SURVEY OF THE GEOLOGY OF HAITI

GUIDE TO THE FIELD EXCURSIONS IN HAITI

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By

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The weathered igneous rocks at the origin of the bauxite may have derived in part from neighbouring rocks of the Dumisseau complex. It is also inferred that allochtonous ash products from volcanoes located north of the Cul-de-sac/Enriquillo graben may have provided the bulk of the parent material which accumulated over the area during Oligocene and Miocene times. The trade winds of these times may have been the primary factor controlling the distribution of the ashes over this area. Extensive laterites must have developed over the area as early as middle Miocene times because upper Miocene clastic deposits in the Peninsula also include red lateritic clays.

The average alumina (Al_2O_3) content of the bauxite of the Plateau de Rochelois is about 50 percent, silica (SiO_2) content is about 3.4 percent, and iron oxides 21 percent. Presently the bauxite of this Plateau is the only economic mineral being explored in Haiti. Other potentially exploitable deposits occur farther east in the La Selle Mountain (figures 3,4).

END OF EXCURSION 2 RETURN TO PORT-AU-PRINCE FOR OVERNIGHT STAY.

EXCURSION THREE: PORT-AU-PRINCE - CAP HAITIEN

ROAD LOG IS BASED ON DISTANCES GIVEN BY THE ROAD POSTS.

As we turn on Nationale one from the road adjacent to the international airport note yellowish-brown marl on the right side. This is part of the Delmas-Rivière Grise Formations which make up the hills of Port-au-Prince, as previously discussed.

We proceed across the fertile part of the southern edge of the Cul-de-Sac Plain, cross the bridge over Rivière Grise (also called Rivière du Cul-de-Sac) and continue northward. Note progressive change that takes place in the vegetation which becomes totally xerophytic in the northern part of the plain. This is due to the rain shadow effect of the Chaine des Matheux and Montagnes du Trou d'Eau (figure 4).

The Cul-de-Sac Plain is the western extension of the major pull-apart depression which divides Hispaniola into two distinct geologic provinces. The area was open marine during most of Cenozic time but became emergent during late Pleistocene due to a later episode of compression related to strike-slip motion along the northern Caribbean megashear (Maurrasse et al., 1982b). These late tectonic activities gave rise to high-angle reversed faults as well as minor thrust faults along both the northern and southern edges of the depression.

17.0 km. Pebbly mudstone of late Pleistocene to Holocene ages. Note low hills made up of fanglomerates which developed along the southwestern side of the Chaine des Matheux (Figures 3-4).

19.0 km. Crossing of the western end of the fault system at the northern boundary of the Cul-de-Sac Plain.

20.9 km. Thermal Spring called "Sources Puantes" on the west side of the road near the mangrove swamp. The water averages a temperature of 33°C; it is rich in hydrogen sulfide and dissolved minerals (salinity is about 12.7 parts per thousand: Woodring et al., 1924). Preliminary geothermal reconnaissance works have been undertaken in the area in order to assess its geothermal potentials. Across is a quarry of calcareous breccia which is used as building material, as previously mentioned. The road climbs the gentle slope of the alluvial fans developed along the scarp of the NW-SE trending fault of the Southwestern flank of the Chaine des Matheux. Coral heads are also found among the boulders.

26.0 km. Titanyin. Here the low hills are underlain by medial Miocene marl and limestone. These facies can be better observed north of this locality at an open pit quarry which can be seen at the distance.

30.3 km STOP 12: SOURCE MATELAS Figure 31B Quarry of the "Ciment d'Haiti" at Source Matelas is in late Miocene nerito-pelagic facies. The series shows gentle folding and minor faulting throughout. Biogenic content is a rich planktonic foraminiferal fauna including among other taxa, Globigerinoides haitiensis, Gs. obliquus obliquus, Globorotalia pseudomiocenica, Globigerina nepenthes etc. The facies indicates that the area remained under pelagic conditions even though it was adjacent to the emergent Matheux-Trou d'Eau land mass which has apparently remained an emergent block since at least the latest Oligocene. The prevailing paleogeographic conditions of this area during the Miocene are much reminiscent of those previously discussed for the La Selle-Baoruco block, i.e., an island surrounded by steep sided, fault controlled margins. Subsequent tectonic activities incorporated this island into the larger Hispaniolan land mass. Steep, fault-controlled margins still occur farther north of here, near Montrouis. The nerito-pelagic facies here are similar to those found at the periphery of the La-Salle-Baoruco block (Maurrasse et al, 1982b).

From Duvalierville northward the low hill topography and the gently dipping Plaine de l'Archahale are also the results of talus fan deposits along the edge of the western boundary fault of the Matheux Mountain.

71 km. The northwestern flank of Matheux comes closer to shore, and the fault continues into the Gulf. Some elevated Pleistocene reefs can be seen along the right side of the road at Carries.

As the coastal region narrows farther north, the road runs closer to the mountain, note extensive Karst features along the slopes. Entrances to series of well known caves called "Trou Forban" can be seen toward the top of the steep mountain side. These caves were used by the Arawacks for ceremonial purposes.

73 km. Closest approach of the northwestern flank of the Matheux to shore where the fault continues northwestward into the Gulf of La Gonave. Farther northward, low hills are of Mio-Pliocene clastics which were evidently originated from the nearby paleo River of Montrouis.

More fanglomerates and elevated Pleistocene terraces appear until Mountrouis. Some well defined terraces occur in the vicinity and at the site of Hotel Xaragua (78 km).

81.2 km STOP 13: PIERRE PAYEN - Southern limit of Bois Neuf region. Yellowish-brown sandy marl. Hemipelagic facies of late Miocene age. The foraminiferal fauna is very well preserved, and very well diversified. It includes an assemblage indicative of the latest Miocene Globorotalia margaritae Zone.

82.1 km. Etang Bois Neuf. This small pond lies in a fault controlled depression underlain by upper Miocene to lower Pliocene sandy marl. The lake occurs about at the juncture of northwest and north-northeast trending faults (figure 3) which underwent differential displacements during the late Pleistocene. The soft marl caught in between two competent blocks buckled gently giving rise to a constriction allowing water to accumulate in the Bois Neuf area which then became permanently emergent. Morne Bois Neuf seen on the west side of the pond may have remained a separate small island off the mainland during Pleistocene high sea-stand.

88.2 km STOP 14: BOIS NEUF Outcrop of clayey sand, silstone, and intraformational mudflow (intrabasinal slump). The age is also latest Miocene Globorotalia margaritae Zone.

The abundance of benthonic taxa at this location indicates a depth of water shallower than the preceding station. This hemipelagic facies most likely accumulated on a deep shelf or on the slope close to the shelf edge. The depositional environment was intermittently flooded by more abundant and coarser terrigenous sediments carried by the Riviere de Saint Marc which must have existed since that time. These clastic facies are in marked contrast to the eupelagic chalk facies deposited during the early Miocene. This drastic change in the depositional regime is similar to that of the La Salle-Baoruco block (Maurrasse et al., 1982b) previously discussed. Two superimposed factors evidently contributed to the change: tectonic activities and paleoclimatic fluctuations in post early Miocene time. The dry climate which prevailed over the area during early Miocene time contributed to a dominantly pelagic regime. Contrariwise, heavy intermittent rainfalls appear to have prevailed over the area during cooler climatic conditions subsequent to early Miocene. A low sea-level would have also enhanced the flow of terrigenous supplies by allowing erosion of previously inundated shelf area. Nonetheless, areas that were either sufficiently remote from rivers, or isolated by geographic features from subaqueous flows continued to accumulate nerito-pelagic facies as seen at STOP

12. Late Miocene uplifts (Maurrasse, 1982c) further enhanced the existing climatic effects.

The composition of the clastic elements indicates a provenance compatible with the terranes of the drainage system of the present Rivière de Saint Marc.

92.0 km. Ca Perisse and Morne Rousseau on the westside of the road. Another variable clastic series crop out at the level of the road. Its age ranges from early Late Miocene to latest Miocene. The upper series going to the top of Morne Rousseau reaches the Late Pliocene Globorotalia tosaensis Zone. This facies also suggests near shelf break to a deep neritic environment as attest the presence of Scaphopods and other smaller Pelecypods which are characteristic of low energy muddy shelf environments. A modern analog would be the present Gulf of La Gonave at Port-au-Prince Bay.

The oldest coral reefs of this area occur as limestone cliffs capping the Pliocene marl at Morne Rousseau. Unless a para-conformity is present in between the two series, these oldest reefs may be of late Pliocene age. This is suggested by the sedimentary record which indicates that the corals developed over a gradually emerging shelf environment, much the same way the successive Pleistocene terraces developed.

96.9 km. Note elevated Pleistocene terrace at the entrance of the city of Saint Marc. The road runs on top of the second raised terrace which is covered by lateritic soil.

101 km. Northern limit of the city of Saint Marc. Steep cliff at turn consists of Miocene bioclastic and terrigenous sediments, and is part of the series to be seen farther north in the Saint Marc anticline.

102 km. Southwest limb of the northwest-southeast trending Saint Marc anticline. The calcareous sandstones, sandy foraminiferal marl beds can be seen dipping successively to the southwest.

104 km. Core region of the anticline. It comprises predominantly yellowish gray foraminiferal marl intercalated with coral rubbles in beds of variable thickness (15 centimeters average). Gypsum also occurs in cracks intersecting the whole sequence. Planktonic foraminifera are very small and include among others Globigerina aff. pachyderma, Globigerinoides oliquus, Globigerinoides extremus, Globoquadrina venezuelana, Globorotalia margaritae, and Globorotalia pseudomiocenica, suggesting a latest Miocene to possibly earliest Pliocene age for the oldest outcrops in the eroded core region. An exploratory well was drilled in 1947 by the Atlantic Refining Co. in an area about 500 meters from the road. The drilling results indicated the presence of lower Miocene sandy claystones and limestones comparable to lithofacies of the Thomonde Formation down

to 800 meters, terminal depth. Tests for Hydrocarbons are reported to have been negative (Rigaud and Pierre-Louis, 1982).

105 km. End of northeastern limb of the anticline. The road gradually descends the dip slope of the anticline to reach the southern rim of the Artibonite Plain. Here again you will observe a dry area which is in the rain shadow zone of the "Montagnes de Saint Marc" (figure 4).

Ahead lies the Artibonite Plain which is essentially an alluvial plain built up by sediments carried by three major rivers: 1) The Artibonite River in the central region and also the main river; 2) Rivière de l'Estère which drains the southwestern slopes of the massif of the Montagnes Noires (figure 4); 3) Rivière La Quinte, which drains the southern slopes of the Montagnes du Nord'Ouest (figure 4).

The plain is actually a fault bounded structural depression (figure 3) developed during an episode of late Paleogene distention after deactivation of the main island arc (Maurrasse, 1982c). The depression was slowly filled by the coalescing deltas as they progressed westward into the bay. Most of the plain was still under marine waters until early Pliocene, and possibly until late Pliocene as suggest marine sediments of these ages found at the easternmost end of the Mirebalais Basin, near the Central Plain (figure 12).

The northern boundary fault system or Gonaives fault zone conists of series of parallel high-angle faults which continue northwestward into the Northwestern Peninsula (figure 3). This fault zone shows evidence of some degree of left-lateral strike-slip displacement, and linear intrusions of andesitic and basaltic magmas.

134 km. Northern rim of the Artibonite Plain. Hills here consist of lithographic limestone of uncertain age, but most likely Paleogene or older. They are intruded by basaltic andesitic rocks. Butterlin (1954) and subsequent workers assigned an early Eocene age to the limestones and a Cretaceous age for the neighbouring igneous roks. In view of the fact that the latter are intruding the limestones, it is evident that the intrusions must be younger than the early Eocene age of the limestone. As we will discuss at Stop 16, the intrusions could be even younger than Middle Eocene. However, it is possible that several magmatic events took place along the major fault zone subsequent to the deactivation of the island arc (Maurrasse, 1982c, p. 163). In fact, in the Massif de Terre Neuve (figure 4), which is transected by the northwestern extension of this fault zone, Kesler (1971) reported two intrusive events. The oldest event is associated with hypabyssal basaltic plutons intruding Plaeocene and Eocene limestones. The date of the later event in the Terre Neuve area is compatible with a magmatic episode affecting medial Eocene limestones in the Gonaive area, as will also be discussed later.

125 km STOP 15 PERISSE. Marble quarry of massive crystalline limestone varying in color from beige to gray and black, depending on the intensity of metasomatism in the rock which is intruded by hybapyssal basaltic andesite. As pointed out in the preceding paragraph, the lack of reliable fossils in these limestones make the timing of these intrusions still uncertain within post Cretaceous time.

This area is the southeastern tip of a minor horst, the Morne Grammont seen toward the north-northwest from here. This small mountain actually divides the northernmost part of the Artibonite Plain into a smaller unit called Savane Désolée, because of its sub-desertic character caused by the rain shadow effect of the adjacent Montagnes Noires.

Extensive multidirectional faults also affect the limestone whose fragments have been subsequently completely recimented in a solid competent rock, now used as rock marble.

The Morne Grammont appears to have stood as a separate island off the mainland throughout the Pleistocene. This structurally controlled mountain is a smaller analog of the Martin Garcia Mountain at the end of the Neiba Mountains (figure 2) in the Dominican Republic.

152 km. Gonaives - This city is also named after an original Arawak town which existed at this site in pre-Columbian time. It was then known as Gonaibo, and was apparently the capital city of the Caciquat of Marien which was ruled by Guacanagaric. Gonaives is also the city where Haiti was proclaimed independent in 1804.

North of Ganaives the xerophitic vegetation indicates another rain-shadow zone. From there on the outcrops along the road leading to Cap-Haitien provide excellent cross-sections of the Hispaniolan main island-arc complex.

166 km STOP 16. North of village of Poteaux at Morne deux Mamelles. This area is part of the northernmost extremity of the Montagnes Noires transected by major and subsidiary northwest trending faults related to the Gonaives fault zone (figure 3). Extensive metasomatism occurs in the limestone in the fault zone. The sedimentary rocks consist essentially of very light tan to white pelagic limestone, in layers 5 to 15 centimeters thick. Identifiable planktonic microfauna include Globigerapsis index and Lamptonium fabaeforme, both indicative of a middle Eocene age. Farther north there is evidence showing that a magmatic event was contemporaneous with this limestone deposit.

167 km. West of Pass Reine. These outcrops of thinnly bedded limestones formerly classified as the Ennery Formation are here equated to the Neiba formation.

174 km STOP 17. Limestones near Ennery. Here the eupelagic limestones similar to the one seen north of Gonaives now include intercalated beds of shallow-water biocalcirudite (figures 16,17). As pointed out in the section concerning the formations, the biocalcirudite beds are allochtonous materials brought into the deeper water environments by intermittent basin-edge turbidites. Here also spatial distribution of coeval facies indicates the presence of shallow banks adjacent to deep waters at the time of deposition of these rocks. The modern analog of such environment can be found in the present day lesser Antilles island arc, where there are fault-controlled intervening deep basins between inactive volcanic banks and the active volcanic islands. Note conspicuous groove casts and load casts at the bottom of the thickest (about 150 centimeters thick) bioclastic turbidite layer. Chert stringers can also be observed interspersed in the layer. The cherts are post depositional to the turbidite event, and developed by pervasive diagenetic silicification in scattered spots of the deposit. Thinner bioclastic turbidite layers may exhibit more extensive silicification, as can be seen in such a layer (15 centimeters thick) which occurs about 250 centimeters below the thickest turbidite. As previously mentioned, the limestone fragments found in the turbidites are identical to the shallow-water facies of the Plaisance limestone proper, which we will see near the Puiboreau pass at STOP 19.

More outcrops of the limestone facies seen at STOP 17 can be observed at 176 km and 180 km road posts, respectively.

181 km. At 1 kilometer west of junction road leading to Ennery, and less than 100 meters or so west of bridge crossing "Rivière d'Ennery". Here the thinnly bedded limestone of the Neiba type of facies is mixed with a basaltic agglomerate layer 5 to 6 meters thick. This volcanic event is apparently corelative with the magmatic event which caused metasomatic alteration in the limestone sequence seen at STOP 16. The planktonic microfauna found associated with this pyroclastic layer also yielded a Middle Eocene age, consistent with the age assignment given by previous authors (Woodring et al. 1924; Butterlin, 1954). More spectacular agglomerates, (fig. 28B) and also pillow-lavas will be observed along the road cuts of the southern flank of Morne Puilboreau, which is the mountain range immediately north of here.

182 km. Junction new section of road "Nationale 1" and the old section leading to Ennery.

183.2 km STOP 18. Lower foothills of Morne Puilboreau. Yellowish brown foraminiferal marl intermixed with subaqueous igneous flows. These middle Eocene eruptive events were apparently not associated with distinct volcanic structures, which suggests that they may have taken place along major fault zones during the Upper Paleogene dislocation of the original main island arc (Maurrasse, 1982c). Similar fissure eruptions were reported by Burbank (in Woodring et

al., 1924) in the Montagnes de Terre Neuve northwest of here. The petrology of these rocks, also studied by Burbank, indicates that they are analcite andesites and analcite-olivine andesites, or transistional between the essexite and other types of basalts found farther north. Microscopically the plagioclase is strongly zonal and ranges in composition from labradorite to sodic oligoclase albite. Because of the irregular borders of sodic plagioclase the interlacing prisms are never strictly euhedral. In some cases, small amounts of soda orthoclase is found in between the plagioclases. Plagioclases generally amounts to 40 or 50 percent of the rock. Purple pleochroic augite occurs in subordinate amount, forming 20 to 30 percent of the rock. Olivine was apparently a primary constituent in some of the rocks but is altered to iddengsite. Analcite and/or natrolite may also fill spaces between the plagioclase and replace the feldspars to a variable extent (Burbank, in Woodring et al., 1924). The marl contains abundant planktonic foraminifera of a mixed assemblage including older taxa from the upper Paleocene Globorotalia pseudomenardii zone, and younger taxa of the upper Middle Eocene Orbulinoides beckmanni zone.

I should point out that the "Crête Sale" Formation of Butterlin (1957) described from similar sequences found southeast of Ennery is here considered to be a lateral facies, or a member of the series found in this area. The sequences described by Bulterlin may have been closer to the eruptive center, as they include a relatively greater porportion of pyroclastics than those cropping out here. As I noted earlier, these volcanic eruptions may have been related to distention in first and second order shear zones which developed in the left-lateral wrench fault tectonic system of the northern boundary of the Caribbean plate (Maurrasse, 1982c; Maurrasse et al., 1982b). Their modern analog can be examplified by the pesent situation in the lesser Antilles where alkaline volcanic series and olivine rich sub-alkaline basalts occur in relation to NE- SW and SE-NW trending faults crossing the archipelago and dislocating the Caribbean crust into large blocks (Westercamp, 1980). In the lesser Antilles arc tholeiitic series characterize the first stage of activity, while the actual stage of maturity is characterized by primary calc- alkaline suites (Westercamp, 1980).

183.9 km. Agglomerates intercalated with pelagic chalk. The chalk here is remarkably rich in Chilogumbelinids. The presence of Globigerinatheka barri indicates a late Middle to earliest Late Eocene age for the sequence.

It is worth noting that a lithofacies similar to this outcrops occurs farther west in the valley of the "Trois Rivières" about 1.8 kilometer north of "Rivière Gros Morne". However, in the latter area the foraminiferal fauna includes Globorotalia Kugleri, indicative of an earliest Miocene age for that sequence. It is thus evident that during Middle Cenozoic the northern part of Hispaniola went through several episodes of fissures eruptions in the areas of major dislocation. Eruptive centers are known indeed to have become

active in these faulted areas until the Pleistocene (Woodring et al., 1924; Butterlin, 1954). The youngest eruptive centers with defined volcanic structures are known in Haiti, near Thomazeau and Saut d' Eau, and in the western Dominican Republic, near San Juan de la Maguana and Rio Yaque del Sur in the Sierra de Neiba, Sierra de Ocoa. Pleistocene eruptive centers are also known in the Cordillera Central, south-southeast of Peak Duarte (figure 2). Their absolute age has been determined to be less than one million years (Vespucci, 1980).

187.5 km. Andesitic agglomerates in chalk of late Middle Eocene age. Sedimentary structures indicates a subaqueous flow within close proximity of a volcanic center.

188.5 km. STOP 19. Chalk facies of the Jérémie Formation. Here the rock series is of late Middle Eocene age, and possibly early Late Eocene. Like its younger analog at Stop 11, it is also characterized by the dominance of Chilogumbelinids in the foraminiferal assemblage. This same facies occurs farther west in the Massif du Nord'Ouest (figure 4) where the outcrops range in age from the latest Early Eocene, Globorotalia aragonensis zone, to the early Middle Eocene Hantkenina aragonensis zone. I should also point out that despite the absence of distinct layers of intrabasinal bioclastic turbidites in these series, the older levels in the Massif du Nord'Ouest also include reworked middle Paleocene foraminiferal fauna.

190.4 km. Recurrence of andesitic agglomerates in chalk.

191.4 km. Thickly bedded biocalcirudite and biocalcarenite of the Plaisance limestone lithofacies proper, as originally designated by Vaughan (1921, in Vaughan et al., 1921).

192 km. STOP 20. PUILBOREAU COL. Altitude 950 meters. Here you can see the typical Plaisance limestones which form a prominent northwest-southeast trending divide between the limestone terranes to the south-southwest and the igneous terranes to the north-northeast. The transition between this shallow water facies and the coeval deep-water chalk is quite abrupt in this area. In fact, thrust contact is suggested, as can be seen in an outcrop about 500 meters south of the pass.

The Plaisance limestone facies developed over fault-controlled banks bordered by deep water basins to the south and both active and extinct volcanoes to the north. Clear waters apparently prevailed over the banks which sustained prodigious productivity of benthic foraminifera. The most characteristic species of these limestones are Dictyoconus puilboreauensis and Dictyoconus codon. The abundance of calcareous green algae further indicates that the depth of the bank stayed within the euphotic zone, and probably within the reach of wave base. Intermittent turbidites containing elements from the bank as observed at Stop 17 may have been triggered by

heavy storms which disloged abundant materials from the bank surface.

As we proceed down on the steep winding road along the northeastern slope of Morne Puilboreau observe further outcrops of the limestone which is also extensively fractured throughout.

198 km. Contact between the sedimentary rocks and the igneous complex (here dacite and andesite) which constitutes the hearthland of the northern part of Hispaniola. From here on we will be crossing the volcanic island arc of early Hispaniola.

199.5 km. Outcrop of lithofacies of the "Trois Rivière" Formation south of the bridge crossing the Trois Rivières immediately south of the town of Plaisance. Note tightly folded and sheared inter-bedded series of dark brown fine-grained sandstone, sandy-shale and argillite.

205 km. Plaisance.

207.2 km. Contact between pure argillite and thinnly bedded limestone with chert of Trois Rivieres Formation, and partially weathered andesite of the old island arc complex. The limestone includes ghost of Radiolaria which are indicative of an open marine environment. Here the intercalation of argillite and volcanogenic turbidite with the pelagic limestone suggests proximity to the volcanic center. Rocks of this formation are time correlative with those of the Macaya Formation (figure 11), which also represent hemipelagic facies generated in similar geologic environment at the distal portion of the Nicaragua Rise-Jamaica island-arc system (Maurrasse, 1982c). Unlike these island-arc deposits, the Dumisseau Formation seen along the transect of the Southern Peninsula is the result of basaltic eruptions related to back-arc spreading.

206.2 km. Andesitic agglomerate.

208.1 km. Gray hornblende andesite.

208.2 km. Pyroxene andesite, gray to greenish in color. It also shows minor shearing structures.

208.3 km. Basaltic andesite, very dark gray to greenish gray, with birdseye tuff indicative of explosive volcanic activity. The abundance of pyroxene in the pyroclastic may also indicate closeness to the volcanic vent.

209.2 km. "Col du Bedeuret". 500 meters altitude. Mountain pass controlled by fault systems transecting the igneous complex.

212.7 km. North flank of Morne Bedeuret with outcrops of andesite, dacite and metadiabase.

216 km. Foothill of the Morne Bedeuret with outcrop of quartz diorite.

233 km. Plaine du Nord. This area of the northern Plain is alluvial and became emergent at the end of the Pleistocene. The city of Cap-Haitien is at the northerwestern outskirt of the Plain where an outlier of Cretaceous sedimentary rocks forms a smaller mountain chain called "Morne du Haut du Cap" which formed a separate island offshore prior to the Holocene emergence of the region.

263 km. Gateway at the south side of the city of Cap Haitien (ex Cap Francais) often called the Paris of the Antilles (West Indies) during the colonial time. Observe fault contact between hemipelagic cherty sequence and porphyritic igneous rock. Shortly after independence from France, Haiti became divided and Cap Haitien became the capital of the Northern Kingdom led by Henri Christophe the builder of the Citadelle. The city was then called Cap Henri. Its present name became in use after the death of Henri Christophe in 1820.

Most of the city lies on alluvium accumulated along northeast-trending fault systems transecting the Morne Calvaire/Morne du Cap outlier. Contacts between the island-arc igneous suite and Cretaceous rocks attributable to the Trois Rivières formation are also fault controlled in the area. As pointed out by Woodring et al (1924) a typical sequence of the latter formation occurs along the shore near Carénage, the most northerly section of the city. It consists of interbedded brown to yellow silstone, claystone, fine sandstone marl, dense black and blue chert stringers. Maximum thickness of beds is about 25 centimeters, but there are levels where closely spaced chert beds may reach thicknesses of several meters. Like similar chert beds found in the Dumisseau Formation (Maurrasse et al., 1979a) in the Southern Peninsula, the thick chert beds are apparently of volcanogenic origin. Nonetheless, while the series observed at Cap Haitien can be attributed to a hemipelagic sequence deposited in the fore-arc basin of an island-arc system, those observed in the Southern Peninsula are pelagic and thought to have been deposited in the back-arc area (Maurrasse, 1982c).

SUMMARY AND CONCLUSIONS

The geologic transects of Haiti discussed in this field guide provide the basic information necessary to understand the fundamental differences between the northern and southern portions of Hispaniola separated by the prominent Cul-de-sac/Enriquillo depression (figure 3). The transects also allow for further paleogeographic interpretation of the western area of Hispaniola with extrapolation on the eastern area of the island as a whole

The geologic data at hand clearly show that during late Mesozoic time an active island-arc system(s) existed in the northern portion of Hispaniola north of the present Cul-de-Sac/Enriquillo depression. It was characterized by extensive alkaline and calcalkaline eruptive activities. On the other hand the geologic record of that time in the Southern portion of the island exhibits tholeiitic basalts suggestive of an origin from a possible back-arc environment for their petrogenesis (Maurrasse, 1982c; Maurrassee et al.,