

often involves conflicting elements, the relative value of which is a matter of uncertainty.

The figures given in illustration of the above observations are profile sections drawn very roughly to true scale (two inches to a mile). Where a section is drawn longitudinally down a valley, it is not always taken along a straight line, but is made to follow the more important bends of the valley. The horizontal line in each figure represents the sea-level (O.D.).

IV.—NOTES ON SOME MARINE MIOCENE SHELLS FROM EGYPT.

By R. BULLEN NEWTON, F.G.S.

(PLATES VIII AND IX.)

THE marine Miocene shells from Egypt referred to in this paper form part of the collection of Egyptian fossils sent to the British Museum for determination by Captain H. G. Lyons, R.E., F.G.S., Director-General of the Geological Survey of Egypt.

Several writers have contributed lists of marine molluscan species occurring in the different Miocene areas of Egypt—the Siwa Oasis, the Pyramids, Jebel Geneffe, Chalouff, and the coast of the Bitter Lake—among whom may be mentioned, A. B. Orlebar,¹ Oscar Fraas,² Ch. Laurent,³ Gerhard Rohlfs,⁴ L. Lartet,⁵ and Mayer-Eymar,⁶ but for the most complete treatise on this subject we are indebted to Dr. Theodor Fuchs,⁷ whose principal investigations were published in the *Palæontographica* for 1883.

Dr. Fuchs' interesting comparisons between the marine Miocene shells of Egypt and those of the Vienna Basin enabled him to establish the fact that a large number of the species were common to both areas; a result more particularly noticeable when comparing the "Grunden Schichten" (= Helvetian) forms with those of the Siwa Oasis, although certain other species were regarded as analogous to those found in the "Horner Schichten" (= Oligocene—Aquitanian stage) and "Steinabrunner Schichten" (= Miocene—Tortonian stage) of the same Basin. The present collection appears to contain representatives of the three lower stages of the Miocene system, no true characteristic Oligocene forms having been determined, viz. :—

MIOCENE	{	Tortonian.
		Helvetian.
		Burdigalian (= Langhian).

¹ "Some Observations on the Geology of the Egyptian Desert": Journ. Bombay Branch Roy. Asiatic Soc., 1846, No. x, pp. 229–250; 14 plates of fossils.

² "Aus dem Orient: Geologische Beobachtungen am Nil, auf der Sinai-Halbinsel, und in Syrien," 1867, pp. 157–173.

³ "Essai Géol. sur les terrains de l'Isthme Suez": Annuaire Soc. anciens élèves Ecoles, Arts, Métiers, 1870, p. 230.

⁴ "Von Tripolis nach Alexandrien," 1871, vol. ii, pl. iv.

⁵ "Essai Géol. Palestine, l'Égypte, et l'Arabie," pt. ii, Paléontologie: Biblioth. Hautes Etudes Sci. Nat., vol. vii (1873), No. 2, pp. 48, 73.

⁶ "Zur Geologie Egyptens": Viert. Nat. Ges. Zürich, vol. xxxi (1886), pp. 263–5.

⁷ "Die Geologische Beschaffenheit der Landenge von Suez": Denk. Akad. Wiss. Wien., vol. xxxviii (1878), pt. 2, pp. 36–8. In Zittel's memoir, "Ueber den Geologischen Bau der libyschen Wüste," 1880, pp. 41–5. "Beiträge Kenntniss Miocænfauna Aegyptens und der libyschen Wüste" (in Zittel's work on Egypt): Palæontographica, vol. xxx (1883), pp. 19–66 (or pp. 1–48), pls. vi–xiii (i–viii) and xix–xxii (xiv–xvii).

It remains to be stated that the majority of the specimens in this collection were obtained from various places comprised in a tract of country lying between Cairo and Suez, which are referred to as 'Camps,' each one being numbered and having the following geographical position :—

CAMPS.			LATITUDE.		LONGITUDE.
No. 6	...	...	29° 57' 40" N.	...	31° 44' 30" E.
No. 9	...	...	30° 10' 15"	...	31° 45' 20"
No. 19	...	...	30° 16' 30"	...	31° 54' 40"
No. 21	...	...	30° 8' 40"	...	31° 56' 40"
No. 22	...	...	30° 15' 30"	...	32° 2' 10"

The additional localities recorded for two of the species are : W. of Jebel Zait, off the Gulf of Suez, and Jebel Geneffe, near Suez.

MOLLUSCA : GASTEROPODA.

Genus TUGURIUM, P. Fischer.

Kiener & Fischer: *Spécies Coquilles Vivantes (Calcar, Trochus, etc.)*, 1880, p. 450 ; Fischer's *Manuel Conchyliologie*, 1885, p. 760.

TYPE.—*Trochus Indicus*, Gmelin.

TUGURIUM BORSONI, Sismonda, sp.

Phorus gigas, Michelotti: *Desc. Foss. Miocènes Italie*, Sept., 1847, p. 175, pl. vii, fig. 1 (non *Trochus gigas*, Borson, 1821).

Phorus Borsoni, Sismonda (Bellardi MS.): *Synopsis Pedemontii Fossilium*, 2nd ed. (1847), p. 50.

Tugurium Borsoni, var. *pagodæformis*, Sacco: *Moll. Terz. Piemonte*, 1896, pt. xx, p. 27, pl. iv, figs. 4, 5.

DESCRIPTION.—*Testa conica, libera, umbilicata; anfractibus planis, infundibuliformibus, basi repanda; periphæria rotundata; umbilico parvo; apertura trigona.* (Michelotti.)

DIMENSIONS.—Height, (about) 40 millimètres; diameter of base, 40 millimètres.

Some conical limestone casts contained in this collection appear to be referable to this species. They possess about five or six wide, depressed whorls, deeply sutured, of infundibuliform arrangement, and obtusely acute at the periphery; the base is concave and prominently umbilicated; surface exhibiting no sculpture. One of the specimens has some foreign material (small bivalve shells) agglutinated to the spire in the neighbourhood of the suture. This character, together with its perforated base, would indicate its relationship to Fischer's *Tugurium*, in which genus it is here placed. From a comparison of the published figures of this species, especially those last issued by Sacco, there is little doubt that these Egyptian casts may be safely referred to the Italian species which characterizes the Helvetian division of the Miocene of that country. The *Trochus gigas* of Borson, at one time confused with this species, belongs to *Pleurotomaria*.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—North Italy; Egypt, between Camps 19 and 22. Coll. Geol. Surv. Egypt, No. 815, Box No. 4c.

Genus TURRITELLA, Lamarck.

Mém. Soc. Hist. Nat. Paris, 1799, p. 74.

TYPE.—*Turbo terebra*, Linnæus.

TURRITELLA TEREBRALIS, Lamarck. (Pl. VIII, Fig. 1.)

Turritella terebralis, Lamarck: Hist. Nat. Anim. sans Vert., vol. vii (1822), p. 59. Basterot, "Desc. Tert. Sud-Ouest France": Mém. Soc. Hist. Nat. Paris, vol. ii (1825), pt. i, p. 28, pl. i, fig. 14. Lartet, "Essai Géol. Palestine, l'Égypte, et l'Arabie," pt. ii, Paléontologie: Biblioth. Hautes Études Sci. Nat., vol. vii (1873), No. 2, p. 48. Sacco: Moll. Terz. Piemonte, 1895, pt. xix, p. 8.

DESCRIPTION.—*Testa elongato-turrita, transversim striata; striis confertis æqualibus; anfractibus medio convexis, basi apiceque depressis; suturis infra marginatis.* (Lamarck.)

REMARKS.—As far as detail is concerned the Egyptian examples of this shell are well preserved, although none of them are quite perfect. The main characters of the species as given originally by Lamarck include its elongate, turreted form, the basal and apical depression of the nearly centrally inflated whorls, the regular, elevated spiral striæ forming its sculpture, with no evidence of longitudinal striations, and the possession of a prominent suture. The basal margin of each whorl extends obliquely to the suture. The spiral angle of 13° agrees with the type figured by Basterot from the neighbourhood of Bordeaux.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Bordeaux; N. Italy. Egypt: Jebel Geneffe (Lartet); Camp 22 (= 23a); Jebel Geneffe, Suez Canal (5c). Coll. Geol. Surv. Egypt, No. 328, Box No. 23a; No. 990, Box No. 5c.

Genus STROMBUS, Linnæus.

Systema Naturæ, 10th ed. (1758), p. 742.

TYPE.—*S. pugilis*, Linnæus.

STROMBUS NODOSUS, Borson, sp.

Mitra nodosa, Borson, "Saggio Orittog. Piemontese": Mem. R. Ac. Sci. Torino, vol. xxv (1820), p. 208, pl. i, fig. 9.

Strombus Bonelli, Brongniart: Mém. Terr. Calc.-Trapp. Vicentin, 1823, p. 74, pl. vi, fig. 6. Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. Geol. Reichs., vol. iii (1852), p. 189, pl. xvii, figs. 2-6.

Strombus, sp. (cf. *Bonelli*), Fuchs: Palæontographica, vol. xxx (1883), p. 36 (18), pl. vi (i), fig. 4.

Strombus nodosus, Sacco: Moll. Terz. Piemonte, 1893, pt. xiv, p. 4.

DESCRIPTION.—Species having an elongate, narrow, oblong, subcylindrical test, ornamented with transverse sulcations; whorls convex, divided by a deep suture and bearing nodular plications in the centre; last whorl with a ring of large prominent tubercles in the upper part, beneath being (in old forms) some minor tubercles separated by spiral sulcations; aperture elongate, subequal; labrum thick and smooth within; base curved in adult forms; canal very short; columella smooth.

DIMENSIONS (of medium-sized specimen).—Length, (about) 50 mm.; diameter, 30 mm.

REMARKS.—The specimens referred to this species are limestone casts, but possessing certain definite characters which suffice for their determination. Both young and adult examples are represented. The narrow, elongate form, its long and deeply

sutured spire, with the centrally nodular plications, as well as the spiral striæ, or sulci, ornamenting the surface, serve to distinguish it from *S. coronatus*, DeFrance, a closely related species. *S. coronatus* is a shorter and much wider shell with a sharp conical spire, consisting of depressed whorls feebly sutured. Fuchs has figured a similar cast from Egypt under the name of *Strombus* cf. *Bonelli*, but the present examples exhibit rather more clearly the sculpture of the species. Hoernes and Sacco must be referred to for a longer synonymy of this species than is offered here; it is important to notice that Sacco has united *S. Bonelli* of Brongniart, which is an adult form, with the present species.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—North Italy; Bordeaux; Vienna Basin; Switzerland, etc. Egypt: Oasis Siwa (Fuchs); between Camps 19 and 22. Coll. Geol. Surv. Egypt, No. 833, Box No. 3c.

Genus PYRULA, Lamarck.

Mém. Soc. Hist. Nat. Paris, 1799, p. 73.

TYPE.—*Bulla ficus*, Linnæus. (Syn. *Ficula*, Swainson.)

PYRULA CONDITA, Brongniart. (Pl. VIII, Figs. 2, 3.)

Pyrula condita, Brongniart: Mém. Terr. Calc.-Trapp. Vicentin, 1823, p. 75, pl. vi, fig. 4. Sowerby (G. B.): Quart. Journ. Geol. Soc., vol. iii (1847), p. 415. Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. Geol. Reichs., vol. iii (1853), p. 270, pl. xxviii, figs. 4-6.

Ficula condita, Sacco: Moll. Terz. Piemonte, etc., 1891, pt. viii, p. 23, pl. i, fig. 27.

DESCRIPTION.—*Testa ficoidea, cancellata; striis transversis erectiusculis; interstitiis longitudinalibus, frequentibus, decussantibus; spira brevissima, plano-retusa, centro mucronata; apertura oblonga.* (Hoernes.)

The diagnosis of this species, given here, is that taken from Hoernes' work, which, on account of being somewhat fuller, is thought to be of more practical use than the original as drawn up by Brongniart.

REMARKS.—Several casts in the collection evidently belong to this species. They exhibit the smooth arcuate columella, an oblong fusoid aperture, a depressed spire, and an elongate terminal area. The ornamentation, although obscure, is seen to consist of a cancellated structure made up of close longitudinal striations crossed by strong, elevated spiral ridges with finer striæ between each. These specimens have been compared with some beautiful examples of the species in the British Museum from Saucats, S.W. of France, and are found to agree in all essential details.

The species differs from *P. reticulata* of Lamarck in possessing a more delicately arched columella and in its finely cancellate sculpture. The specimen numbered 58a appears to be a very old form of this species.

DIMENSIONS.—Length, 55 mm.; width, 35 mm.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Turin; S.W. France; Vienna Basin; Portugal (Sowerby), etc. Egypt: between Camps 19 and 22 (1c), and

Camp 22 (58a). Coll. Geol. Surv. Egypt, No. 816, Box No. 1c; No. 326, Box No. 58a.

GENUS DELPHINULA, Lamarck.

Annales Muséum Paris, vol. iv (1804), p. 108.

TYPE.—*Turbo delphinus*, Linnæus.

(?) DELPHINULA, sp.

REMARKS.—The two specimens referred doubtfully to this genus have very convex whorls and a slit-like perforation at the base of the columella; the aperture is large, oval, and acuminate anteriorly; no sculpture can be traced, and no further identification of the specimens is possible.

DIMENSIONS.—Height, (about) 50 mm.; diameter, 45 mm.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Egypt: between Camps 19 and 22. Coll. Geol. Surv. Egypt, No. 817, Box No. 46c.

Genus CANCELLARIA, Lamarck.

Mém. Soc. Hist. Nat. Paris, 1799, p. 71.

TYPE.—*Voluta reticulata*, Linnæus.

CANCELLARIA, sp. (Pl. VIII, Figs. 4, 5.)

REMARKS.—Two limestone casts appear to belong to this genus. They have convex whorls, an elongate turreted spire, a subcanaliculation at the base, and an oval aperture pointed anteriorly. In this last character and their form generally they are doubtless related to *C. acutangula* of Faujas-de-Saint-Fond, a species common to the Miocene beds of Bordeaux, N. Italy, Corsica, etc.

DIMENSIONS.—Length, 34 mm.; diameter, 22 mm.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Egypt: between Camps 19 and 22. Coll. Geol. Surv. Egypt, No. 833, Box No. 3^x c.

MOLLUSCA: LAMELLIBRANCHIATA.

Genus OSTREA, Linnæus.

Systema Naturæ, 10th ed. (1758), p. 696.

TYPE.—*O. edulis*, Linnæus.

OSTREA DIGITATA, Eichw., var. ROHLFSI, Fuchs.

Ostrea digitata, Eichwald: Natur. Skizze Lithauen Volhynien und Podolien, 1830, p. 213.

Ostrea digitalina, Du Bois de Montpéroux: Conchiologie Foss. Wolhyni-Podolien, 1831, p. 74, pl. viii, figs. 13, 14.

Ostracit, Rohlf: Von Tripolis nach Alexandrien, vol. ii (1871), pl. iv, fig. 1 (no text).

Ostrea Rohlfsi, T. Fuchs: Denk. Akad. Wiss. (Wien), vol. xli (1879), p. 106, pl. vi, figs. 5-8.

Ostrea digitalina, var. *Rohlfsi*, T. Fuchs: Palæontographica, vol. xxx (1883), pp. 44 (26), 55 (37), 61 (43); pl. xii (vii), figs. 3-6; pl. xxii (xvii), figs. 1-3.

? *Ostrea digitalina*, Mayer-Eymar: ibid., p. 74 (8).

REMARKS.—Although belonging to the group of oysters characterized by *O. digitata* of Eichwald (misspelt *O. digitalina* by most authors), this form exhibits some differences, especially in sculpture, which require the adoption of the composite determination introduced by Fuchs, as *O. digitata*, var. *Rohlfsi*. Probably a new name would have been preferable for the Egyptian shell, for, while agreeing with

the European (Russia, Poland, etc.) species in its elongate shape and somewhat acute ligamental region, it differs in the absence of true digitiform plications on the external surface of the lower or convex valve, this feature being replaced by a series of closely-set, radial, and lamellose costæ, typical of *O. Rohlfsi* from the Tertiaries of Persia. The Persian shell, however, has a much rounder outline and lacks any elongation of the dorsal margin.

The upper valves are depressed, and bear numerous concentric, sub-lamellose growth-lines; in the present collection some of these are covered in places externally with parasitic bryozoa belonging to the genus *Cellepora*.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Egypt: Siwa Oasis (Rohlf and Fuchs); Jebel Geneffe, near Suez (Fuchs); island on the Lake of Birket-el-Qurum (Mayer-Eymar); Camp 21. Coll. Geol. Surv. Egypt, No. 627,¹ Box No. 27a,¹ and No. 361, Box No. 56a.

OSTREA GINGENSIS, Schlotheim, sp.

Ostréo-Pinnite, Knorr: Recueil Monumens Catastrophes Pétrifications, vol. ii (1768), pt. 1, p. 119, pl. d.

Ostracites Gingensis, Schlotheim: Taschenbuch (Leonhard), vol. vii (1813), p. 72.

Ostrea crispata, Goldfuss: Petrefacta Germaniæ, vol. ii (1833), p. 15, pl. lxxvii, figs. 1a-f.

Ostrea Gingensis, Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1870), p. 452, pls. lxxvi-lxxx.

Ostrea? Gingensis, Sacco: Moll. Terz. Piemonte, etc., 1897, pt. xxiii, p. 10, pl. iii, fig. 29.

DESCRIPTION.—Shell with rather narrow, elongate valves; lower valve convex, concentrically and irregularly lamellose, longitudinally plicated, umbonal area slightly curved, triangular, more or less pointed and with a deep ligamental fossula; upper valve depressed, operculate, and ornamented with rugose, concentric, lamellar lines of growth.

DIMENSIONS (of largest specimen).—Height, 120 mm.; length, 65 mm.

REMARKS.—The Egyptian specimens of this species have very worn exteriors, the longitudinal plications being almost obliterated. Hoernes has given some excellent illustrations of the shell from the Vienna Basin, his largest example measuring 355 by 180 millimètres. This author's work must also be consulted for a fuller synonymy of the species than is here offered.

HORIZON.—Miocene (Tortonian). In the manuscript lists Captain Lyons refers to these specimens as belonging to the Upper Miocene of Mayer-Eymar.

DISTRIBUTION.—Vienna Basin; South Germany (Swabia); Switzerland; Bohemia; North Italy, etc. Egypt: west of Jebel Zait, western shore of the Gulf of Suez. Coll. Geol. Surv. Egypt, No. 622, Box No. 16a.

¹ Locality for these numbers is not recorded.

OSTREA FUCHSIANA,¹ sp. nov. (Pl. IX, Figs. 1, 2.)

DESCRIPTION.—Lower valve convex, rounded anteriorly, and produced in rear; summit truncate; surface divided up into a series of divergent plications, between each being a wide and conspicuous depression or channel; the plications at the different periods of growth becoming modified into hollow, narrow, and elevated spines. Near the posterior margin the interior of the valve exhibits a large, deep, and nearly round muscular scar with concentric markings; the ligamental area is small, triangular, and curved posteriorly; obscure marginal denticulations are present on each side of the shell near the ligamental area.

DIMENSIONS.—Height, 80 mm.; length, 100 mm.; diameter, 40 mm.

REMARKS.—The above characters are drawn up from a single lower valve which was found in association with *Ostrea vestita* and *O. Virleti*. Its very convex form and peculiar spiny character of the external surface appear to separate it from other species of *Ostrea*. It slightly resembles *O. foliosa*, Brocchi, from the Italian Pliocene, but in that species the outer surface is sulcated and fluted, and rarely shows elevated spines. The specimen, encrusted in places with a Celleporoid Bryozoa, is of fawn colour and entirely free from matrix. I have ventured to name this shell after Dr. Theodor Fuchs, one of the first authorities on the Miocene conchology of Egypt.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Egypt: Camp 19. Coll. Geol. Surv. Egypt, No. 342, Box No. 13^c a.

OSTREA VESTITA?, Fuchs.

Ostrea vestita, Fuchs: Palæontographica, vol. xxx (1883), p. 44 (26), pls. xi (vi), xii (vii), figs. 1, 2.

REMARKS.—Among the Egyptian specimens are two lower valves of an oyster referred doubtfully to this species. They are of oval-oblong shape, very strong and thick, and apparently composed of regular foliaceous growths, the exposed edges of which do not, however, bear the fimbriated markings observable in Fuchs' figures of the type, though the absence of this character may be noted in his fig. 2 of pl. xii. In other details the specimens agree with *O. vestita*.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Egypt: Siwa (Fuchs); Camp 19. Coll. Geol. Surv. Egypt, No. 342, Box No. 13a.

OSTREA (ALECTRYONIA) VIRLETI, Deshayes.

Ostrea Virleti, *Ostrea pseudo-edulis*, *Ostrea excavata*, Deshayes: Expéd. Sci. Morée, vol. iii (1883), pt. 1 [Mollusques], pp. 122-4, pl. xxi, figs. 1-6.

Ostrea excavata, *Ostrea Virleti*, Abich, "Ueber Steinsalz, etc., Russischen Armenien": Mém. Ac. Imp. Sci. St. Pétersbourg, sér. vi, vol. ix (1859) (= pt. 1, vol. vii, Mém. Sci. Phys. Nat.), pp. 124-5, pl. ii, figs. 1, 2; pl. iii, fig. 1; pl. v, figs. 1, 2.

Ostrea Virleti, Fuchs: Denk. Akad. Wiss. (Wien), vol. xli (1879), pt. 2, p. 106, pl. iv, figs. 1-9; Palæontographica, vol. xxx (1883), pp. 43 (25), 61 (43), pls. ix (iv), x (v).

DESCRIPTION.—Shell of variable form, mostly orbicular or oblong; valves prominently plicated, margins more or less flexuous;

¹ Non *Ostrea Fuchsi* of A. de Gregorio, 1884.

plications elevated, few, squamose, irregularly radiate, and obsolete near ventral region in aged examples; ligamental fossula of lower valve moderately excavated and less perceptible in the upper valve.

DIMENSIONS (of an adult valve).—Height, 135 mm.; length, 95 mm.; diameter, 50 mm.

REMARKS.—Several of the present specimens are exceedingly thick and coarse, whilst the ligamental areas and muscular scars are of great size. Fuchs recognizes *O. pseudo-edulis* and *O. excavata* as synonymous with *O. Virleti*, the three species being somewhat difficult to separate from each other.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Morea (Deshayes); Russian Armenia (Abich); Persia (Fuchs). Egypt: Siwa and Jebel Geneffe (Fuchs); south of Middle Station, Old Suez Railway (24a); Camp 19 (13^a a); Camp 21 (12a). Coll. Geol. Surv. Egypt, No. 360, Box No. 12a; No. 342, Box No. 13^a a; No. 625, Box No. 24a.

Genus PECTEN, O. F. Müller.

Zool. Danicæ Prod., 1776, p. xxxi.

TYPE.—*Ostrea maxima*, Linnaeus.

PECTEN ACUTICOSTATUS, G. B. Sowerby.

Pecten acuticostatus, G. B. Sowerby: Quart. Journ. Geol. Soc., vol. iii (1847), p. 49, pl. xvii, fig. 18.

Janira lævicostata, Seguenza, "Form. Tert. Reggio (Calabria)": Atti R. Ac. Lincei, ser. iii, vol. vi (1879), p. 188, pl. xiv, fig. 16.

Pecten acuticostatus, Fuchs: Palæontographica, vol. xxx (1883), p. 41 (23), pl. viii (iii), figs. 1-6.

DESCRIPTION.—*P. testa suborbiculari, valva altera convexa, costis radiantibus 20, acutis, elevatis; lateribus costarum interstitiisque concentricè striatis; auriculis magnis, tenuiter radiatim costatis.* (G. B. Sowerby.)

REMARKS.—The above constitutes the original diagnosis of this species, which was drawn up from a fragmentary lower valve found in the Tertiary deposits of Portugal (Tagus district). An examination of the type in the Geological Society's Museum proves that some valves in the Egyptian collection can with safety be regarded as this species. A series of elevated triangular ribs, with wide interstitial spaces ornamented by fine concentric striæ, appear to distinguish the shell from other forms. Similar structures characterize *P. lævicostata* of Seguenza from Italian Pliocene (Zanclean) beds, and therefore it may be included as a synonym of Sowerby's older name.

DIMENSIONS (of largest convex valve).—Height, 70 mm.; length, 75 mm.; diameter, 15 mm.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Tagus Beds of Portugal (Sowerby); Southern Italy (Seguenza). Egypt: Siwa and Geneffe (Fuchs); Camp 22 (26^{xxx} a) and probably from Camp 21 (20a). Coll. Geol. Surv. Egypt, No. 365, Box No. 20a; No. 324, Box No. 26^{xxx} a.

PECTEN ADUNCUS, Eichwald.

Pecten aduncus, Eichwald: *Natur. Skizze Lithauen, Volkynien, und Podolien*, 1830, p. 213.

Pecten Josslingi, G. B. Sowerby: *Quart. Journ. Geol. Soc.*, vol. iii (1847), p. 419, pl. xvi, figs. 10-12.

Pecten convexo-costatus, Abich, "Ueber Steinsalz, etc., Russischen Armenien": *Mém. Ac. Imp. Sci. St. Pétersbourg*, sér. vi, vol. ix (1859), pt. 1, p. 118, pl. i, fig. 4.

Pecten aduncus, Hoernes, "Foss. Moll. Tert.-Beck. Wien": *Abhandl. k. k. geol. Reichs.*, vol. iv (1867), p. 401, pl. lix, figs. 7-9. Fuchs: *Palæontographica*, vol. xxx (1883), p. 36 (54), pl. xix (xiv), figs. 1-5.

DESCRIPTION.—Species with very convex lower valve and a rounded, incurved umbone; costæ about 17, rounded, wide, smooth, and separated by conspicuous sulci, or grooves, which are ornamented with fine concentric striations; upper valve flat, with 12 narrow costæ, more or less obsolete at the umbone.

DIMENSIONS (of larger upper valve).—Height and length, 40 mm.

REMARKS.—Two upper valves of this species are contained in the collection, the larger having its inner surface covered with parasitic annelid tubes and a bryozoan (*Cellepora*).

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Poland (Eichwald); near Lisbon (G. B. Sowerby); Russian Armenia (Abich); Vienna Basin (Hoernes). Egypt: Nile Valley (Fuchs); Camp 22. *Coll. Geol. Surv. Egypt*, No. 324, Box No. 26^{xxxx} a.

PECTEN BEUDANTI, Basterot.

Pecten Beudanti, Basterot, "Desc. Tert. Sud-Ouest France": *Mém. Soc. Hist. Nat. Paris*, vol. ii (1825), pt. 1, p. 74, pl. v, figs. 1a-c. Hoernes, "Foss. Moll. Tert.-Beck. Wien": *Abhandl. k. k. geol. Reichs.*, vol. iv (1867), p. 399, pl. lix, figs. 1-3. Sacco: *Moll. Terz. Piemonte, etc.*, 1897, pt. xxiv (*Pectinidæ*), p. 62, pl. xx, figs. 1-8.

DESCRIPTION.—Species characterized by its valves bearing very elevated, rounded, and radial costæ (14-16), ornamented with fine, closely-set, regular, lamellose, and transverse striæ. The lower valve is very convex, furnished with an incurved umbone, a moderately short cardinal line having vertically striated auricles of apparently equal size; the upper valve is flat and sometimes rather concave.

DIMENSIONS (of largest lower valve).—Height, 85 mm.; length, 95 mm.; diameter, 20 mm.

REMARKS.—This species need not be confused with either *P. solarium* of Lamarck or *P. Tournali*, which are forms of somewhat similar ornament, but possessing a convexity in both valves. Sacco's examples from Italy, although of rather smaller size and recognized under varietal names, appear to exhibit the general structural features of this species. The occurrence of this shell in Egypt is recorded here for the first time.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Bordeaux; Portugal (Sowerby); Constantine (Coquand); Italy; Switzerland; Vienna Basin. Egypt: Camp 22. *Coll. Geol. Surv. Egypt*, No. 322, Box No. 14a.

PECTEN CRISTATO-COSTATUS, Sacco.

Pecten cristato-costatus, Sacco: Moll. Terz. Piemonte, etc., 1897, pt. xxiv, p. 64, pl. xxi, figs. 1-7.

DESCRIPTION.—*Testa affinis P. subarcuatus*, Tourn., *sed in valva dextera costæ radiales valde elatiores, strictiores, acutiores, subtriangulares, sulcis profundissimis (costis latioribus) disjunctæ.* (Sacco.)

A single lower valve from Egypt appears to belong to this species, although the radial costæ become rounder as they reach the ventral margin, and their terminations are ornamented with extremely fine transverse striæ. In all other characters it is extremely like Sacco's shell. Costæ 18-20.

DIMENSIONS (of a lower valve).—Height, 40 mm.; length, 41 mm.; diameter, 11 mm.

REMARKS.—This species is closely related to *Janira benedicta* (Lamarck), Fontannes, from the Pliocene of the Rhône Valley, and differs mainly in possessing a greater number of ribs.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Italy. Egypt: Camp 19. Coll. Geol. Surv. Egypt, No. 371, Box No. 25^a.

PECTEN ESCOFFIERÆ, Fontannes.

Pecten Escoffieræ, Fontannes: Etudes Tert. Bassin Rhône, 1878, pt. iii, p. 95, pl. v, fig. 1. Fuchs: Palæontographica, vol. xxx (1883), p. 24 (42), pl. viii (iii), figs. 9-12.

DESCRIPTION.—Shell small, subtriangular, and with a moderately convex right valve, bearing about 18 subrotund, elevated costæ; the sculpture consists of fine concentric striæ in the grooves, which become more or less lamellar on the depressed summits of the ribs.

DIMENSIONS (of right valve).—Height and length, 21 mm.; diameter, 5 mm.

REMARKS.—The collection contains only a right valve of this species. Fuchs has already recognized it from Egyptian rocks.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Visan Basin (Fontannes). Egypt: Siwa (Fuchs); Camp 22. Coll. Geol. Surv. Egypt, No. 324, Box No. 26^{xx}.

PECTEN (ÆQUIPECTEN) MALVINÆ, Bois de Montpéreux.

Pecten Malvinæ, Bois de Montpéreux: Conch. Foss. Wolhyni-Podolien, 1831, p. 71, pl. v, figs. 2, 3.

Pecten opercularis, Goldfuss: Petrefacta Germaniæ, vol. ii (1833), p. 62, pl. xcv, figs. 6a-b (*non c and d*) (Lamarck, *non* Linnæus).

Pecten Malvinæ, Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1867), p. 414, pl. lxiv, figs. 5a, b. Fuchs: Palæontographica, vol. xxx (1883), p. 24 (42).

Æquipecten Malvinæ, var. *acuticostulata*, Sacco: Moll. Terz. Piemonte, etc., 1897, pt. xxiv, p. 16, pl. iii, figs. 36-40.

DESCRIPTION.—Both valves of this shell are convex and circular in shape, with a variable number of longitudinal costæ; the original description gives 30-35, Hoernes mentions 30, whereas Fuchs says that the average number is 21, which agrees best with what is seen on the Egyptian specimens. The ribs are simple over the umbonal region, but afterwards split up into three or four divisions, with minute interstitial spaces between each; both the ribs and the spaces are ornamented with lamellose and concentric

striations, which become more remote and lamellar near the margin.

DIMENSIONS (of best specimen).—Height and length, 50 mm.

REMARKS. — In adopting a subgeneric name, it may be mentioned that Sacco recognizes this shell under *Æquipecten* of Paul Fischer, on account of its similarity to the type, *P. opercularis*. It is indeed difficult to separate *P. Malvinæ* from the Linnæan species, except that it is somewhat less circular and fan-shaped. Hoernes' work must be referred to for a longer synonymy of the species than is here offered.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Poland; Vienna Basin; Touraine; Italy; Persia (Fuchs). Egypt: Jebel Geneffe (Fuchs); no locality recorded for the present Egyptian specimens. Coll. Geol. Surv. Egypt, No. 624, Box No. 22a.

PECTEN (*ÆQUIPECTEN*) ZITTELI, Fuchs.

Pecten Zitteli, Fuchs: Palæontographica, vol. xxx (1883), p. 41 (23), pl. vii (ii), figs. 1-12.

Æquipecten Zitteli, Sacco: Moll. Terz. Piemonte, etc., 1897, pt. xxiv, p. 31.

DESCRIPTION.—Shell suborbicular, furnished with 13-15 broad, radial costæ, and a series of corresponding deep grooves; ribs elevated and subdivided into minor grooves and ridges; ornamentation closely lamellose.

DIMENSIONS (of one valve).—Height, 48 mm.; length, 48 mm.; diameter, 10 mm.

REMARKS.—This species belongs to the group of *Pecten opercularis* which Fischer has named *Æquipecten*, and is related to *P. Malvinæ* and *P. cavarium* of Fontannes. The Egyptian examples are in a good state of preservation.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Egypt: Oasis Siwa (Fuchs); Camp 19. Coll. Geol. Surv. Egypt, No. 371, Box No. 25a.

PECTEN (*AMUSSIOPECTEN*) BURDIGALENSIS, Lamarck.

Pecten Burdigalensis, Lamarck: Annales Muséum, vol. viii (1806), p. 355. Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1867), p. 418, pl. lxx. Fuchs: Denk. Akad. Wiss. (Wien), vol. xxxviii (1878), pt. 2, p. 37.

Amussiopecten Burdigalensis, Sacco: Moll. Terz. Piemonte, etc., 1897, pt. xxiv, p. 53, pl. xv, figs. 1-7.

DESCRIPTION.—Species of suborbicular shape, with the lower valve more convex than the other; auricles small and of equal size; valves ornamented externally with 12-14 distant, broad, slightly elevated, radial costæ, which are crossed by extremely fine and closely-set concentric striations.

REMARKS.—The Egyptian specimens, although somewhat imperfect, may be readily recognized as this large and well-known species.

DIMENSIONS.—Height, 80 mm.; length, 85 mm.; diameter (both valves in contact), 20 mm.

Sacco's name of *Amussiopecten* was founded to include rather large, but graceful, pectinoid shells, bearing internal costæ and

outwardly a series of depressed ribs; both valves being convex and slightly gaping.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Bordeaux; Gironde; Portugal; Sardinia; the Azores; Vienna Basin; Constantine, etc. Egypt: Jebel Geneffe (Fuchs); 9 kilometres S.S.W. of Camp 22. Coll. Geol. Surv. Egypt, No. 355, Box No. 15a.

PECTEN, sp.

REMARKS.—Three valves of different pectinoid shells, too imperfect for determination.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Egypt: Camp 22. Coll. Geol. Surv. Egypt, No. 324, Box No. 26^a a.

Genus AMUSSIUM [AMUSIUM], Chemnitz.

Conchyl. Cabinet, vol. vii (1784), p. 284, pl. lxi, fig. 595.

TYPE.—*Ostrea pleuronectes*, Linnæus.

AMUSSIUM CRISTATUM, Bronn, sp. (Pl. VIII, Fig. 6.)

Ostrea pleuronectes, Brocchi: Conch. Foss. Subapennina, vol. ii (1814), p. 573 (non Linnæus).

Pecten cristatus, Bronn: Zeitsch. Mineralogie (Leonhard), vol. ii (1828), p. 542. Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1867), p. 419, pl. lxvi, fig. 1.

Amusium cristatum, Sacco: Moll. Terz. Piemonte, etc., 1897, pt. xxiv, p. 47, pl. xiii, figs. 30, 31; pl. xiv, fig. 1.

Pecten cristatus, Repelin: Bull. Soc. Géol. France, sér. iii, vol. xxv (1897), p. 130.

Pecten (Cornelia) cristatus, Mayer-Eymar: Palæontographica, 1898, vol. xxx, pt. 2, p. 65.

DESCRIPTION.—Shell depressed, nearly orbicular, with a smooth outer surface, and internally possessing 26–32 elevated, radial costæ, which are acuminate and slightly curved at their terminations, and do not quite reach the ventral margin.

REMARKS.—This species is represented in the collection by a single fragment attached to a lower valve of *Pecten acuticostatus*. It is the internal portion of a valve showing three pairs of costal rays with bent acuminate ends, the intervening space between each pair having a maximum width of 9 millimètres. According to Mayer-Eymar this species ranges from Helvetian to Sicilian times in the neighbourhood of the Pyramids.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Vienna Basin; Southern France; Italy; Sicily; Sardinia; Algeria (Repelin), etc. Egypt: probably from Camp 21. Coll. Geol. Surv. Egypt, No. 365, Box No. 20^a a.

Genus SPONDYLUS, Linnæus.

Systema Naturæ, 10th ed. (1758), p. 690.

TYPE.—*S. gæderopus*, Linnæus.

SPONDYLUS, sp.

Spondylus, sp., cf. *crassicostatus*, Fuchs: Palæontographica, vol. xxx (1883), p. 25 (43), pl. viii (iii), fig. 14.

DESCRIPTION.—The valves are suborbicular, compressed, and ornamented with fine, closely arranged, tortuous ribs, which separate

wider and more prominent costæ having a lamellar or funnel-shaped structure. These larger costæ are broader and less numerous on the right or lower valve than on the left.

DIMENSIONS.—Height, 60 mm.; length, 65 mm.; diameter, 32 mm.

REMARKS.—Only one example of this shell is in the collection, consisting of a pair of fragmentary valves *in situ*, though preserving no dorsal characters of any moment and showing merely the slightest indication of one of the lateral auricles. So worn is the specimen that the asperities of the test are a good deal modified, the bases only of the sharp elongate spines, so prominent a feature in recent *Spondyli*, being present. It appears to differ from *S. crassicostatus* in its rounder, more compressed valves and thinner test, and from *S. gæderopus* in the lower valve exhibiting no trace of a foliaceous growth. It probably represents an intermediate form between these two species, which with better material at hand might be worthy of a new specific name. The fragmentary shell figured by Fuchs from Egypt corresponds in most details with the present specimen.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Egypt: Siwa (Fuchs); no locality recorded for this specimen. Coll. Geol. Surv. Egypt, No. 623, Box No. 21a.

Genus *AXINÆA*, Poli.

Testacea Siciliæ, vol. i (1791), p. 32.

TYPE.—*Arca pilosa*, Linnæus.

AXINÆA PILOSA, Linnæus, sp.

Arca pilosa, Linnæus: Systema Naturæ, 12th ed. (1767), vol. i, pt. 2, p. 1,143, Nos. 181, 182.

Pectunculus glycymeris and *P. pilosa*, Searles Wood, "Mon. Crag Moll. England": Mon. Palæontographical Soc., 1850, p. 66, pl. ix, fig. 1 (*pars*).

Pectunculus pilosus, Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1864), p. 316, pl. xl, figs. 1, 2; pl. xli, figs. 1–10. Seguenza, "Form. Terz. Reggio (Calabria)": Mem. R. Accad. Lincei, ser. iii, vol. vi (1880), pp. 282, 360.

DESCRIPTION.—This is a suborbiculate, equilateral species, convex, and substriated; umbones incurved; margin crenulated. Shell closely related to *Arca glycymeris* of Linnæus, though differing from it in never departing from the regular or equilateral condition; that species being frequently oblique in shape. Searles Wood combined the two under *P. glycymeris*, but more modern authors have treated them as separate species, a plan adopted on the present occasion.

REMARKS.—Two examples illustrate this species; they are partial casts showing remnants of the thick test in places. The more perfect one has the valves *in situ*, and exhibits the longitudinal striations together with a series of concentric growth-lines. On the sides are prominent oblique ridges representing the inner margins of the large adductor scars.

DIMENSIONS.—Height, 75 mm.; length, 71 mm.; diameter, 46 mm.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Found recent in the Mediterranean Sea; and fossil in N. and S. Italy; Poland; Morea; S. France; Rhône Basin; near Lisbon; England; Vienna Basin; Azores; Oran, etc. Egypt: Camp 22. Coll. Geol. Surv. Egypt, No. 325, Box No. 57a.

Genus *CARDIUM*, Linnæus.

Systema Naturæ, 10th ed. (1758), p. 678.

TYPE.—*C. costatum*, Linnæus.

CARDIUM, sp. (Pl. IX, Figs. 3, 4.)

REMARKS.—Under this genus are placed three casts of shells with attached valves, which are tumid, oblique, and elongate, and furnished with incurved, anterior, nearly contiguous umbones, beneath being an oval excavation. One of the specimens is covered with obscure vertical ribbing on its left valve, and still more obscure indications of concentric sculpture. An obtuse, postero-median, oblique carination proceeds from the beaks to the ventral region, forming the inner margin of the posterior area. This form appears to be related to *Cardium discrepans*, Basterot, a species common to the Miocene of Southern France, N. Italy, etc.

DIMENSIONS.—Height, 45 mm.; length, 43 mm.; diameter, 30 mm.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Egypt: Camp 9. Coll. Geol. Surv. Egypt, No. 642, Box No. 53a.

Genus *LUCINA*, Lamarck.

Mém. Soc. Hist. Nat. Paris, 1799, p. 84.

TYPE.—*Venus edentula*, Linnæus.

LUCINA MULTILAMELLATA?, Deshayes. (Pl. VIII, Fig. 7.)

Lucina multilamellata, Deshayes: *Encyclopédie Méthodique*, vol. ii (1830), p. 377 (not figured). Hoernes, "Foss. Moll. Tert.-Beck. Wien": *Abhandl. k. k. geol. Reichs.*, vol. iv (1864), p. 227, pl. xxxiii, fig. 2. Fuchs: *Palæontographica*, vol. xxx (1883), p. 39 (21), pl. vi (i), fig. 12.

DESCRIPTION.—The Egyptian collection contains a series of casts belonging to a lenticular and suborbicular shell with both valves in contact, which resembles very strongly Fuchs' interpretation of this species as figured by him in the *Palæontographica*. The surface irregularities on the interior of the valves, alluded to by Deshayes in the original description, are well seen in the specimens, besides some obscure indications of radial striæ.

DIMENSIONS.—Height, 52 mm.; length, 54 mm.; diameter, 24 mm.

HORIZON.—Miocene (Helvetian).

DISTRIBUTION.—Bordeaux; Vienna Basin. Egypt: Siwa (Fuchs); between Camps 19 and 22 (2c) and S.E. of Camp 19 (48c). Coll. Geol. Surv. Egypt, No. 830, Box No. 2c; No. 871, Box No. 48c.

Genus *TELLINA*, Linnæus.

Systema Naturæ, 10th ed. (1758), p. 674.

TYPE.—*T. radiata*, Linnæus.

TELLINA LACUNOSA, Chemnitz.

Tellina lacunosa, Chemnitz: *Conchylien-Cabinet*, vol. vi (1782), p. 92, pl. ix, fig. 78.

Tellina papyracea, Gmelin: Linnæus' *Systema Naturæ*, 13th ed. (1790), vol. i, pt. 6, p. 3, 231.

Tellina tumida, Brocchi: *Conch. Foss. Subapennina*, vol. ii (1814), p. 513, pl. xii, fig. 10.

Tellina lacunosa, Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1859), p. 91, pl. ix, fig. 1. Fuchs: Denk. Akad. Wiss. (Wien), vol. xxxviii (1878), pt. 2, p. 36.

Tellina tumida, Seguenza, "Form. Terz. Reggio (Calabria)": Mem. Atti R. Accad. Lincei, ser. iii, vol. vi (1880), p. 73.

DESCRIPTION.—Shell roundly ovate, ventricose, possessing a wide postero-median depression in the right valve and a peculiarly twisted ventral region.

DIMENSIONS.—Height, 48 mm.; length, 53 mm.; diameter, 25 mm.

REMARKS.—Represented by some casts exhibiting attached valves, which have been compared with recent examples of this species from Guinea, and found to agree in all essential details. They show the central depression of the right valve, a more inflated left valve, and the typical flexuosity of the ventral area. No scar impressions are visible, but the posterior oblique area, reaching from the beaks to the infero-ventral margin, is well defined. Two valves, Box No. 48^x c, are doubtfully referred to this species; they may be young forms.

HORIZON.—Miocene (Burdigalian).

DISTRIBUTION.—Recent, from the Guinea Coast; fossil from Italy, Switzerland, South of France, Vienna Basin, etc. Egypt: Jebel Geneffe (Fuchs); Camp 6 (52a) and S.E. Camp 19 (48^x c). Coll. Geol. Surv. Egypt, No. 641, Box No. 52a; No. 871, Box No. 48^x c.

Genus *MERETRIX*, Lamarck.

Mém. Soc. Hist. Nat. Paris, 1799, p. 65.

TYPE.—*Venus meretrix*, Linnæus.

MERETRIX ERYCINA, Linnæus, sp.

Venus erycina, Linnæus: Systema Naturæ, vol. i (1767), pt. 2, p. 1, 131.

Cytherea erycinoides, Lamarck: Hist. Nat. Anim. sans Vert., vol. v (1818), p. 581.

Callista erycina, H. & A. Adams: Genera of Recent Mollusca, vol. ii (1857), p. 425.

Cytherea erycina, Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1861), p. 154, pl. xix, figs. 1, 2.

Cytherea erycinoides, Seguenza, "Form. Terz. Reggio (Calabria)": Mem. Atti R. Accad. Lincei, ser. iii, vol. vi (1880), pp. 52, 60, 119.

DESCRIPTION.—Shell transversely oval, cuneiform; wide, short, and round anteriorly; round, acuminate, and produced in rear; surface ornamented with depressed concentric sulcations.

DIMENSIONS (valves *in situ*).—Height, 48 mm.; length, 37 mm.; diameter, 23 mm.

REMARKS.—The Egyptian specimens referred to this species are somewhat obscure and imperfect, though that from which the above dimensions are taken is in fairly good condition and shows the shape of the shell as well as the typical parallel, obtuse sulcations which ornament its valves. There is a long synonymy to the species which is well set out in Hoernes' work, but not repeated here.

HORIZON.—Miocene (Burdigalian).

DISTRIBUTION.—Bordeaux; North and South Italy; Gironde Basin; Rhône Basin; Portugal; Vienna Basin, etc. Egypt: Camp 6. Coll. Geol. Surv. Egypt, No. 640, Box No. 51a.

MERETRIX, allied to HAGENOWI, Dunker, sp.

Cytherea Hagenowi, Dunker : Novitates Conchologicae, 1865, pt. ii, No. 2, p. 13, pl. iv, figs. 13-15; Zeitschr. Malakozoologie (Menke & Pfeiffer), 1849, p. 184.

DESCRIPTION.—Shell characterized by its rounded posterior margin and rather shallow valves, ornamented with numerous regular, concentric, and rather obsolete plications.

REMARKS.—An imperfect right valve contained in this collection appears to be closely allied to this species, and differs chiefly in exhibiting a strongly pronounced concentric sculpture. It, however, compares favourably with a recent specimen from the Red Sea in the British Museum identified as this species.

DIMENSIONS.—Height, 50 mm.; length, 60 mm.; diameter, about 12 mm.

HORIZON.—Miocene (Burdigalian).

DISTRIBUTION.—Egypt: Camp 6. Coll. Geol. Surv. Egypt, No. 640, Box No. 51^a.

MERETRIX LAMARCKI, Agassiz, sp.

Cytherea nitidula, Basterot, "Desc. Géol. Tert. Sud-Ouest France": Mém. Soc. Hist. Nat. Paris, vol. ii (1825), pt. 1, p. 91, *non* Lamarck. Goldfuss: Petrefacta Germaniæ, vol. ii (1840), p. 239, pl. cxlix, fig. 11.

Cytherea Lamarcki, Agassiz, "Iconographie Coquilles Tertiaires": Nouv. Mém. Soc. Helvétique Sci. Nat., vol. vii (1845), p. 39, pl. vii, figs. 1-4. Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1861), p. 153, pl. xviii, fig. 5.

DESCRIPTION.—Species ovate, transverse, ventricose, inequilateral; wide and round anteriorly and in rear; lunule prominent; posterior area lanceolate; margins closed.

DIMENSIONS.—Height, 44 mm.; length, 56 mm.; diameter, 28 mm.

REMARKS.—An internal cast of both valves *in situ* represents this shell. Its careful comparison with the excellent figures of Agassiz and Hoernes leaves no room for doubt that it belongs to this form. The elegant rounded and ventricose character of this species is well maintained in the specimen.

HORIZON.—Miocene (Burdigalian).

DISTRIBUTION.—Bordeaux; Westphalia; Vienna Basin, etc. Egypt: Camp 6. Coll. Geol. Surv. Egypt, No. 641, Box No. 52^a.

[BIVALVE: INDETERMINABLE.]

REMARKS.—A badly preserved specimen — not identifiable, but probably belonging to the genus *Meretrix*.

HORIZON.—Miocene (Burdigalian).

DISTRIBUTION.—Egypt: Camp 6. Coll. Geol. Surv. Egypt, No. 640, Box No. 51^a.

Genus VENUS, Linnæus.

Systema Naturæ, 10th ed. (1758), p. 684.

TYPE.—*Venus chione*, Linnæus.

VENUS BURDIGALENSIS?, Mayer-Eymar.

Venus Burdigalensis, Mayer-Eymar: Journ. Conchyliologie, sér. II, vol. iii (1858), p. 298; *ibid.*, sér. II, vol. iv (1860), pl. v, fig. 4; Syst. Verz. Foss. Reste Madeira, etc., 1864, p. 19. Hoernes, "Foss. Moll. Tert.-Beck. Wien": Abhandl. k. k. geol. Reichs., vol. iv (1861), p. 129, pl. xv, fig. 1.

REMARKS.—Three internal casts of a *Venus* with attached valves are referred doubtfully to this species. They are of similar proportionate size to the type, and preserve the same obliquely curved outline of the dorso-posterior area. The lunule is large and deeply excavated, whilst the escutcheon is long, wide, and lanceolate. No pallial impression is seen, and the muscular scars are nearly obsolete.

DIMENSIONS.—Height, 60 mm.; length, 68 mm.; diameter, 38 mm.

HORIZON.—Miocene (Burdigalian).

DISTRIBUTION.—Bordeaux; Vienna Basin; Island of Baixo, Madeira. Egypt: Camp 6. Coll. Geol. Surv. Egypt, No. 1,002, Box No. 47c.

VENUS, sp.

REMARKS.—Represented by two imperfect casts, which exhibit a deep excavation beneath the beaks corresponding to the lunule; on the other side is a prominent lanceolate depression representing the escutcheon area. A concentric lamellose ornamentation is somewhat obscurely seen in one of the specimens. They are probably the moulds of *Venus plicata*, Gmelin.

DIMENSIONS.—Height, 35 mm.; length, 40 mm.; diameter, 23 mm.

HORIZON.—Miocene (Tortonian).

DISTRIBUTION.—Egypt: Camp 9. Coll. Geol. Surv. Egypt, No. 642, Box No. 53^a.

EXPLANATION OF PLATE VIII.

TURRITELLA TEREBRALIS, Lamarck. Helvetian of Jebel Geneffe.

FIG. 1.—Several examples on a small slab of yellowish sandstone.

PYRULA CONDITA, Brongniart. Helvetian of Camp 22.

FIG. 2.—Back view of specimen.

FIG. 3.—Front aspect, showing aperture.

CANCELLARIA, sp. Helvetian: between Camps 19 and 22.

FIG. 4.—Front aspect of shell.

FIG. 5.—Back view of same specimen.

AMUSSIUM CRISTATUM, Bronn, sp. Tortonian: probably from Camp 21.

FIG. 6.—Fragment showing the internal surface of a valve and its pairs of costal rays; attached to a valve of *Pecten acuticostatus*.

LUCINA MULTILAMELLATA?, Deshayes. Helvetian: between Camps 19 and 22.

FIG. 7.—Cast of specimen with indications of radial striæ.

EXPLANATION OF PLATE IX.

OSTREA FUCHSIANA, sp. nov. Tortonian: from Camp 19.

FIG. 1.—External view of lower valve, exhibiting the radial ridges and spines.

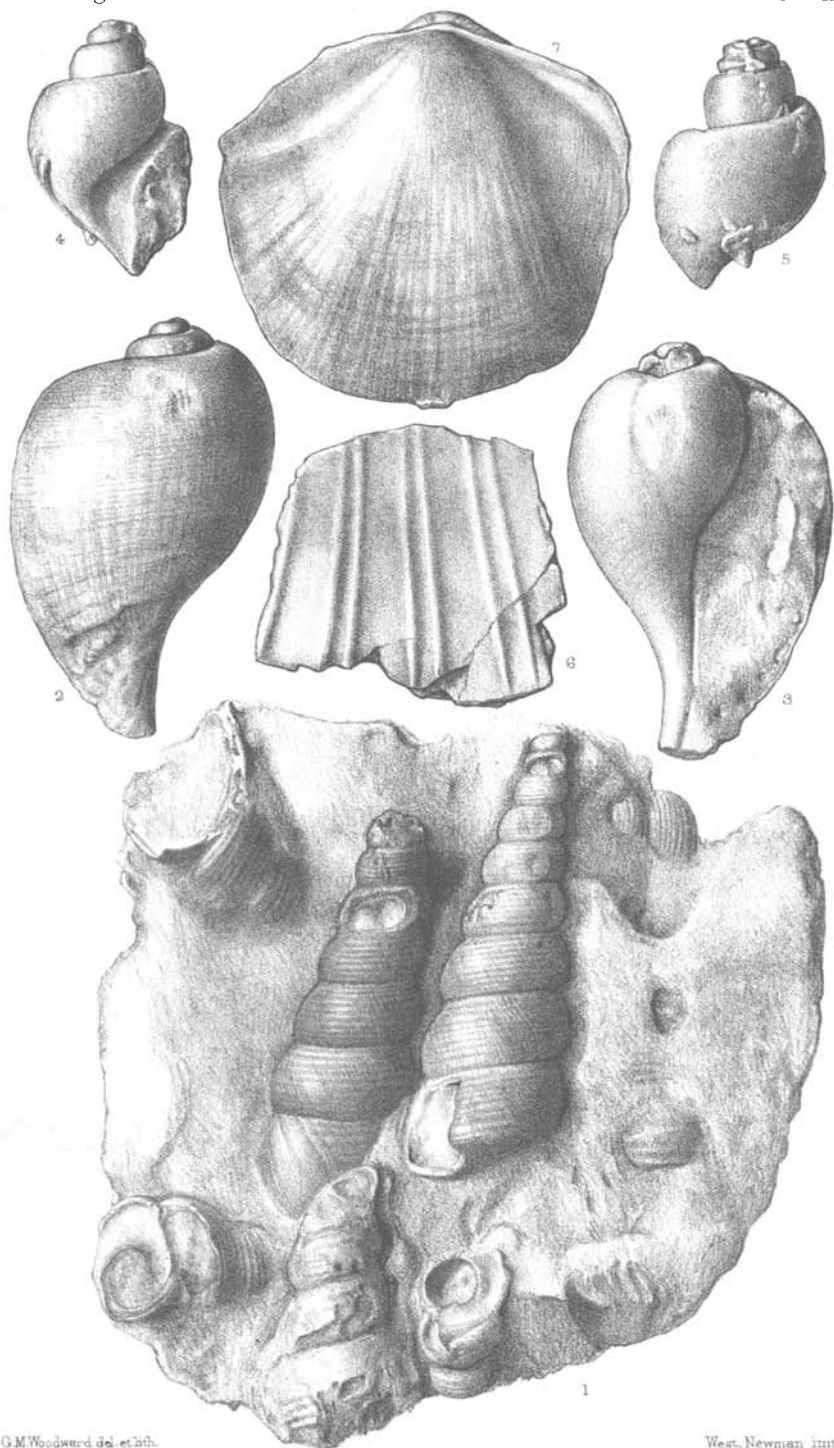
FIG. 2.—Internal view of same specimen, showing small ligamental area and extensive muscular scar.

CARDIUM, sp. Tortonian: Camp 9.

FIG. 3.—Cast of a specimen showing vertical striation.

FIG. 4.—Umbonal view of same specimen.

[The figures on both Plates are drawn natural size.]



G.M. Woodward del. et lith.

West, Newman imp.

Egyptian Miocene Shells.