

The entire drainage of the plain, apparently, was first diverted into the present course of Rivière Las Cahobas across the escarpment along the south margin of the plain and through the conspicuous gap in the Montagnes Noires southwest of Las Cahobas, as has been suggested by Tippenhauer,¹ and outlined by Jones.² The gap in the escarpment northwest of Las Cahobas seems much wider than it would be if cut by the stream that now occupies it. The gap in the Montagnes Noires southwest of Las Cahobas is all out of proportion to the present small streams that flow northeastward and southwestward from the divide in the gap, which has an altitude of about 245 meters above sea level. The cause of the diversion is not known. The high-level gravels at Las Cahobas and in the valley of Rivière Fer-à-Cheval south of the Montagnes Noires are, according to available information, about 30 meters lower than the gap. If the former surface of the plain were as high as the gap these gravels were deposited during a later stage of the drainage. Additional evidence concerning the outlet of the Central Plain drainage through the Las Cahobas gap, based on the features of the valley of Rivière Fer-à-Cheval, is considered on page 388.

The present gorge of the Artibonite is cut wholly in limestone and its course was probably determined by a former lateral stream in the north slope of the mountains that had an extensive underground drainage. After the gap across the Montagnes Noires at Las Cahobas was deepened down to the basement of volcanic rocks now exposed the deepening proceeded less rapidly, whereas the development of the underground drainage of the lateral streams was accelerated. The final diversion may have been due to the capture of this headward underground drainage by a southwestward-flowing tributary of the Artibonite on the south slope of the mountains. At the time of the diversion the surface of the plain probably coincided with one of the higher terraces along Rivière Artibonite above the mouth of Rivière de Las Cahobas. Between the present gorge and the mouth of Rivière de Las Cahobas the valley of the Artibonite is very narrow, presenting a contrast to the wide terraced valley above.

MONTAGNES NOIRES.

NAME AND EXTENT.

The name Montagnes Noires is here used for the mountains between the Central Plain and the Artibonite Valley and their prolongation eastward to the Dominican border. The entire mountain complex is named from the Montagnes Noires, the mountains immediately northwest of the gorge of Rivière Artibonite. The higher mountains farther northwest are generally called the Chaîne des Cahos. The range between the Central Plain and the valley of Rivière Fer-à-Cheval is unnamed.

¹ Tippenhauer, L. Gentil, *Neuer Beitrag zur Topographie, Bevölkerungskunde, und Geologie Haitis*: Petermanns Mitt., Band 55, p. 53, 1909.

² Jones, William F., *A geological reconnaissance in Haiti*: Jour. Geology, vol. 26, pp. 748-749, 1918.

Toward the northwest the Montagnes Noires merge into the Massif du Nord, and toward the southeast they are continuous with the northern part of the Sierra de Neiba of the Dominican Republic. The northwestern boundary of the Montagnes Noires is drawn somewhat arbitrarily along the valley of Rivière d'Ennery and southeastward along the pass traversed by the road from Ennery to St.-Michel de l'Atalaye.

Between the valley of Rivière d'Ennery and the Dominican border the length of the Montagnes Noires is about 120 kilometers and their average width is 15 kilometers, but toward the southeast their width is reduced to 6 kilometers or even less.

GENERAL FEATURES.

The northwestern part of the Montagnes Noires comprises several mountain ranges, but the southeastern part is a single range. The trend of the ranges parallels the structural trend. The crest of the southeastern part of the range coincides with the crest of a simple anticline that trends about N. 70° W. This trend extends from the Dominican border westward to the conspicuous gap followed by the road from Mirebalais to Las Cahobas. Immediately northwest of this gap there is a single anticlinal range, but the trend changes to N. 50° W. Farther northwest the Montagnes Noires comprise several ranges, the crest of which generally coincides with the crest of a complex anticline. The conspicuous change in trend coincides with the change in trend of the upper part of the Artibonite Valley and in the mountain system included in the Montagnes du Trou d'Eau and the Chaîne des Mateux. A separate name might be justified for the range southeast of the gorge of Rivière Artibonite, as it strikes into the Artibonite Valley and is separated from the main part of the mountains by a syncline.

Limestones are the surface rocks over large areas in the Montagnes Noires. Older rocks are exposed in the deep valleys and possibly on the crests of the interior ranges.

SURFACE FEATURES.

NORTHWESTERN PART.

The northwestern part of the Montagnes Noires was crossed during the reconnaissance only along the trail between St.-Michel de l'Atalaye and Dessalines. Along this trail the mountains include several rugged ranges. The crest of the mountains is crossed at an altitude of 510 meters above sea level, but on both sides of the trail peaks rise to an estimated altitude of 1,200 meters above sea level. Morne Chapelet, a conspicuous peak near Ennery, has an estimated altitude of 1,400 meters above sea level. These mountains are very rugged. Stairlike cliffs rise for hundreds of meters on some of the slopes. Southwest of St.-Michel de l'Atalaye a low range composed of limestone faces the Central Plain. West of this

range Morne Salée rises to an estimated altitude of 800 meters above sea level. In this region the ridges are composed of limestone and are very rugged. The valleys have been cut down to the underlying volcanic rocks, and some of them have been enlarged into rolling interior lowlands. (See Pl. VI, A, p. 64.) Near Paul alluvial savannas are common in these lowlands, which have an altitude of about 400 meters above sea level, slightly higher than that of the Central Plain, into which they drain. Some of the valleys near Dessalines are like those near Paul, but they are narrower and have been cut down to an altitude of 100 meters above sea level. The western boundary of this part of the Montagnes Noires is a straight scarp that extends for many kilometers from the eastern side of the valley of Rivière la Quinte southeastward toward Dessalines and rises abruptly 300 to 600 meters above the Gonaïves Plain. (See Pl. XXV, B, p. 334.) This abrupt scarp apparently is a fault scarp, along which the western range of the mountains is tilted in a monoclinical block sloping northwestward. This type of structure, which has determined the surface features, extends farther west, as Morne Grammont, an isolated outlier of the Montagnes Noires rising above the Gonaïves Plain southeast of Gonaïves, apparently is a similar monoclinical block. Other hills near the boundary of the Montagnes Noires southeast of Morne Grammont are almost completely buried in alluvium.

SOUTHEASTERN PART.

The top of the range southeast of the Las Cahobas gap is a rolling plateau, about 4 kilometers wide, in which large areas are covered with residual red clay. The central part of the range consists of limestone, and the slopes from the plateau are much steeper but less intricately dissected than those in the foothills, which are composed of younger detrital rocks. The range is bounded on the south by the narrow valley of Rivière Fer-à-Cheval, a prolongation of the Artibonite Valley. Along the trail from Belladère to Savanette the south slope of the range is much more precipitous than the north slope, descending from an altitude of 1,250 meters above sea level at the crest of the range to 535 meters above sea level at Savanette, only about 3 kilometers to the south.

DRAINAGE.

The gorge of Rivière Artibonite, which cuts directly across the Montagnes Noires, and the abandoned gorge at Las Cahobas are the most conspicuous drainage features. The probable history of Rivière Artibonite is discussed on pages 381-382. In the northwestern part of the Montagnes Noires the drainage is almost completely controlled by the structure. Most of the streams flow either northwestward or southeastward, parallel to the strike of the rocks, and finally break across the outer ranges through deep, narrow gorges into the Artibonite Plain or the Central Plain.