

4. Tamaulipas Limestone. ADKINS reported Albian fossils in the middle of the series, west of Miquihuana . . . . . about 1500 m.

3. Valanginian. Reddish, sandy marls with many *Exogyra couloni* DEFR. in the lower part. In the middle, large ammonites identified by Dr. C. BURCKHARDT as *Acanthodiscus* of *michaels*-group . . . . . 150 m.

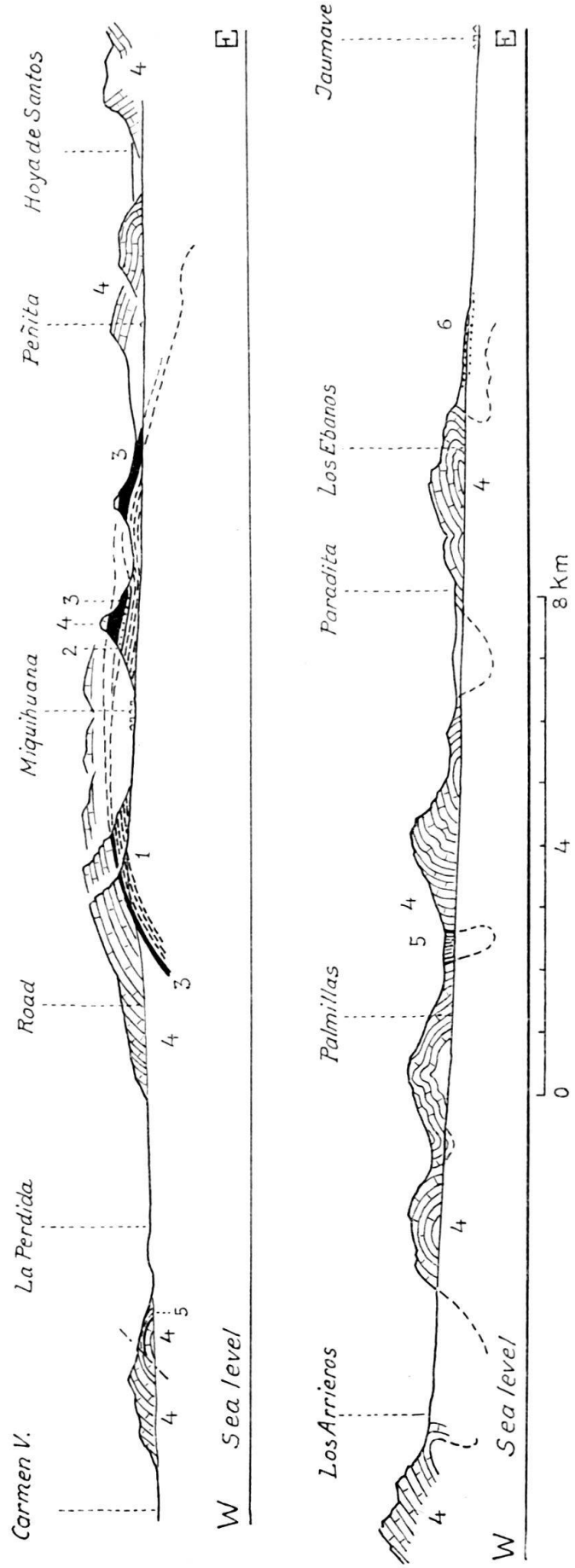

Fig. 10. *Sections of Interior Ranges.*

(Compare Sketch-Map Fig. 9).

1: Redbeds; 2: Portlandian; 3: Valanginian; 4: Tamabra Limestone; 5: San Felipe beds; 6: Terrace gravel.

2. Portlandian. Grey limestone with brachiopods and small oysters.
Absent from the west flank . . . . . 0—12 m.
1. Red Beds. Base not seen, identical with those of Huizachal . . . . 200—300 m.

The western limb of the Miquihuana Anticline steepens up to 45—50°. According to BAKER the Tamaulipas Limestone is underlain farther west by nearly 1000 m of Lower Cretaceous limestone, under which come Gypsum Beds which he considers Upper Jurassic.

Farther north, towards Aramberri in Nuevo Leon, the structure is completely different from that of the Sierra Madre Front Ranges. Great hills, dipping uniformly NW, are followed by Lower Cretaceous limestones dipping NE. Under these are Gypsum Beds and Red Beds with Gabbro-intrusions. The Red Beds are found a long way north and west of Aramberri.

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