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PAPER ON

A Collection of Fossils

— FROM —

Springvale, Near Couva, Trinidad,

— BY —

R. J. LECHMERE GUPPY,
HONORARY CONSULTING GEOLOGIST TO THE
SOCIETY.

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ON A COLLECTION OF FOSSILS FROM SPRINGVALE,
NEAR COUVA, TRINIDAD.

By R. J. LECHMERE GUPPY,
Honorary Consulting Geologist to The Society.

In our study of the Geology of Trinidad, we must proceed step by step, but the general cultivation of elementary geology would facilitate a more rapid progress. Everyone who digs a quarry or makes a boring should preserve samples of the materials, even the least likely looking, found or passed through, and submit them to those who have the means of scientific examination. We have now made a real and important advance in our knowledge of the Tertiaries; first, from the information gained from the Manjak Mines and, secondly, from the discovery of the Springvale fossils. These give us the means of effecting some improvement upon our previous classifications, and to speak with more certainty upon some points, but we have a long way to go before reaching finality, or anything like it.

I make these remarks prefatory to a report on a collection of shells found at Springvale, near Couva, in this Island. These fossils have been confided to me by the Agricultural Society for examination.

The two kinds of matrix adherent to these fossils seem to indicate that they come from two beds, one a ferruginous shelly

conglomerate, the other a grey calcareous sandstone which often consists of little else than comminuted shells. The grains of sand found in varying proportions are fine and of uniform size, indicating deposit in tranquil waters of moderate depth. There are many minute black specks which are probably manganese.

To show the distribution of these fossils, I have appended a table showing the occurrence of the species elsewhere. The presence of characteristic species of the Haitian Miocene indicates that the deposit belongs to that period. Though Dall and others have used the term "Oligocene" for the deposits of this age I see no reason for doing so as the epithet Miocene is sufficiently good for the typical series of deposits found in Haiti, Jamaica, Cuba, Trinidad, Cumana, Panama, &c, &c. (See my paper on the Caribbean Region, *Trans. Can. Inst.* 1908 9, p. 381) Most of the species dealt with in this paper are well-known to me as occurring in the Caroni beds of Savaneta. Many of them were procured for me by my excellent friend, the late Louis Alexander Leroy, a planter and colonist of high intelligence and attainments. These I described and published in scientific journals. For the naming of the present collection, I have referred chiefly to the works of Carrick Moore and Sowerby on the Haitian fossils, and to my own writings on the Jamaican, Haitian and Trinidadian fossils. I have also referred to Gabb's work where necessary, and in a few cases to Dall's fine monograph on the Florida fossils.

Some time ago, I published a Note on Fossils from Tamana. As these are of the same geological age as the present collection and as the corals of the Tamana deposit are similar to those of St. Croix, Naparima, I take this opportunity to correct an error made by P. Martin Duncan in his paper on these corals.* His statements as to the alliances of the Naparima fossils and rocks are incorrect. The St. Croix beds and the Tamana beds are

* *Journal Geological Society* 1867, Page 12.

miocene as my researches have shown. The Manzanilla beds may be older. The lowest beds of the Naparima series, the Orbitoides bed, &c., formerly called by me the San Fernando beds, are eocene and pass down into the Cretaceous. Here I may take the opportunity to say a few words in reference to the correlation of the West Indian deposits of tertiary age. Gregory has written a valuable paper in which he deals with this question.* I have made use of his paper in mine on the "Geological Connexions of the Caribbean Region." His erudition and research are profound. From time to time I have sent him copies of my papers. I wish he had been equally kind to me. But he is a "Professor" and has achieved fame in many fields, while I have no titles or any recognition of my work from any scientific authority and probably he looks upon me as one of the small fry not worth notice.† Still if he had sent me his papers I should not have remained so long in ignorance of what he has written. It is difficult in this country, where science is unwelcome, to find the means of making oneself acquainted with all that is published on geological subjects connected with the West Indies. Our Public Library is useless for any scientific purpose, being devoted to the supply of fiction and the scientific works stored there being neglected and inaccessible. Our little scientific institution (called Victoria Institute), gained after years of asking and patient waiting, which might have done something to meet the want, has been perverted from the objects of its foundation to those of a music hall and billiard saloon. Consequently, when I want any information I cannot get within the walls of my own library and museum I have to go at great cost and inconvenience to myself to the scientific museums and libraries of Europe and America. And as I am now getting past work of that sort, having spent over fifty years in the malarious and enervating climate of

* Journal Geological Society 1895, Page 255.

† In this matter I am quite content to be in the same Company with though on a much lower plane than that eminent man William Smith the father of English Geology—(See what Marcou says about him in "Roches du Jura" Page 353).

Trinidad and been subject, not only to the most terrible fevers, but also to the deadly persecution of those who hate science and freedom, and who command all influence in the community, I can do but little.

As I have said, Professor Gregory's erudition and research are profound, but they have not saved him from falling into the error of mixing up the Miocene with the Eocene and calling the result Oligocene. So far as I am concerned, I have objected to the use of the latter term which has only come into use since my eyes have been opened to the distinctions between the Eocene and Miocene of the West Indies. For the deposits containing *Arca patricia*, *Fetaloconchus*, *Solarium*, *Turbinellus*, *Conus*, &c., &c., in Haiti, Jamaica, Cumana (Venezuela), Trinidad, &c., I prefer to retain the term Miocene. In his paper of 1895 (Journal of the Geological Society, Vol. LI., page 295) Gregory refers to two Echinoids sent him from Antigua as most typical of the West Indian "Oligocene." Of these *Echinanthus antillarum* is stated by Cotteau to be an eocene species from St. Barts while *Chlypeaster concavus* (Cotteau) is stated to be from the miocene of Anguilla, having been previously recorded by me from that island under the name of *C. ellipticus*. I fear that some mistake has crept in here, for while the St. Barts formation is eocene that of Anguilla is decided to be miocene. I am the more inclined to suspect a mistake here because I find that *Echinolampas semiorbis*, which I described from the miocene of Anguilla, has been assigned by Cotteau to the eocene of St. Barts. The error is a serious one, because Cotteau cites *E. semiorbis* from Cuba, and much confusion has already arisen as regards the classification and arrangement of the West Indian strata, owing to the want of due care in assigning the fossils to their proper beds. (See Vaughan Jennings in the Journal of the Geological Society, 1892, page 541.) I shall not go further into these points just now because I have in hand a paper on the Geology of Antigua and other parts of the West Indies in which I shall touch on this question. In

the meantime, what I have said is, I think, sufficient to justify the use of the term miocene for the fossils which are the subject of this paper.

LIST OF THE MIOCENE MOLLUSKA OF TRINIDAD, 1910.

The species found at Springvale, near Couva, are distinguished by the letter S. Those previously known from the Caroni beds have an asterisk (*) added. C denotes the occurrence of the species at Cumana in Venezuela, **D** in the Pointapier Ditrupa bed, J in Jamaica and H in Haiti (San Domingo).

- Bula paupercula—Sow. * H. C. J.
 vendryesiana—Guppy. * J.
 Scalaria leroyi—Gup. S * J.
 Trochita colinsti—Gab. S.
 Natica subclausa—Sow. * J. H.
 canrena—Lin. S. H. †
 phasianeloides—Orb. S. J.
- Aclis teres—Gup. D.
 Ringicula tridentata—G. D. J.
 Eulima egregia—Gup. S *.
 Turbonila plastica—Gup. D.
 octona—Gup. D.
 Turitela planigyrate—G. S *.
 Petaloconchus sculpturatus—Lea. S * H.
 Mathilda plexita—Dal. D.
 Carinaria caperata—G. *.
 Solarium quadriseriatum—Sow. S * J, H.
 Risoa pariana—G. D.
 Benthonela turbinata—G. D.
 Dilwynela erata—G. D.
 Cadulus parianus—G. D.

Cancelaria lævescens—G. J. H.
scalatela—G. J. H.

Murex miocenica—Dal. S.
cornurectus—G. S. H.

Typhis alatus—Sow. D. J. H.

Latirus teselatus—Dal. S. * J.†

Turbinelus validus—Sow. S. H.
ovoideus—Kien. * H.

Fasciolaria semistriata—Sow. S. J. H.

Ficula carbacea—G. S * J.

Persona similima—Sow. * J. H.

Coraliophila magna—Dal. S.

Oliva cylindrica—Sow. S * C. J. H.

Ancilaria lamelata—G. S.

Conus planiliratus—Sow. S * J. H.

Marginela coniformis—Sow. S * J. H.

solitaria—G. D.

arcuata—G.

Mitra henekeni—Sow. S * J. H.

Clementia tæniosa—G. *.

Sanguinolaria unioides—G. *.

Telina sægræ—Orb. S* H.

strophia—Dal. S.

Dosinia liogona—Dal. S.

cyclica—G. *.

Teredo fistula—Lea. * H.

Corbula vieta—G. * J. H.

vininea—G. S. J. H.

- Crasinela guppyi*—Dal. * J. H.
Cytherea planivieta—G. S. J.
Venus blandiana—G. * J.
 halidona—Dal. S.
 glyptocyma—Dal. S. J. H.
Arca patricia—Sow. * H.
 consobrina—Sow. S* C. J. H.
Limopsis subangularis—G. D.
Pecten inæqualis—Sow. S. * J. H.
 crasicardo—Com. S.
Cardium compresum—Dal. S.
Ostrea virginica—Gmel. * H.
 percrasa. Com, S.
Anomia umbonata—G. *.

ARTICULATA.

- Ranina cuspidata*—G. *.
Balanus porcatus—Darw. S*.

ECHINODERM.

- Brisus exiguus*—Cot. S.

This list, though having no pretension to completeness will show how large a proportion of the miocene fossil molluska of Trinidad are found in Jamaica, Haiti and Venezuela.

 NOTES ON THE SPECIES.

Scalaria leroyi.—GUPPY.

Geol. Mag. 1874 P. 406 Pl. xvi F. 10 and Pl. xviii F. 2.

The surface characters of the Shells are so much destroyed by fossilization that a doubt rests on the correctness of the determination.

Eulima egregia.—GUPPY.

Proc. U.S. Nat. Museum Vol. xix (1896) P. 314 Pl. xxviii F. 11.

The original specimen figured as above came from the Montserrat Beds.

Solarium quadriseriatum.—SOWERBY.

Journ. Geol. Soc. 1850 P. 81 Pl. x, F. 8.

Varieties of this chiefly based on surface ornamentation have been described by Dall from the Tertiaries of Florida, and by Toula from Gatun (Panama).

Marginela coniformis.—SOWERBY.

Journ. Geol. Soc. 1850 P. 45.

„ 1866 Pl. xvii F. 2.

The examples are large and fine and may be compared with *M. aurora* Dal. Flor. Foss. Pt. i Pl. vi F. 4A Others of Dall's Species are very similar, See *M. balista*, *elegantula* and *newmani* figured on Pl. iv of that Work, possibly also *M. floridana* Dal. *M. Sowerbyi* of Gabb figured by me in Journ. Geol. Soc. Pl. xxviii F. 1 is a Form with a higher Spire. I thought that *M. denticulata* Dal. (Flor. Foss. Pt. i Pl. v F. 8) might be the same.

Mitra henikeri.—SOWERBY.

M. henikeri.—Sow.—Geol. Journal, 1850, p. 46,

Pl. ix. F. 5.

Mitra Silicata.—DAL.—(Flor. Foss. Pt. i. Pl. iv. F. 10) seems very like this. *M. symetrica* and *M. longa* of Gabb are probably forms of this, and *M. titan*—Gabb. is a large form without surface ornament.

Murex mioenica.—DAL.

Florida Fossils, Part i., p. 146, Pl. ix, F. 9.

A single imperfect example.

Murex cornurectus.—GUPPY.

Journ. Geol. Soc., 1876, p. 521, Pl. xxviii., F. 4.

An imperfect example.

Turbinelus validus.—SOW.

Journ. Geol. Soc. 1850, p. 50.

An imperfect example.

Fasciolaria semistriata.—SOWERBY.

Journ. Geol. Soc. 1850, p. 49.

Idem 1866, p. 288, Pl. xvi., F. 12.

The specimens from Springvale are remarkable for size, exceeding eight inches in length. The diameter varies from $3\frac{1}{2}$ to 5 inches. Like all shells of the Genus the characters vary with age and growth. The apical Whorls are tuberculated or polygonal and cancellate like *F. textilis* which is probably a form of this: the later ventricose whorls are smooth only showing light spiral striation. The most slender example simulates *Achatina reticulata* (an African landshell) in figure. The three columellar plaits are very strong. See for further remarks on this species my paper on the Haitian Fossils, Journ. Geol. Soc., 1876, page 523.

Latirus teselatus.—DAL.

Florida Fossils, Part i., p. 108, Pl. x., F. 8A.

I adopt Dall's name for the miocene representative of *T. infundibulum*.—Gmel.

There is only one example of this species, and it was entirely invested externally with an organism like *Membranipora*, which on examination proves to be more like *Stromatopora*. On the spire, the covering forms a thin layer only, but on the last whorl near the Aperture the incrusting organism forms a Boss of several concentric layers. It resembles *Carpenteria* but there are no large Apertures. The likeness to *Orbitoides* (see Carpenter, Journ. Geol. Soc., 1850, Pl. vii.) should not be overlooked.

Ficula carbacea.—GUPPY.

Journ. Geol. Soc., 1866, p. 580, Pl. xxvi, F. 7.

F. misisipiensis—Gab -- See Guppy, Haitian Fossils, Journ. Geol. Soc., 1876, page 525.

Allied to the Pacific form *F. reticulata*.

Casts only, but retaining sufficient of the shell substance to make the determination certain.

Coraliophila magna.—DALL.

Florida Fossils, Pt. i., page 155, Pl. xi., F. ii.

Ancilaria lamelata.—GUPPY.

Journ. Geol. Soc., 1866, p. 579, Pl. xxvi., F. 9.

This has some resemblance to *A. shepardii*.—DALL. (Flor. Foss. Pt. i, page 46, Pl. iv., F. 4). These full-grown examples are scarcely distinguishable from *A. glabrata* of the Caribbean Sea. The Spire is covered with enamel and the lamellar plait leaves a chink between it and the Body-whorl. On these characters the generic name of *Dispacus* has been invented for the shell.

Petalococonchus sculpturatus.—LEA.

P. domingensis Sow. Journ. Geol. Soc. 1850.

Page 51 Pl. x, F. 9

Dall, Flor. Foss. Pt. ii. P. 305.

Trochita colinsii—GABB.

Caribbean Fossils 1878, Page 342 Pl. xlv, F. 11.

Natica canrena—LINNÉ.

There are two forms among the Naticas in the Collection, but with no better material at hand I hesitate to separate them.

Turitela planigrata—GUPPY.

Proc. Scient. Assoc. Trin. 1867, Page 169.

Geol. Mag. 1874, Pl. xviii, F. 5.

Venus glyptocyma—DALL.

Florida Fossils, Part vi Page 1294 Pl. lv, F. 21.

V. hendersonii Dall, Flor. Foss. Pt. vi, P. 1295 Pl. lv, F. 22.

V. burnsii Dall, Flor. Foss. Pt. v, Pl. xlvii F. 11.

V. burnsii Dall is from the "Oligocene" of Florida. The Form from Jamaica and Haiti has been called *hendersonii* by Dall. *V. glyptocyma* Dall is also from the "Oligocene" of Florida. All these are in my opinion forms of the one Species which following Carrick Moore I called *V. paphia* that being the name of the recent representative of the Group.

Venus halidona—DALL.

Flor. Foss. Pt. vi, page 1307 Pl. xxxviii, F. 1, 1a.

An imperfect specimen from which much of the Shell has been removed.

Venus blandiana—GUPPY.

Geological Magazine 1874, P. 444 Pl. xvii, F. 8.

This is included here to complete the List but no specimens were found at Springvale. See my Paper on the Tamana Fossils 1909.

Cytherea planivicta—GUPPY.

Journ. Geol. Soc. 1866, P. 292 Pl. xviii F. 3.

The figure is poor and barely conveys an Idea of the Shell whose affinities are indicated at the Page cited.

Dosinia liogona—DALL.

Florida Fossils Pt. vi, P. 1230 Pl. liv, F. 11.

Telina sagrae—ORB.

Guppy. Journ. Geol. Soc. 1876, Page 530.

Telina constricta Gab.

Metis trinitaria Dal. Flor. Foss. Pt. v, P. 1041, Pl. xlvi F. 24.

Dall suggests that D'Orbigny's "Paléontologie de Cuba" was never published. Although it was incomplete I consulted it at the British Museum Library during my investigation of the Haitian, Jamaican and Trinidadian Fossils. I have little Doubt that the Figure of *T. sagrae* given by D'Orbigny was intended to represent the species before us, which resembles *T. biplicata* Conrad and *T. sobralensis* Sharp. among tertiary Fossils and *T. constricta* and *T. gruneri* among living shells. In Carrick Moore's first List of the Haitian Fossils it was inserted as *T. ephippium*.

Telina strophia—DALL.

Flor. Foss. Pt. v, P. 1019, Pl. xlvii, F. 11.

A mere fragment of shell attached to a cast, but the peculiar sculpture admits of the determination.

Pecten inaequalis—SOWERBY.

Journal Geol. Soc. 1850, Page 52.

Guppy, Journ. Geol. Soc. 1866, Pl. xviii F. 6.

Pecten demiurgus Dal. Flor. Foss. Pt. iii, P. 718 Pl. xxvi, F. 3.

The specimen originally figured by me from Jamaica was a small example of this species which is much better figured and described by Dall under the name of *demiurgus*. It is abundant and of large size at Springvale.

My reference to *comparilis* (Gumey and Holmes) is uncertain, but I am inclined to suspect that *P. excentricus* Gabb belongs to this species.

Pecten crasizardo—CONRAD.

Arnold. California Pectens, P. 71, Pl. xi, F. 5. 6 also Pl. xvi, xvii, xviii.

To avoid having to make a new name I take this as an approximate identification merely. There is a large number of Pectens in the miocene and their range of size and variation is so great that without an ample supply of specimens and access to all the literature it is difficult to be certain about the right name. The Pectens not less than certain other Molluska found in the Miocene Beds attain a great individual as well as numerical development and the larger specimens assume characters different from those of the smaller ones.

Corbula viminea—GUPPY.

Journ. Geol. Soc. 1866, P. 293 Pl. xviii F. 11.
Dall, Flor. Foss. Pt. iii., P. 850.

Ostrea percrassa—CONRAD.

Tertiary Fossils, Page 50. Pl. xxv, F. 1.

Our specimens are thick and heavy, but they agree with Conrad's Figure. The name is appropriate. It may possibly be the same as *Ostrea tryonii* Gab. (Miocene Fossils 1878, P. 348 Pl. xlv, F. 27). The other two Forms of Oyster found in the

Westindian Miocene, *O. haitensis* and *O. virginica*, do not appear in this collection.

Cardium compressum DALL.

Flor. Foss. Pt. v, P. 1109, Pl. xlvi, F. 21.

Arca consobrina—SOWERBY.

Journ Geol. Soc. 1850, Pl. x, F. 12.

Dall prefers the name of *halidonata* (Flor. Foss. Part iii, Page 646) and he rejects Gabb's identification with *A. floridana*. Like most arks the shell is variable but I am satisfied that our shell is the one intended by Sowerby in his Figure. Dall's figure in my opinion does not represent Sowerby's *consobrina*, which is more like his actinophora in shape, though the proportions are not exactly the same.

Ranina cuspidata.—GUPPY.

This crustacean from the Tamana beds was described and figured by me in the Bulletin of the Agricultural Department, 1909.

Balanus porcatus.—DARWIN.

Barnacles probably of this species are not uncommon in the miocene deposits and there is a bed composed chiefly of them at the Government Farm in Tobago. A few specimens are in the collection from Springvale.

Brisus exiguus.—COTTEAU.

Echinides tertiaires de S. Barts, &c., p. 35, Pl. vi, F. 16-18.

The examples are large, but are only casts. The species was recorded by me in 1866 from Anguilla under the name of *B. dimidiatus* from which it differs slightly.

LIST OF WORKS CONSULTED IN THE PREPARATION
OF THE FOREGOING PAPER.

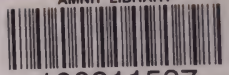
- Carrick Moore & Sowerby—Journ. Geol. Soc., 1850.
 Guppy—Jamaican Fossils— Ibid. 1866.
 „ West Indian Tertiaries— Ibid. 1866.
 „ West Indian Tertiary Fossils—Geological Magazine,
 1874.
 „ Haitian Fossils—Journ. Geol. Soc., 1876.
 Gabb.—San Domingo. Geology & Fossils—
 Gabb. Caribbean & Costarican Fossils.

See the list of works on West Indian Geology appended to my paper on “The Growth of Trinidad” Trans. Canadian Institute, 1904 5. Several additions must be made to this list, among others the following:—

- 1909 Toula—Tertiary Fauna of Gatun.
 Jahrbuch der Geol. Reichsanstalt—Wien.

Though the author has described most of the Fossils found at Gatun, under new names, they appear to be identical with species of the Haitian and Jamaican Miocene.

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