

by J.W. West.

Remarks to: Geology of the Lower Patia river. ~~by Anonymus~~

There is a chance to find oil in the lower Patia region, for these reasons:

A. Stratigraphy:

1) The Cretaceous (Upper Cretaceous of ^{West} ~~Anonymus~~) which is entirely volcanic (mostly flows) ^{in the Cauca Valley} becomes gradually shaly and sandy towards the Pacific coast, as proved by ^{West} ~~Anonymus~~, by observations in the Quibdó region and at the Napipí. The last place containing Cretaceous ammonites and is situated on the E flank of the "Cordillera" de la Costa. Though no seepages have been observed nor reported from these sediments, they ^{of oil interest} look very likely to be ~~say~~ promising.

2) Lower Tertiary (Oligocene and Eocene) may be supposed to be present in the subsurface of the Patia Valley. Between ^{the islands} Gorgona and Gorgonilla, ^{thin} NW of Tumaco, a thick formation of dark shales and quartzitic sandstones, similar to the Negritos of NW Perú, overlies the metamorphics of ^{possible} ~~probable~~ Cretaceous age (crossed by gabbro). Lower Tertiary is very probably present in an extensive area on the W side of rio Baudó. Outside the ~~bay~~ Bocana de Buenaventura, on the Palmas island, folded older Tertiary, evidently overlain by the flat Pacific formation (upper Miocene of ^{West} ~~Anonymus~~) is well exposed. All these zones lie on the western side of the Cordillera de la Costa which continues geologically (same rocks) from Cabo Corrientes towards the Gorgona, with a large depression between the latter points. Thus, it may be expected that older Tertiary occurs in the subsurface of the Patia and it may be supposed to be very thick. The ^{petroliferous nature} ~~petroliferous nature~~ of these sediments is unknown; they are productive in W Ecuador and NW Perú.

(The Eocene mentioned by ^{West} ~~Anonymus~~ is probably the Oligo-Miocene coal formation of the Cauca Valley, with characteristic foraminifers.)

3) The Miocene of ^{West} ~~Anonymus~~ is evidently the upper Miocene of the Paleont. Dept. of Oklahoma University, an upper part of the Gatun. At the Napipí, toward the edge of Cordillera de La Costa this gentle to flat formation lies unconformably on older Tertiary and Cretaceous (see: Gregory, Structure of Asia. Napipí profile, and the writer's ~~section~~ plan of the upper Napipí made at The Hague). It cannot be expected to be an oil formation because no oil indications were found, though thoroughly studied at ^{except along} Buenaventura-Málaga, at the Baudó and at the Napipí-Truandó. However, it ~~contains~~ contains porous sands and marls and may be secondary ^{petroliferous} where buried.

B. Tectonics. The Pacific Valley, we refer to, lies between ^{the} W and ^{the} Coast, Cordillera.

At the upper Napipí, at the Baudó and at the Gorgona, the Lower Tertiary is intensely folded, crumbled and faulted, structures being very short. This takes place at the E side of the rigidized mass of the metamorphic-igneous Cordillera de la Costa. Towards the Western Cordillera, no outcrop zones of Lower Tertiary were found by the writer, but they probably occur on the E side of the middle Atrato. E of Buenaventura, a huge fault between W Cordillera and Pacific Valley must be supposed and faults may intervene, too, E of Barbacoas. Along the Pacific valley, the upper Miocene is flat or gently folded, but stronger folded, and faulted (Naipipí) toward the Coast Cordillera, this may indicate, that the Lower Tertiary is also more gentle in the deep subsurface of the Pacific Valley (excepting places where cross-uplifts are present, viz. at Guayaquil, at the Atrato-Tuyra watershed and in the Quibdó region). Detailed observations in the very contracted Cauca Valley, from Cali to Tambo, and at the Patia Valley (see: Grosse, Patia) prove that the intensely folded and thrust ~~of the~~ E side of the W Cordillera passes toward E into gentle, wide folds arranged along the inner ^{W-}side of the Patia and Cali basins (the cross uplift of Papayan which separates ^{after the two} basins is intensely folded). Applied to the Pacific Valley, one may suppose that in the lower Patia region such folds with older Tertiary and Cretaceous may be present, possibly beneath the upper Miocene Remolinos anticline of ^{West} Anónimas, which lies far away from the Gorgona manifestation of the Cordillera de la Costa.

C) Unfavourable View Points ~~and~~

The lower Tertiary is very shaly ^{and may be very thick} on the ~~W side of the~~ E side of the Coastal Cordillera. It is unknown whether the older Tertiary folds, at a larger distance from the Cordillera become conformable with the upper Miocene folds. These are the chief risks for oil prospects. The faults ^{unfavourable} may have no ~~larger~~ influence in the lower Patia Valley (they are reported also from other geologists). Considering the Amotape mountains ^{as} an uplift of the Coastal Cordillera, it is striking that ~~no~~ oil activity started E of that mountains. In Ecuador, the oil activity is restricted to the westernmost coast, not inside. The lower Patia also lies inside the Coastal Cordillera (Gorgona uplift).