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Quod si cui mortalium cordi et curæ sit non tantum inventis hæerere, atque iis uti, sed ad ulteriora penetrare; atque non disputando adversarium, sed opere naturam vincere; denique non belle et probabiliter opinari, sed certo et ostensive scire; talis, tanquam veri scientiarum filii, nobis (si videbitur) se adjungant
—*Novum Organum, Prefatio.*

VOLUME THE TWENTY-SECOND.

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PROCEEDINGS OF THE GEOLOGICAL SOCIETY.

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SOLD ALSO AT THE APARTMENTS OF THE SOCIETY.

MDCCLXVI.

The Caithness group seems to be a mixture of species from glacial beds of both earlier and later date.

The high percentage of North American forms in all the groups, but more especially in the first six, is a feature of much interest.

February 21, 1866.

William Henry Corfield, Esq., B.A., Fellow of Pembroke College, Oxford, University College Hospital, Gower Street, W.C.; Henry Lee, Esq., The Waldrons, Croydon; Henry Skiffington Poole, Esq., B.A., Cape Breton, Nova Scotia; Alexander Ramsay, jun., Esq., 45 Norland Square, Notting Hill, W.; Charles Pearce Serseold, Esq., Taplow Hill, and 24 Oxford Square; George Suche, Esq., 77 Grosvenor Street, W.; and James Maurice Wilson, Esq., M.A., Fellow of St. John's College, Cambridge, Rugby School, were elected Fellows.

The following communications were read:—

1. *On the TERTIARY MOLLUSCA of JAMAICA.*

By R. J. LECHMERE GUPPY, Esq., Civil Service, Trinidad.

(Communicated by Henry Woodward, Esq., F.G.S., F.Z.S.)

[PLATES XVI.—XVIII.]

§ 1. THE RELATIONSHIPS OF THE MIOCENE OF JAMAICA.

IN 1862 Mr. Lucas Barrett, Director of the Geological Survey of the West Indies, brought over from Jamaica and deposited in the British Museum a collection of Miocene fossils. In 1863 Mr. Carrick Moore communicated to the Geological Society the results of his examination of the shells, Dr. Duncan described the corals, and Prof. Rupert Jones gave an account of the Foraminifera*. In 1864 Dr. Duncan and Mr. Wall gave a sketch of the geology of a part of Jamaica, showing the relations of the Cretaceous and Tertiary formations exposed in that island †. In the same communication Dr. Duncan described several new and interesting corals from the Cretaceous, Eocene, and Miocene strata; but beyond the general results given in Mr. Carrick Moore's paper above referred to, the shells have remained untouched. It was, I believe, the intention of Mr. Barrett to have worked out this portion of the subject, and, indeed, he had already had one plate engraved, which has since been destroyed for want of instructions; but as his untimely and lamented death has intervened to prevent our receiving the benefit of his illustration of the fossils alluded to, I have undertaken to furnish an account of these remains ‡.

* Quart. Journ. Geol. Soc., vol. xix. p. 510.

† *Ibid.*, vol. xxi. p. 1.

‡ The following extract from a letter of Mr. Barrett was published by Dr. Woodward in an obituary notice of that naturalist: "The Tertiary system of

In the paper by Dr. Duncan and Mr. Wall, before cited, the relations of the various strata are so well and succinctly described, that it is unnecessary for me to do more in this place than to allude to the fact that the formation whence the mollusca to be described were derived consists of shales, sands, and marls exposed in several parts of Jamaica, and that it has suffered great disturbance, in common with the Tertiary strata of other parts of the West Indies, and is frequently found in a position approaching to the vertical. The identity of many of the species found in these rocks with forms from San Domingo, Cuba, Cumana, Antigua, Anguilla, and Trinidad, shows the very extended development of Miocene formations in the Caribbean area. The period appears to have been one of exuberant development of marine life, and the conditions seem on the whole to have been favourable to the preservation of the shells and other remains.

The general remarks made by Mr. Carriek Moore in his papers on the San Domingan Tertiary fossils * are as a rule applicable to those of Jamaica; and many of those observations have been confirmed by Dr. Duncan's investigations of the corals, and those of Prof. Rupert Jones of the Rhizopoda. Among the new facts brought to light is the very remarkable resemblance of a portion of the West Indian Miocene fauna to that of the Maltese beds.

The great difference between the Miocene faunas of the American and Caribbean areas is particularly remarkable when we take into consideration the alliances of the latter with the European Miocenes, and the more we investigate the subject, the more we find to confirm the conclusions already arrived at on this head. Still, there is a certain amount of resemblance, and, upon examination, I find that the *Petalocochus Domingensis* of Sowerby, appears identical with *P. sculpturatus* of Lea, from the Miocene of Virginia.

From my examination of the Jamaican fossils, I am of opinion that, with the Middle Tertiary beds of San Domingo and Cuba, those of Cumana, and the Caroni series in Trinidad, the Miocene of Jamaica is to be considered as representing the upper or later part of the West Indian Miocene as at present known; while the Chert-formation in Antigua, the Anguilla beds, and the beds exposed at San Fernando in Trinidad, belong to the lower and older part of the Miocene.

In Jamaica the Miocene strata consist of highly inclined marls and shales, which are especially characterized by *Ceras*, *Strombi*, and large *Pleurotoma*, with small *Nannulina* and *Orbitoides*, as well as corals. At Cumana we have a fauna almost identical with that of Jamaica, including similar foraminifera and corals; among the latter is *Flabellum carolinum*, Dunc. The beds consist in part of

Jamaica is very interesting, though I have not been able to separate it into Sir Charles Lyell's divisions. I must first study the recent shells of Jamaica. The upper Tertiary strata contain a *Terebratulid* (with a short loop): *Terebratulina* (*prospit-serpatis*) and an *Argopecten*. There is a marl-bed, probably formed in the deep sea, containing abundance of Pteropods (*Clodora*, *Coccolis*, *Cuvieria*)."
 * Geol. Mag., February 1, 1863.

* Quart. Journ. Geol. Soc. vol. vi. p. 39, and vol. ix. p. 129.

sands, with a calcareous conglomerate, which latter yields the coral alluded to. The Caroni series in Trinidad consists of shales, clays and sands, and some marls, which are characterized by large *Ostrea* (*O. Haitensis*, Sow.). In Cuba the formation consists apparently of strata resembling those of Anguilla, in which the shells are found chiefly as casts, most of which have been referred by d'Orbigny to existing species, but which in all probability will be found to be identical for the most part with the extinct species found in Jamaica and San Domingo. *Tellina biplicata*, Conrad, related to *T. ephippium* of the Indian seas, and to *T. Sobradensis*, Sharp, of the Portuguese Tertiaries, and *Natica phasianelloides*, d'Orb., the *Tellina* occurring in the Caroni series in Trinidad, and also in San Domingo, and the *Natica* in Jamaica, San Domingo, Anguilla, and at San Fernando in Trinidad, are recorded by d'Orbigny from the Cuba beds. The Chert-formation of Antigua has been fully remarked upon by Dr. Duncan*, who correlates it with the Lower Limestone of Malta. The Miocene of Anguilla is a light-coloured marly limestone containing numerous mollusca, chiefly as casts. Among the better-preserved shells are *Solarium quadriseriatum*, Sow., and *Natica phasianelloides*, d'Orb. The Echinoderms in this deposit are in better condition, and exhibit a strong resemblance to those found in the Miocene beds of Malta. Among the species which are specifically identical, we have *Schizaster Scillo*, and *Cidaris Melitensis*, occurring in association with an extinct species of *Echinolampas*, only to be distinguished critically from *E. hemisphaericus*, and another almost as near to *E. scutiformis*. *Clypeaster ellipticus*, Michelin, and three living species of Echinoderms also occur in these beds. At San Fernando, in Trinidad, we have a numerous succession of gypsaceous marls, shales, and some partial limestones, enclosing *Natica phasianelloides*, *Orbitoides Mantelli*, *Nummulina*, and *Echinolampas ovum-serpentis*, as well as some *Terebratula*.

It must be understood that while there remains but little doubt as to the very close proximity in age of the Miocene formations of Cumana, Jamaica, and San Domingo, our information is not quite so exact with respect to those of Cuba, Anguilla, and Trinidad, owing to the bad state of preservation of the fossils at the latter localities. And in endeavouring to correlate these beds, I have used the terms Upper and Lower Miocene, not as implying that these formations are respectively equivalent to the Upper and Lower Miocene of Europe, but merely as marking what seems to be the relative antiquity of the Middle Tertiary beds of the Caribbean area.

The connexion between the formations found in all the localities mentioned could only be shown by a general table, including all the known species from those localities. On the present occasion my remarks must necessarily be confined to the Jamaican fossils.

As yet I only know of one species common to Jamaica and Cuba (*Natica phasianelloides*) and only two common to Jamaica, Anguilla, and the Caroni beds in Trinidad. Mr. G. P. Wall, F.G.S., has kindly favoured me with a small collection of Tertiary fossils from Cumana,

* Geol. Mag. 1864, vol. i. p. 97.

and among these I find fourteen species common to Jamaica. There are thirty-four species common to Jamaica and San Domingo; and if the Haitian species not found in Jamaica were now under consideration, the intimate relationship of all the Car bean Miocene beds would be clearly shown.

Thirteen species have been identified with living forms out of the total of sixty-one species which are described in this communication. This would give a proportion of about twenty-one per cent., a somewhat larger proportion than was arrived at by Mr. Carrick Moore for the San Domingo fossils. Yet I cannot lay much stress upon the exact ratio of recent species in considering the relative age of the Jamaica and San Domingo beds; for we have seen that thirty-four species are common to both localities, and out of these, seven are existing species, many of which are widely distributed and have been found in the Miocene of other localities. Such are *Lucina Pennsylvanica* and *Venus paphia*, which both occur in the Miocene of Europe. Moreover some of the species identified with living forms do not now inhabit the West Indies. Among these are *Pectunculus pennacus* and *Natica mammillaris*. There are several shells in the Jamaica collection which are too imperfect for specific determination, the generic names of which are given in Mr. Carrick Moore's paper on these fossils. Among them is a small *Ancillaria*, a genus which is now extinct, or nearly so, in the West Indies.

The most characteristic fossils of the West Indian Miocene appear to be *Natica phasianelloides*, *Solarium quadriseptatum*, and *Orbitoides Mantelli*, these species having been found in nearly all the Miocene localities, exclusive of Cumana; and they will doubtless be ultimately found there also.

The eastern affinities of the West Indian Miocene fauna is evidenced in the most unequivocal manner by a portion of the collection now described. *Cythera planivincta* is very closely allied to *C. erycina*; *Cardium lingua-leonis* is nearer to *C. rubicundum* of Madagascar than it is to *C. elongatum* of the West Indies; and so on with several of the species. But it must not be overlooked that while there is undoubtedly a closer resemblance of a part of the mollusca to living eastern forms, than to living West Indian forms, another part of the fauna presents nearer affinities to that now inhabiting the contiguous waters. Again, a certain number of the species (e.g., those of the genera *Cassis*, *Cassidaria*, *Conus* and *Natica*) seem to have their nearest congeners in the European early and middle Tertiaries.

I shall mention another point which has some bearing on the affinities of faunas distant in time and in space. Mr. Jenkins has shown me a small collection of fossils from Travancore, in the Society's Museum. These fossils seemed to me to be probably of older Pliocene or Upper Miocene date; but without prejudice to the conclusions which may be arrived at after a closer examination of the fossils in question, I may state that several of them appeared to me to have near resemblances to species now existing in the West Indies. From this it would appear that while the fauna of the West Indies in Miocene times appears to have been more closely related to the existing

eastern fauna than it is at present, there was a fauna in the eastern area during some part of the Tertiary Period with a stronger resemblance to that of the present Caribbean seas than now exists. Thus these various geologico-geographical groups bear a somewhat similar sort of affinity to one another, that we find displayed between certain recent and fossil species of animals.

When taken as a whole, the resemblance of the Caribbean Miocene fauna to that of Bordeaux, Dax, and Malta is striking, and it is closer than its likeness to the American Miocene*. The present molluscan fauna of the West Indies is not altogether devoid of affinities to that of the Mediterranean, and even to that of the Red Sea. Several of the species are, if not identical, at least so near, that they are known by the same names. Hence arises some of the confusion with respect to localities that we occasionally find in conchological books; the same species being attributed in one to the Mediterranean or to the Red Sea, in another to the West Indies.

The series of mollusca now described, with those previously described by Mr. Sowerby, and the corals published by Dr. Duncan, will furnish a basis for future investigations into the geology of the Tertiary formations of the West Indies and Tropical America, and we may expect conclusions of no small interest therefrom.

§ 2. LIST OF SPECIES.

Species.	Distribution.			Fossil. Other localities.
	Recent.	Fossil. Cumana.	Fossil. S. Domingo.	
<i>Cassis sulcifera</i> , Sow.			*	
— <i>nodulifera</i> , Guppy.				
<i>Malca canura</i> , Guppy.				
<i>Cassidaria sublaevigata</i> , Guppy.				
<i>Strombus pugilis</i> , Linn.	*			Cuba; Anguilla.
— <i>bitrons</i> , Sow.			*	Trinidad?
<i>Conus plumiliratus</i> , Sow.			*	
— <i>sobolus</i> , Sow.			*	
— <i>stereostoma</i> , Sow.			*	
— <i>gracilonatus</i> , Guppy.				
— <i>interstinctus</i> , Guppy.			*	
— <i>gracilissimus</i> , Guppy.				
<i>Murex Domingensis</i> , Sow.		*	*	
<i>Persona simillima</i> , Sow.		*	*	
<i>Ranella crassa</i> , Dilw.	*			
<i>Oliva reticularis</i> , Lam.	*			
<i>Mitra Henekeni</i> , Sow.			*	
<i>Fasciolaria semistriata</i> , Sow.			*	
<i>Latirus infundibulum</i> , Gmel.	*		*	N. America.

* By this I mean that there is such a number of types common to the Miocene of Bordeaux, &c., that they resemble deposits formed within the same great zoological province. It is in this respect that the resemblance is less close with the American Miocene.

LIST OF SPECIES (*continued*).

Species.	Distribution.			Fossil. Other localities.
	Recent.	Fossil. Cuba.	Fossil. S. Domingo.	
<i>Marginella coniformis</i> , Sow.		*	*	
<i>Columbella ambigua</i> , Guppy		*		
— <i>gradata</i> , Guppy		*		
<i>Cancellaria Barretti</i> , Guppy			*	
— <i>laevescens</i> , Guppy			*	
— <i>Moorei</i> , Guppy		*	*	
<i>Pleurotoma consors</i> , Sow.			*	
— <i>venustum</i> , Sow.			*	
— <i>Barretti</i> , Guppy		*		
— <i>Jamaicense</i> , Guppy				
<i>Terebra inequalis</i> , Sow.		*	*	
<i>Phos Moorei</i> , Guppy			*	
— <i>elegans</i> , Guppy				
<i>Corithium plebeium</i> , Sow.			*	
<i>Natica sublausa</i> , Sow.			*	
— <i>sulcata</i> , Born.	*	*	*	
— <i>mammillaris</i> , Lam.	*			
— <i>plasiannelloides</i> , d'Orb.			*	Cuba; Anguilla; Trinidad.
<i>Turbo castaneus</i> , Chem.	*	*	*	
<i>Solarium quadriseriatum</i> , Sow.			*	Anguilla; Trinidad.
<i>Cyclostrema bicarumata</i> , Guppy				
<i>Nerita Woodwardi</i> , Guppy				
<i>Dentalium dissimile</i> , Guppy				
<i>Vernotus papulosus</i> , Guppy			*	
<i>Verrucapapilia</i> , Linn.	*	*	*	Verm.
— <i>Woodwardi</i> , Guppy		*		
<i>Cytherea planivoluta</i> , Guppy				
— <i>carbosa</i> , Guppy				
<i>Lima Pennsylvanica</i> , Lam.	*	*	*	Piedmont; N. America.
<i>Cardium sabricostata</i> , Guppy			*	
<i>Cardium Haitense</i> , Sow.		*	*	
— <i>Bignonia-leonis</i> , Guppy				
— <i>inconspicuum</i> , Guppy				
<i>Corbula vinnica</i> , Guppy				
<i>Pectunculus pennacens</i> , Lam.	*			
— <i>acanthostatus</i> , Sow.		*	*	
<i>Arca consobrina</i> , Sow.		*	*	
— <i>Novae</i> , Lam.	*		*	
— <i>maculilateralis</i> , Guppy				
<i>Pecten exasperatus</i> , Sow.	*			
— <i>inaequalis</i> , Sow.			*	
<i>Chama arcinella</i> , Lam.	*		*	N. America.

§ 3. DESCRIPTION OF THE SPECIES.

1. *CYPRIS SUICIFERA*, Sow.

Quart. Journ. Geol. Soc. vol. vi. p. 47, pl. 10. f. 1.

A form allied to the recent *C. tuberosa*.

2. *CASSIS MONILIFERA*, spec. nov. Pl. XVII. fig. 8.

Shell ovate, scarcely ventricose; whorls 5, varices few (1-2) or none; ornamented with obsoletely nodose, low, round, spiral ridges, and bearing on the superior angle a somewhat moniliform row of tubercles; spire small, conic; columellar callus granose; outer lip thickened and dentate; columella very tortuous beneath the callus; canal recurved.

Allied to *C. abbreviata*, Lam. (recent), and still closer to *C. diadema*, Defr. of the Bordeaux Miocene.

3. *MALEA CAMERA*, spec. nov. Pl. XVII. fig. 9.

Shell ovate, ventricose; whorls 6-7, destitute of varices, zoned by about 16 low spiral ridges; spire short, conic; aperture rather narrow, outer lip thickened, dentate; inner lip sinuate, dentate; columella tortuous, irregularly folded or plaited; callus thin.

4. *CASSIDARIA SUBLEVIGATA*, spec. nov. Pl. XVII. fig. 10.

Shell ovate, rimate, striated by transverse grooves which are decussated by numerous fine longitudinal lines; varices scarcely prominent, few; whorls 6-7; spire small, acuminate; suture impressed; aperture elongate; outer lip forming a varix which is scarcely prominent externally, thickened and strongly toothed internally; columellar margin covered by a spreading callus, on which are several folds or plaits; canal short, narrow, slightly reflected.

Allied to the *C. levigata*, Sow., of the San Domingan Miocene, from which it is easily distinguished by its short spire and larger size. Among recent species it is most nearly related to *C. striata*, but the shorter spire, among other characters, serves to distinguish it.

5. *STROMBUS PUGILIS*, Linn.

Syst. Nat. (ed. 12) p. 1209; Reeve, C. 1. Strombus, No. 39.

A common shell in the Caribbean Sea.

6. *STROMBUS BIFRONS*, Sow.

Quart. Journ. Geol. Soc. vol. vi. p. 48, pl. 9. f. 8.

7. *CONUS PLANILIBATUS*, Sow. Pl. XVI. fig. 7.

Quart. Journ. Geol. Soc. vol. vi. p. 44.

8. *CONUS SOLIDUS*, Sow. Pl. I. fig. XVI.

Quart. Journ. Geol. Soc. vol. vi. p. 45.

9. *CONUS STENOSTOMA*, Sow. Pl. XVI. fig. 2.

Quart. Journ. Geol. Soc. vol. vi. p. 45.

10. *CONUS GRANOZONATUS*, spec. nov. Pl. XVI. fig. 5.

Shell elongate, ornamented with numerous (18) transverse nodose ridges, and longitudinally striated by lines of growth, which are most distinct in the sulcations between the ridges; uppermost keel or ridge on the angle of the whorl bearing larger tubercles; spire elevated, acuminate.

11. *CONUS INTERSTINCTUS*, spec. nov. Pl. XVI. fig. 3.

Shell obconic, transversely ornamented with many small ridges bearing moniliform granules, which are most distinct anteriorly, but become simple striations near the anterior canal; whorls 10, superiorly carinate; spire rather elevated, acuminate.

12. *CONUS GRACILISSIMUS*, spec. nov. Pl. XVI. fig. 4.

Shell elongate, subfusiform, slender, ornamented with fattened spiral ribs which are crossed by longitudinal striae most distinct in the interstices of the ribs; spire elevated, acuminate; whorls angular above, the angle ornamented with a single row of small obtuse tubercles; aperture very narrow, elongate; outer lip prominent; posterior sinus distinct.

13. *MUREX DOMINGENSIS*, Sow.

Quart. Journ. Geol. Soc. vol. vi. p. 49, pl. 10. fig. 5.

14. *PERSONA SIMILLIMA*, Sow., sp. Pl. XVII. fig. 13.

Triton simillimus, Sow. Quart. Journ. Geol. Soc. vol. vi. p. 48.

15. *RANELLA CRASSA*, Dillw. Pl. XVIII. fig. 9.

Dillwyn, Descr. Cat. 692; Reeve, C. I. *Ranella*, No. 1.

16. *OLIVA RETICULARIS*, Lam.

Lamarck, Animaux sans Vert. (ed. Desh.) vol. x. p. 613; Reeve, C. I. *Oliva*, No. 16.

This species still lives in the Gulf of California, and also in the West Indies, where it is rather rare.

17. *MITRA HENEKENI*, Sow.

M. Henikeri, Sow. Quart. Journ. Geol. Soc. vol. vi. p. 46, pl. 9. f. 5.

A small example of this species occurs in the Jamaica collection.

18. *FASCIOLARIA SEMISTRIATA*, Sow. Pl. XVI. fig. 12

Quart. Journ. Geol. Soc. vol. vi. p. 49.

19. *LATURUS INFUNDIBULUM*, Gmel.

Lamarck, An. s. Vert. (ed. Desh.) vol. ix. p. 386; Reeve, C. I. *Turbinella*, No. 3.

20. *MARGINELLA CONFORMIS*, Sow. Pl. XVII. fig. 2.

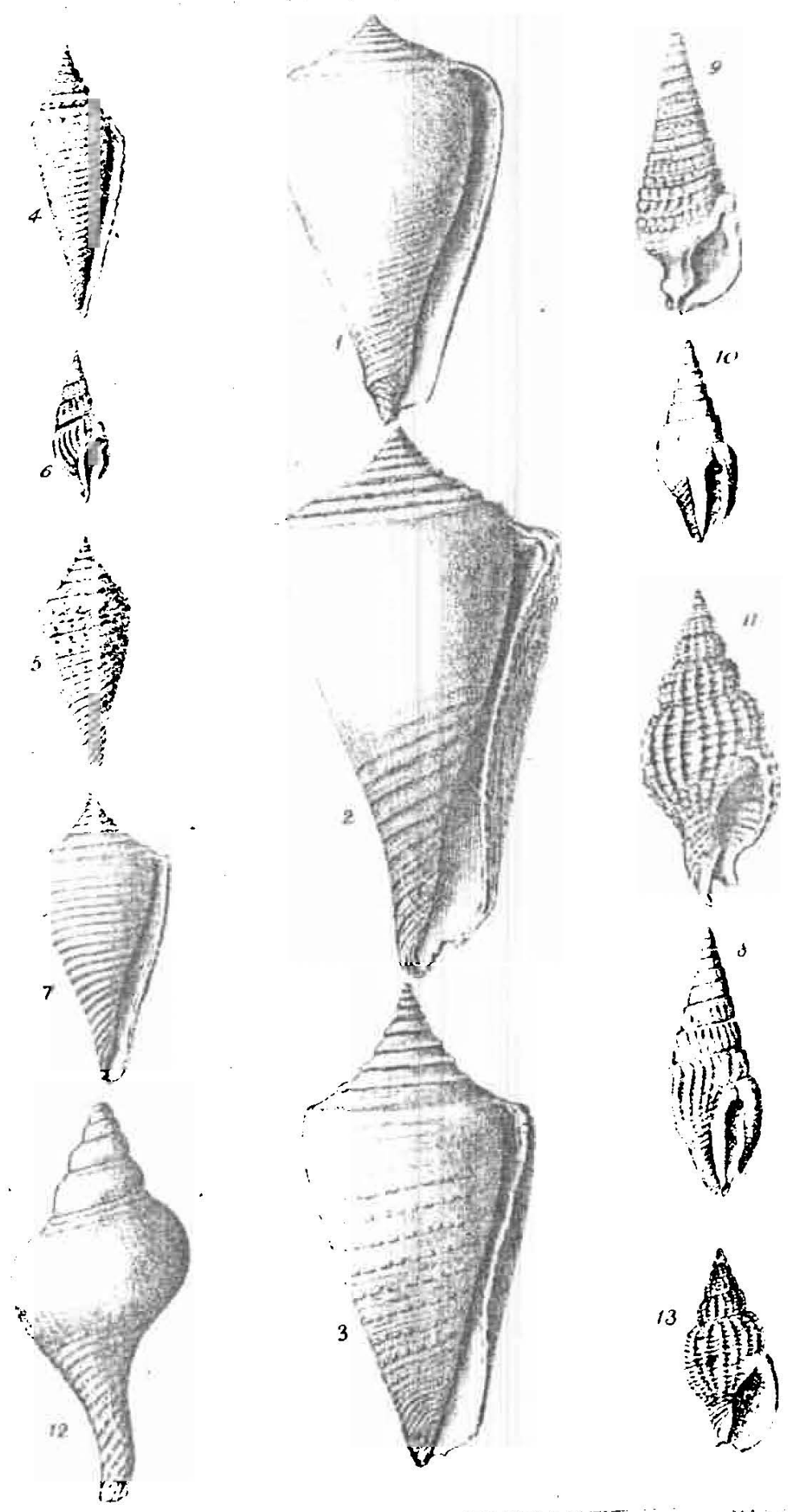
Quart. Journ. Geol. Soc. vol. vi. p. 45.

21. *COLUMBELLA AMBIGUA*, spec. nov. Pl. XVI. fig. 8.

Shell elongate, acuminate, thick, longitudinally ribbed with stout somewhat undulated costae; whorls about 10, flattened laterally, gradually increasing; aperture narrow, outer lip thickened, blunt, toothed within, scarcely indented by an obsolete posterior sinus; canal short, recurved; columellar callus with prominent edges.

22. *COLUMBELLA GRADATA*, spec. nov. Pl. XVI. fig. 10.

Shell thick, elongate, whorls about 9, flattened and ornamented



the disk, where they are not broader than one-third of their interstices; double anteriorly and posteriorly, where they are equal in width to the interstices; hinge-line long, straight, forming an abrupt angle with the rounded anterior margin; posterior margin with an oblique slope.

59. *PECTEN EXASPERATUS*, Sow.

Sow. *Thesaurus Conch.* vol. i. p. 54, pl. 18. f. 183-6; Reeve, *C. I. Pecten*, pl. 2. f. 7 & 8.

This *Pecten* still lives in the West Indian seas. The fossil has 20 ribs, and is slightly longer than the recent shell; but I cannot regard the differences as specific.

60. *PECTEN INÆQUALIS*, Sow. Pl. XVIII. fig. 6.

Quart. Journ. Geol. Soc. vol. vi. p. 52.

61. *CHAMA ARCINELLA*, Lam.

The Jamaican shells do not differ from the recent examples; but the San Domingan specimens may be considered a variety. The former have more numerous imbricating subtubular spines, which in the latter are not so regularly arranged in rows, and assume more the character of coarse squamose granules.

EXPLANATION OF PLATES XVI.-XVIII.

(Illustrative of Tertiary Shells from Jamaica).

PLATE XVI.

- Fig. 1. *Conus solidus*, Sow.
 2. — — *streusoides*, Sow.
 3. - - - *inters'inctus*, Guppy.
 4. — — *gracilissimus*, Guppy.
 5. — — *granosoratus*, Guppy.
 6. *Pleurotoma Jamaicense*, Guppy.
 7. *Conus planiliratus*, Sow.
 8. *Columbella cubana*, Guppy.
 9. *Cerithium plebium*, Sow.
 10. *Columbella gracilata*, Guppy.
 11. *Phos Moorei*, Guppy.
 12. *Fasciolaria sinistriata*, Sow.
 13. *Phos elegans*, Guppy.

PLATE XVII.

- Fig. 1. *Natica phasica*, Alcides, d'Orb.
Marginella conformis, Sow.
Vermetus populosus, Guppy.
 4. *Dentulum d'orsabile*, Guppy.
 5 a, 5 b. *Cyclotrocha bicarinatum*, Guppy.
 6. *Pleurotoma Barretti*, Guppy.
 7. *Cancellaria Moorei*, Guppy.
 8. *Cassis monilifera*, Guppy.
 9. *Mala canava*, Guppy.
 10. *Cassidaria sublevigata*, Guppy.
 11. *Cancellaria Barretti*, Guppy.
 12. — — *versicis*, Guppy.
 13. *Persona simillima*, Guppy.