D. UNDETERMINED FORMATION

Bed 12

a) Bibliographic history

KUGLER (1938, p. 220–221) described as Bed 12 the low bank of oil-bearing sandstone that emerges from the sea off the North shore of Soldado Rock. Its strike is oblique to the general strike of the Soldado beds themselves, perhaps as a result of uncomformable overlap.

b) Type section

Outcrop on the North shore.

c) Stratigraphic relationship

The nature of this sandstone is quite different from the "underlying" Bed 11, and no direct relationship could be established between the two. Their contact is strongly eroded and remains below the water level at low tide.

d) Thickness

Unknown; about 4 meters exposed.

e) Lithology

Near the contact with Bed 11, Bed 12 consists of fine-grained brown-weathering sandstone with a bluish calcareous core when fresh. This sandstone has nothing in common with the sandstones found in streaks and lenses on Soldado Rock itself: K.1497(C-1), for instance, is a very fine-grained dark-grey sandstone, totally different from such gritty white sandstones as K.905(D-3) or K.1495(D-4). Upwards, the calcareous sandstone changes into a dark-brown non-calcareous oilsand (K.1498, D-1).

f) Paleontology

The deposit is barren.

g) Age

Bed 12 shows affinities with sandstones known from the San Fernando (Mount Moriah) Formation of Trinidad, and also resembles the Nariva Sandstone and some of the sandstones of the Karamat Formation in that Island, but the total absence of fossils does not permit a definite comparison with any of these formations.

E. MIOCENE BEDS

Dr. P. Jung and Mr. R. Panchaud of the Natural History Museum, Basel, stayed on Soldado Rock from 25–28 February 1973 for the purpose of collecting additional fossils and to check some previous statements. On the first day they were accompanied by Messrs J. B. Saunders of Texaco Trinidad, Inc., and by P. L. Percharde of Trinmar Ltd. During the time Saunders assisted Jung and Panchaud in carrying out a short reconnaissance of the Rock, Percharde did some Scuba diving with a short core barrel to take sea-bottom samples. He started about 80 meters NW of the West end of Bed 2 and extracted ten samples, roughly 8 meters apart. Saunders examined the contents of these samples and, starting from the Rock in a NW direction (see map), he reported in a private letter the following results:

- J.S.3223: Block of fresh, hard silty clay with excellent fauna rich in planktonic foraminifera belonging to the *Globorotalia opima opima* Zone.
- J.S.3222: Block of silty sandstone with very rich, predominantly planktonic fauna of very constant small size, suggesting sorting. Mostly about *Globigerinatella insueta* Zone.
- J.S.3221: No bedrock present.
- J.S.3220: Barrel with a few siltstone fragments. Fauna as J.S.3223. Mainly small planktonics, brown and a few whites, possibly also *Globigerinatella insueta* Zone.
- J.S.3225: Barrel with crumpled, brown clay, calcareous. Sample somewhat contaminated. Rich *Globigerinatella insueta* Zone with a number of *Orbulina* and Recent mollusks.
- J.S.3219: Barrel with sandy siltstone fragments.
- J.S.3218: Barrel with silty clay fragments that were isolated for washing. Good fauna of *Globorotalia opima opima* Zone.
- J.S.3217: As J.S.3218, *Globorotalia opima opima* Zone.
- J.S.3216: As J.S.3218, *Globorotalia opima opima* Zone.
- J.S.3224: Barrel with good, steeply dipping, crumpled, brown clay, calcareous in bottom of barrel. Sample somewhat contaminated with silt. Mainly approximately *Globigerina ciperoensis ciperoensis* Zone with some *Globigerinoides* indicating Miocene.

J. B. Saunders summarizes these observations thus: "The samples so far obtained are somewhat puzzling. P. L. Percharde maintains that the silty clay (*G. opima opima* Zone) is widespread and represents bedrock. In fact the results suggest that this is not so and that, though predominant, the clay is really contained in a matrix of younger material. The youngest proven material is of probable *Globigerinatella insueta* Zone age though, again, some of this is in the form of boulders. A younger matrix may still be involved (vide Orbulinas) which, from our experience of wildflysch elsewhere, is most likely to be Karamat or even Lower Cruse in age."

The deposition of large slipmasses of older rocks in younger turbidites is commonly known in Trinidad in such features as Marac Hill, Morne Roche, Morne Diablo, etc., once called "morros" (KUGLER 1953, p. 41), and now known as olistoliths. An outstanding example of such olistoliths are the Pelican Rocks, situated between 1 and 2 kilometers South of Soldado Rock (Fig. 8).

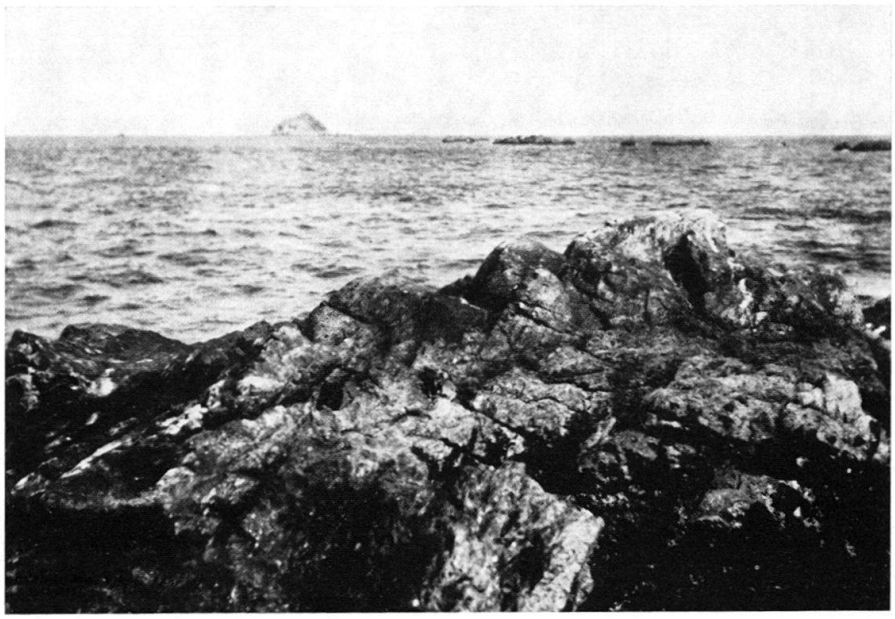

Fig. 8. Southern end of Pelican Rocks with Soldado Rock in background (photo E. Lehner 1934).

They form four quite abnormal N–S directed rows of rocks consisting of chalk-like Navet Formation of Middle Eocene age. A lesser mass of Navet Formation was found in a bore-hole of the Forest Field in Trinidad inside the diapiroid core of mud-flow consisting mainly of Miocene Cruse clays. We, therefore, can assume that likewise the entire area between the Soldado Rock and the Pelican Rocks represents a diapiroidal mass of abnormally thick Miocene turbidites containing submarine slip-masses of older rocks.

F. RECAPITULATION OF THE SAMPLE LISTS OF VARIOUS BEDS[7])

Bed 1

P.J.1152(C-5), glauconitic limestone with oysters
K.10705(C-5), recrystallized glauconitic limestone with mollusks and Smaller Foraminifera
K.10706(C-5), recrystallized glauconitic mollusk–algae limestone with Smaller Foraminifera
K.10704(C-5), recrystallized coquina; some Smaller Foraminifera

Bed 2

K.2948(C-5), silt with *Amphistegina*
K.2949(C-5), MAURY's mollusk bed (Bed 2, 1912)
K.9454(B-4), mollusk–algae limestone with common large oysters and scattered microfossils, also some small Larger Foraminifera
Z.444B(B-4), lumachelle with some *Amphistegina* and Dasyclad algae
E.L.1575 and P.J.1165(B-4), limestone with echinoids (*Salenia*)
P.J.1143(C-5), limestone with poorly preserved mollusks

Slump masses and erratic blocks originating from the Paleocene

K.1317(D-5), mollusk–algae limestone with Smaller Foraminifera (as K.10705 and 10706, Bed 1)
K.2849(F-3), limestone with karren, full of mollusks
K.2875(G-3), limestone with *Venericardia*
P.J.1145(B-3), limestone with fragments of large oysters
P.J.1163(B-5), massive limestone with large oysters
P.J.1164(C-5), id.
P.J.1166(B-3), id.
K.1317a(F-4), coquina as in Bed 2
K.2653(E-4), id.
K.3736(F-3), id.
K.3742(B-5), id.
K.3873(F-2), id.
K.10713(B-3), id.
K.11445(B-3), id.
P.J.1148(F-3), id.
P.J.1149(F-4), id.
P.J.1150(E-4), id.
P.J.1151(E-4), id.
P.J.1158(E-4), id.

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[7]) Roughly in stratigraphical order, from bottom to top.

The initials preceding the numbers refer to the following collectors: T.L.L. = Trinidad Leaseholds Ltd.; K. = H. G. Kugler; Rz. = H. H. Renz; Cd. = C. M. B. Caudri; K.S. = K. Schmid; Z. or F.Z. = F. Zyndel; Gr. = T. F. Grimsdale; E. L. = E. Lehner; J.S. = J. B. Saunders; P.J. = P. Jung.