



FOSSIL LOCALITIES  
LA SABANA, D. F.

SCALE 1:10,000

MICROFOSSILS FROM THE YOUNGER TERTIARY OF LA SABANA, DISTRITO FEDERAL

(MICROFOSILES DEL TERCIARIO SUPERIOR DE LA SABANA, DISTRITO FEDERAL)

by H. M. Bolli and H. H. Krause

INTRODUCTION

Younger Tertiary sediments, which lie unconformably on the metamorphic Caracas Group of Cretaceous or older age, extend as a narrow belt from west of La Sabana to Chirimena, along the coast of north-central Venezuela (Figure 1). They are composed predominantly of loosely consolidated silts, poorly sorted sands and pebble beds with occasional thin intervals of silty shales and shales. Although no fossils have been found previously their age was thought tentatively to correspond either with that of the Cabo Blanco Group (?Miocene/Pliocene/Pleistocene) to the west or with the Aramina Formation (Miocene) from the Carenero area to the east.

During a recent excursion the authors collected a number of shale samples between La Sabana and Caruao. Two of these, taken near and at La Sabana (Figure 1), were found to contain microfossils; one with Foraminifera, Radiolaria and small fish fragments, the other with abundant Foraminifera and some pollen and spores. These microfossils, which are the first known to be obtained from this area, indicate that the age of the younger Tertiary beds, at least around La Sabana, is middle to upper Miocene and comparable to that of the Aramina Formation. The beds are definitely older than the highly fossiliferous Playa Grande Formation of the Cabo Blanco Group, but they may possibly correlate with the Las Pailas Formation, the oldest part of the Cabo Blanco Group.

DESCRIPTION OF THE TWO FOSSIL LOCALITIES, THEIR FAUNA, AGE AND CORRELATION

Locality 1: Road cut ca. 1 kilometer southwest of La Sabana (samples HMB 64/25, 64/44-48). A few feet of horizontally bedded dark grey, brownish weathering, nodular, non-calcareous, slightly silty clay are exposed on the east side of an approximately 30-40 feet long road cut. The samples collected along this outcrop contain the following microfaunas:

Foraminifera: poorly preserved planktonic species, mostly broken, single *Globigerina* chambers. Better preserved, unbroken specimens belong to:

*Orbulina suturalis* Bronnimann  
*Globigerinoides triloba* s.l. (Reuss)  
*Globigerina* sp. (small four-chambered specimens)  
fragment of a ? *Globorotalia* sp.

Radiolaria: All observed Radiolaria belong to the Spumellina. Most of them could not be identified satisfactorily because of apparent abrasion of their margins and infilling of the shells. These include members of the families Porodiscida, Spongiodisca and Stylosphaerida. Only the very scarce Ellipsidiidae were identified specifically.

*Cannartus laticonus* Riedel  
*Cannartus petterssoni* Riedel (new species, still to be described).

Small fish bone and fish scale fragments are present in addition to the above foraminiferal and radiolarian fauna. The Radiolaria are in a much better state of preservation than the planktonic Foraminifera, whose original calcium carbonate tests are replaced by silica or some other non-carbonate mineral.

Age and Correlation:

The presence of *Orbulina* indicates an age not older than the lower Miocene *Globorotalia fohsi barisanensis* zone. According to Dr. Riedel, *Cannartus laticonus* occurs in the *Globorotalia fohsi barisanensis* zone, also probably somewhat higher, in sediments which he attributes to the middle Miocene, while *Cannartus petterssoni* is known only from sediments that he regards as middle Miocene.

The lithology of the beds on the west side of the road cut at Locality 1, where approximately 12 feet of section are exposed, is more arenaceous and no fauna could be recovered.

Locality 2: On the coast, below the east end of La Sabana (samples HMB 64/54, HHK 40, 41). A few feet of dark grey, calcareous, finely micaceous clay, dipping about 30° W, over and underlain by sandstone. The richest fauna was obtained in the lower part, at the level of the dilapidated road that leads from the village down to the beach.

The following foraminiferal species are present:

- Benthonic species: *Amphistegina angulata* (Cushman)  
*Bolivina imporcata* Cushman and Renz  
*pisciformis pisciformis* Galloway and Morray  
 cf. *subaeraiensis* Cushman  
*Buliminella* cf. *basistriata* var. *nuda* Howe and Wallace  
*Cassidulina crassa* d'Orbigny  
 sub*globosa* Brady  
*Gyroldina parva* var. *oranjestadensis* Drooger  
*Nodosaria* sp.  
*Nonion sloanii* (d'Orbigny)  
 triangularis Drooger  
*Plectofrondicularia floridana* Cushman  
*Robulus americanus* (Cushman)  
*americanus espinosus* (Cushman)  
*suteri* Cushman and Renz  
*Saracenaria ampla* Cushman and Todd  
*Uvigerina hispidocostata* Cushman and Todd (abundant)  
*Vaginulinopsis superbus* (Cushman and Renz)
- Planktonic species: *Globigerina nepenthes* Todd  
*Globigerina* sp.  
*Globigerinoides* cf. *altiapertura* Bolli  
*triloba* s.l. (Reuss)  
*Globigerinita* sp.  
*Globoquadrina altispira* s.l. (Cushman and Jarvis)  
*Globorotalia menardii* s.l. (d'Orbigny)  
 cf. *acostaensis* Blow  
*obesa* Bolli  
*scitula* (Brady)  
*Orbulina* sp.  
*Sphaeroidinella seminulina* s.l. (Schwager)

In contrast to Locality 1, which lies about one kilometer to the southwest, this fauna is very rich in well preserved benthonic and planktonic Foraminifera, while Radiolaria are absent. Samples investigated for pollen and spores contained organic material, one of them sufficient pollen and spores to confirm a post-Eocene age.

Age and Correlation:

The foraminiferal fauna of Locality 2 shows close affinities with that of the Aramina Formation of Caranero (Feo-Codecido, 1962) and the beds of La Sabana are therefore considered to have approximately the same age, late middle or early upper Miocene. The Foraminifera of La Sabana are definitely older than those from the Playa Grande Formation of the Cabo Blanco Group (Weisbord, 1962). The possibility remains that the beds of La Sabana could be correlated with the non-fossiliferous Las Pailas, the oldest formation of the Cabo Blanco Group.

The faunas from Localities 1 and 2 allow for little direct comparison. In addition to the presence of Radiolaria at Locality 1, which indicate a different environment, the species *Cannartus laticonus* and *C. petterssoni* from that locality suggest an age possibly slightly older than that indicated by the foraminiferal species from Locality 2.

ORIGIN OF THE FOSSIL BEDS

The fossil assemblage of Locality 1 containing planktonic Foraminifera, Radiolaria and some fish remains is indicative for a deep, marine environment. Its presence in the younger Tertiary of La Sabana, which is largely non-fossiliferous and apparently mainly non-marine, is therefore not easy to explain. If one considers the fauna to be reworked it is difficult to envisage a convenient source, unless one assumes an origin from an area now submerged to the north of the present coast line. No Radiolaria are known from Miocene sediments in Venezuela. Though improbable, the presence of this fauna could possibly be explained by contemporary current action. The fauna of Locality 2 is also indicative for an open marine environment, though less deep than the fauna of Locality 1.

Additional field work, including sedimentological studies, is required to clarify the origin of these marine faunas.

Acknowledgments

The manuscript was discussed with Drs. J.M. Bowen and G. Feo-Codecido, both of Cía. Shell de Venezuela; the former has also given valuable advice in the field. Dr. P.J. Bermúdez of the Ministerio de Minas e Hidrocarburos and Mr. A.N. Fuenmayor of Cía. Shell de Venezuela identified the benthonic Foraminifera, Dr. W.R. Riedel of Scripps Institution of Oceanography, La Jolla, California the Radiolaria and Mr. L. Nijseen of Cía. Shell de Venezuela the pollen and spores. The authors wish to thank all these persons for their aid and interest in the paper, which is published by permission of Cía. Shell de Venezuela.

References

- |                                    |      |  |
|------------------------------------|------|--|
| Bermúdez, P.J. & Fuenmayor, A.     | 1962 | "Notas sobre los Foraminíferos del Grupo Cabo Blanco, Venezuela". Bol. Inf., Asoc. Ven. Geol. Min. Petr., vol. 5, no. 1. |
| Feo-Codecido, G.                   | 1962 | "Contribution to the Geology of North-Central Venezuela". <i>ibid.</i> , vol. 5, no. 5.                                  |
| Léxico Estratigráfico de Venezuela | 1956 | Boletín de Geología, Publ. Especial no. 1.   |
| Weisbord, N.E.                     | 1962 | "Late Cenozoic Gastropods from Northern Venezuela". Bull. Am. Pal., vol. XIII, no. 193.                                  |