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XXXII.—A Synopsis of the Genera and Species of the Class Hypostoma (Asterias, Linnæus)

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the bone earth (phosphate of lime $\dot{C}a^3 \dddot{F}^3$) is the manure, and that this substance only does good in such a soil as is poor in it, which is said not to be the case in Mecklenburg and northern Germany, on which account no such astonishing success has been seen to result from manuring with bones. On the contrary, the English soil is said to have been exhausted of its phosphate of lime by the repeated cultivation of wheat, so that in it this manure is very successful. We have shown in the commencement the views which the author takes of the action of mineral substances as manures, and, according to it, the action of several, as lime, marl, gypsum, &c., are explained; if these substances are not present, or are in only small quantities in the soil, then they must be added, and in order to ascertain this it is absolutely necessary to examine the soil chemically. If one wishes to manure with marl, both the marl and the soil must be first examined, for marls are very variable in their composition, and it is not every one of them which will suit one particular soil.

From M. Pabst we have received another very important work on Agricultural Œconomy*, which treats of the cultivation of plants agriculturally, but it is quite practical. He who wishes for any information concerning the cultivation of those domestic plants which can be produced in our country, will find in this work sufficient instruction.

[To be continued.]

XXXII.—*A Synopsis of the Genera and Species of the Class* Hypostoma (Asterias, *Linnæus*). By John Edward Gray, Esq., F.R.S., Keeper of the Zoological Collection in the British Museum.

[Continued from p. 184.]

Fam. 3. Pentacerotidæ, *Gray, Syn. Brit. Mus.*

The body supported by roundish or elongated pieces, covered with a smooth or granular skin, pierced with minute pores between the tubercles.

A. Pentacerotina. *Body pentagonal or suborbicular, rays short, dorsal wart single, the ambulacra edged with a series of small spines divided into rounded groups.*

a. *The ambulacra with a single series of large spines near the edge.*

* *Body suborbicular, convex above and below; covered above and below with granules, and scattered conical tubercles.*

* Lehrbuch der Landwirthschaft. Zweiten Bandes. 1ª Abtheilung Specielle Productionslehre. Darmstadt, 1839.

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1. Culcita, Agassiz.

Culcita Schmideliana. Asterias Schmideliana, *Retz. Naturforscher*, xvi. t. 1. Ast. placenta. Ast. discoidea, *Lam.*

Inhab. Lord Hood's Island, on reefs. *H. Cuming, Esq.*

Bright orange when alive, when in the water very convex.

** *Body pentagonal, formed of variously shaped, regularly arranged, externally granular ossicula.*

2. Pentaceros.

Body convex above, margin with 2 rows of large spine-bearing tesseræ.

a. *Back formed of irregular elongated ossicula, apparently reticulated; the spines with enlarged bases, interspaces closely punctured.*

1. *Pentaceros grandis*, Seba, t. 8. f. 1. Arms very broad, as wide as long at the base, only half as long as the width of the body.

Diam. 17″.

Inhab. ——.

2. *Pentaceros reticulatus.* Asterias reticulata, *Linn.* Arms rather broad, nearly as long as the width of the body; back convex. *Monstrosity* 4-lobed, *Rumph. Mus.* t. 15. f. D.

Inhab. West Indies, Barbadoes. *Ralph Green, Esq.*

3. *Pentaceros gibbus*, Linck, t. 23. f. 36. Seba, iii. t. 7. f. 1. Arms rather shorter than the width of the body, back depressed.

Inhab. West Indies and St. Vincent's. *Rev. L. Guilding.*

See also Pentaceros lentiginosus, *Linck*, 25. t. 41, 42. f. 72. Ast. pentacyphus, *Retz.*, with smaller spines and a nearly spineless margin; and 2. Pentaceros horridus, *Linck*, t. 25. f. 40.

4. *Pentaceros Cumingii*, Gray. The arms rather narrow, nearly as long as the diameter of the body; marginal spines few, small; back rather depressed, with conical protuberances, bearing small spines.

Diam. 12″.

Inhab. Punta Santa Elena. Rocky ground 12 or 18 fathoms. *H. Cuming, Esq.*

Perhaps the young of a much larger species.

5. *Pentaceros hiuculus*, Linck, t. 26. f. 41. Ast. nodosa, *a. Lamk.* Arms rather narrow, nearly as long as the width of the body, with a single series of blunt tubercles; back rather depressed, with a central large tubercle, on each angle of the centre.

Inhab. Isle of France. *Dr. W. E. Leach.*

In Linck's figure the spines are rather larger than in our specimens of nearly the same size.

6. *Pentaceros Chinensis.* Rays elongated, nearly as long as the width of the body, with small blunt marginal tubercles; back high, with 4 or 5 small central tubercles, and a very large blunt tubercle at each angle.

Inhab. China. *J. Reeves, Esq.*

The central dorsal series of tesseræ are not armed with spines; are they so in larger specimens?

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7. *Pentaceros Franklinii.* Rays elongate, as long as the width of the body, with a dorsal series of broad blunt tubercles; back high, with very large spines at each angle, margin not armed.

Var. 1. With one or two conical tubercles on each side of the tubercles, near the one at the angle of the central dorsal disk.

Inhab. Coast of New Holland. *G. Bennett, Esq.*

See also *Pentaceros turritus,* Linck, t. 22. 23. f. 3. Like the former, but the back is more spinose, and the spines are not so large.

8. *Pentaceros muricatus,* Linck, t. 7. f. 8. Ast. Linckii, *Blainv.* A. nodosa, *Lam.* Seba, iii. t. 7. f. 3. Arms elongated, nearly as long as the width of the body, with a dorsal series of large, and with 2 or 3 large conical spines near the tips; back rather high, spinose.

Inhab. ——. Brit. Mus.

b. *Back formed of irregular flat-topped ossicula, placed in rows so as to appear nearly tessellated; arms elongated, rather narrow.*

9. *Pentaceros nodosa.* Asterias nodosa, *Gmelin* (part), Seba, iii. t. 8. f. 11, 12. (t. 5. f. 11, 12. without spines on the margin?) Arms with a double series of hemispherical tubercles; back rather depressed; marginal ossicula unequal, lower one with small blunt conical spines.

Inhab. Isle of France. *W. E. Leach, M.D.*

c. *Back formed of regular rounded ossicula, placed in rows; back rather low.*

10. *Pentaceros aculeatus,* Seba, iii. t. 5. f. 5. 6. With 3 ridges of small spine-bearing tubercles; back rather depressed, with three small spines at the angles; marginal ossicules rounded, with conical tubercles.

Var. ? or younger? Spine-bearing ossicula further apart, with the skin and granulations worn off and bleached, *Seba,* iii. t. 7. f. 1.

Inhab. West Indies, St. Vincent's. *Rev. L. Guilding.*

See also *Pentaceros spinosa.* Ast. nodosa (part), *Gmel. Seba,* iii. t. 5. f. 7, 8., and var. *Seba,* iii. t. 7. f. 1, 2. Ossicula oblong, with 2 or 3 small conical tubercles.

d. *Back regularly convex, formed of flat granular ossicula with a blunt mobile spine on the centre of each ossicule below; arms short, broad.* Nidorellia.

11. *Pentaceros armatus,* Gray. Arms short, broad, the lower marginal and the 3 last upper marginal plates at the top with short blunt spines; back convex, with central and lateral groups and a series of spines down each arm. Young more convex; spines shorter, blunter and fewer. Younger not so convex, without any marginal spines, and only indications of them on the back.

Inhab. Punta Santa Elena. Rock ground, 12 to 15 fathoms. *H. Cuming, Esq.*

3. Stellaster. Gray.

Body depressed, covered with large flat regular six-sided plates, margin with 2 rows of large tesseræ; the lower rows with a series of compressed mobile spines.

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1. *Stellaster Childreni.* Back convex, with 1 or 2 blunt tubercles on the angles of the centre, arms three quarters the length of the width of the body, narrow, attenuated to a blunt recurved tip. Young, back without any tubercles.

Inhab. China or Japan?

4. Comptonia, Gray.

Body depressed, spinose? dorsal and oral disk covered with very small flat plates, marginal ossicula large, without any mobile spines.

1. *Comptonia elegans*, Gray. Fossil. Black Down.

The fossil genus Cœlaster, Agassiz, from Maestricht, appears to be most nearly allied to this genus, but the plates of the oral disk (which alone are known) appear to be linear longitudinal.

*** *Body pentagonal, formed of variously shaped rather rough ossicula sunk into a naked skin, with a single series of spine-bearing tubercles.*

5. Gymnasteria, Gray.

1. *Gymnasteria spinosa.* Rays triangular, tapering, about one quarter longer than the width of the body, with a dorsal series of conical cylindrical tubercles. Young with a few spines on the margin and back of the arms. Allied to Porania.

Inhab. Panama, fine sand, 16 fathoms. *H. Cuming, Esq.*

2. *Gymnasteria inermis.* Rays rapidly tapering, convex above without any spines.

Inhab. Panama, fine sand, 10 fathoms. Half the size of the young, spined specimens of the former species.

b. *The ambulacra with 2 series of larger spines near the edge; body depressed; back flat.*

* *The ossicula granulated, sunk in the skin, often spine-bearing.*

6. Paulia, Gray.

Body 5-rayed, formed of flat granulated spine-bearing irregular ossicula on the disk and margin without any 2-lipped pores.

Paulia horrida. Chestnut brown; spines acute.

Var. Smaller, arms as long as the width of the body, rather tapering, spines smaller, blunt, rounded at the tip; back more closely granulated.

Inhab. Punta Santa Elena. Rocky ground, 12 to 18 fathoms. *H. Cuming. Esq.*

7. Randasia, Gray.

Body pentagonal, with a tubercular skin above, and large granular plates beneath and on the margin, without any 2-lipped slits, but with one or two small pores near the oral angle beneath, where the tubercles are rubbed off. Allied to Culcita.

1. *Randasia Luzonica.* Thick, brown, the tubercles of the under side unequal, the larger ones flat-topped: sides straight.

Inhab. Island of Luçon, in the Port of Sual. *H. Cuming, Esq.*

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8. ANTHENEA, Gray.

Body 5-rayed, chaffy, with immersed elongated tubercle-bearing ossicula; margin with regular rows of large tesseræ; both surfaces (especially the under) scattered with large 2-lipped pores.

1. *Anthenea chinensis*, Gray. Asterias chinensis, *Gray, Brit. Mus.* Back obscurely netted, rather chaffy, with scattered truncated tubercles in rather diverging lines; marginal plates not tubercled; rays broad, half the length of the width of the body.

Inhab. China, Japan. *J. Reeves, Esq.*

See also Seba, iii. t. 6. f. 5, 6. (*Ast. tessellata*, var. A. Lam.). Similar, but the dorsal tubercles are larger and angular.

9. HOSIA, Gray.

Body 5-rayed, formed of distinct, hexangular, nearly equal, slightly tubercular ossicula; back with small and beneath with larger 2-lipped slits.

Hosia flavescens. Arms two-thirds the length of the width of the body.

Inhab. ——. Perhaps young.

See also Asterias granularis, *Retz. in Muller Zool. Dan.* t. 92. f. 1. 4. From the North Sea. Gmelin referred to Linck, t. 13. f. 22. t. 23. f. 37 ?—t. 24. f. 39. and t. 27. f. 45. all *Goniaster tessellatus*, for this species ? as he also has done to *Ast. equestris.*

** *The ossicula of the upper and lower surface and the margin smooth, with a single continued series of uniform granules round each of their edges.*

10. HIPPASTERIA, *Gray, Syn. Brit. Mus.*

Body 4 or 5-sided, formed of roundish ossicula, with a large truncated central tubercle; upper and lower surface with 2-lipped pores.

1. *Hippasteria Europæa.* Asterias equestris, *Penn. B. Z.* iv. 130. *Sow. Brit. Mis.* f. 3. not Muller nor Lamk. Rays 5, broad, nearly half as long as the width of the body, marginal ossicula with three blunt tubercles placed in a central cross series.

European Ocean.

2. *Hippasteria Johnstoni.* Asterias Johnstoni, *Gray, Johnst. Mag. Nat. Hist.* 1836. vi. f. 21. *not Chiaje.* Rays 4, elongated, slightly tapering, back spinulose with short truncated spines, margin with 3 or 4 series of elongated tapering spines.

North of England.

See also *Hip. plana. Pentaceros planus*, Linck, 21. t. 12. f. 21. (Ast. equestris, *Gmelin and Lam.*), which chiefly differs in the arms appearing longer. 2. *H. cornuta*, Pent. longiorum cornuum, Linck, 43. t. 33. f. 53, with the arms still longer and more slender at the end. All four are perhaps varieties of one; Gmelin refers for this species to Linck, t. 5. f. 13; an *Astropecten*, t. 13. f. 22. t. 23. f. 37. t. 24. f. 39. and t. 27. f. 45. all *Goniaster tessellatus.*

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11. Calliaster, Gray.

Body 5-rayed, with flat immersed ossicula armed with flat-based deciduous conical spines, and without any 2-lipped slits on either surface.

1. *Calliaster Childreni*, Gray. Gray, back slightly convex, with a centre, a ring and 5 radiating lines of small spines; rays slender, tapering, as long as the width of the body; each of the marginal pieces with a central series of 3 distant spines.
Inhab. ——.

c. *Ambulacra with* 3 *or* 4 *series of equal close larger spines near the edge; body depressed, flat; marginal ossicula large, smooth,* 2-*rowed, with only a single series of granules on each of their edges.*

12. Goniaster.

Ossicula flat, the dorsal ossicula granulated and armed with deciduous flat-based spines; both surfaces destitute of any 2-lipped slits.

In the younger specimens only the middle of the back and the central dorsal lines of the rays are spine-bearing, but as the animal enlarges the other tesseræ on the sides become covered, and at length they are separated into groups by the groove extending from the centre to the angle of the margin between the rays. The tubercles easily fall off in the dry specimens, leaving a smooth distinct flat scar.

1. *Goniaster cuspidatus.* Pentagonaster semilunatus cuspidatus, *Linck*, 21. t. 23. f. 37. perfect; t. 22. f. 39. imperfect; and *Seba*, iii. t. 6. f. 9. perfect. Ast. tessellatus, *D* and *C. Lam.* Body 5-angular, sides curved, arms broad, triangular, rather more than half as long as the width of the body.
Inhab. ——.

2. *Goniaster Sebæ*, Seba, iii. t. 8. f. 2. differs in the sides of the rays being angularly inflexed.

3. *Goniaster regularis*, Seba, iii. t. 8. f. 4, copied for *Pentagonaster regularis*, Linck, 20. t. 13. f. 22. Body with five nearly straight sides.

13. Pentagonaster, Gray.

Body formed of convex, smooth, and spineless ossicula; the ossicula of the under side with a central sunk line with a central perforation and a small pit at each end. The marginal ossicula near the tips of the rays very large and swollen.

1. *Pentagonaster pulchellus.* Asterias pulchella, *Gray, Encycl. Metrop.* t. . f. Body with 5 deeply concave sides, with 4 oval convex tubercles on each side, and a small one interposed between the angles of each of them.
Inhab. China.

When the large apical tubercles have been injured it becomes divided into small unequal ones.

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14. Tosia, Gray.

The body formed of smooth and spineless ossicula, rather convex; the dorsal and ventral ossicula entire, without any impressed line, subequal; the marginal ossicula 2-rowed, with a small intermediate one near each tip; dorsal wart triangular.

1. *Tosia australis.* Body flat, with 5 slightly inflexed sides, the central interradial dorsal ossicule largest, marginal 6 above and below, with a small intermediate ossicule at the top of each side, the lower gradually diminishing in size towards the top.

Inhab. Swan River, Port Lincoln, and Van Diemen's Land.

The granules between the ossicula are deficient in the dead and washed specimens. There are 3 or 4 fossil species in the chalk.

B. Echinasterina. *The body discoidal, many-rayed, skeleton netted with numerous elongated doubly mobile articulated spines on mammillary tubercles; dorsal warts numerous.*

15. Echinaster, *Gray, Syn. Brit. Mus.* 62.

Body star-like, granulated, depressed; back rather convex, with a circle of 10—15 conical dorsal warts! Ambulacral spines small, placed in groups with a single continuous row of large slender spines near them. The spines are very long and covered with a granular skin, and have generally a second articulation about one-third the length from the base.

1. *Echinaster Ellisii*, Gray. Asterias Echinus, *Solander and Ellis*, t. 60, 61, 62. Asterias Echinites, *Lam.* Dorsal warts 15; rays 11, or 12; spines large, thick.

Inhab. South America. *H. Cuming, Esq.*

2. *Echinaster solaris.* Asterias solaris, *Naturforscher*, xxviii. t. 1, 2. Rays 21; spines small; dorsal warts 10.

Inhab. ——.

C. Cribellina. *The body divided into cylindrical, elongated rays; dorsal wart single.*

a. *Ambulacra with a single series of crowded filiform spines, sometimes united by a membrane at their base.*

†. *Smooth, the rays netted, with mobile spines, with impressed dots between the net work; dorsal wart convex, flat-topped, with a few radiating grooves.*

* *Spine single, large, on the junction of the ossicula, placed in equidistant series.*

16. Othilia, Gray.

Skin smooth, polished; ambulacra with two very close series of filiform spines.

1. *Othilia spinosa.* Asterias spinosa, *Retz.* Pentadactylosaster spinosus, *Linck*, t. 4. f. 17. Asterias Echinophora, *Lam.* n. 25. not *Chiaje.* Rays rather more than twice the length of the width of the body.

Inhab. North America, Virginia.

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2. *Othilia aculeata.* Rays cylindrical, more than 3 or 4 times as long as the breadth of the body, with 7 rows of acute spines. Young (or *Var.*) arms with only five series of similar spines.

Inhab. Guacomayo, Central America, fine sand, 13 fathoms. *H. Cuming, Esq.*

3. *Othilia multispina.* Rays short, depressed, broad, rather more than twice as long as the width of the body, blunt at the end, with 11 rows of acute distant spines.

Inhab. ——.

4. *Othilia purpurea.* Purplish, rays cylindrical, nearly three times as long as the width of the body, with numerous short, rather blunt spines; under side with cross wrinkles, and 2 or 3 series of pores parallel to the ambulacra. *Monstrosity* 4-rayed.

Inhab. "Isle of France." *W. E. Leach, M.D.*

5. *Othilia Luzonica.* Reddish brown, rays 5 or 6, elongates 4 times as long as the width of the body, with many blunt spines.

Inhab. Isle of Luzon. *H. Cuming, Esq.*

17. Metrodira, Gray.

Slightly granular; rays slender, with large single pores and small scattered spines on the back; smooth, and formed of regular flat ossicula on the sides.

1. *Metrodira subulata.* Yellow brown; rays elongated, slender, tapering.

Inhab. Migupou. *H. Cuming, Esq.*

** *Spines small, crowded, scattered on the sides and at the junctions of the slender ossicula.*

18. Rhopia, Gray. *Stellonia* part, *Agassiz.*

Ambulacral spines long, with several series of larger spines near them.

1. *Rhopia seposita.* Asterias seposita, *Retz. Nov. Ac.* 1783. 229; *Gmel.* 3182; *Lam.* n. 30; *Seba,* iii. t. 7. f. 5. Pentadactylosaster reticulatus, *Linck,* t. 4. f. 5. Stellonia seposita, *Agassiz.*

2. *Rhopia Mediterranea.* Yellow, rays 6, tapering, nearly three times as long as the width of the body; spines short, cylindrical. *Var.?* Rays 7, unequal; spines shorter.

Inhab. Marseilles.

†† *Granulated, the rays above largely tubercular, not spinose, with minute dots between the tubercles, beneath uniform; dorsal wart triangular, irregularly punctate and contorted.*

19. Ferdina, Gray.

Body flat; rays broad, convex and warty above, flat and uniform beneath; ambulacral spines short, united at the base.

1. *Ferdina flavescens.* Yellow, brown varied; rays near half as long again as the width of the body, uniformly tubercular, blunt.

Inhab. Isle of France. *W. E. Leach, M.D.*

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2. *Ferdina Cumingii.* Yellow or brown; rays rather longer than the width of the body, with a central and a marginal row of larger rounded tubercles and some scattered smaller ones; the larger tubercles on the sides are red when the granules are rubbed off, which they often are.

Inhab. West Coast of Columbia. *H. Cuming, Esq.*

b. *The ambulacra with a series of very small short filiform spires (placed in pairs) with a parallel series of spines near them; the rays formed of longitudinal series of tubercles united by transverse ossicula; dorsal wart intricate.*

* *Spines near the ambulacra larger than the ambulacral ones.*

20. Dactylosaster, Gray.

Rays cylindrical, nearly smooth, formed of regular oblong ossicula, each furnished with a central group of unequal short mobile tubercles; dorsal wart 1.

1. *Dactylosaster cylindricus.* Asterias cylindrica, *Lam.* Gray, Ency. Metrop. t. . f. Reddish, brown marbled, rays elongated, cylindrical, blunt, with 8 rows of groups of spinose tubercles, 3 times as long as the width of the body.

Inhab. "Isle of France." *W. E. Leach, M.D.*

2. *Dactylosaster gracilis.* Reddish, brown marbled, rays slender, four times as long as the width of the body, with 7 rows of groups of small spines.

Inhab. West Coast of Columbia. *H. Cuming, Esq.*

21. Tamaria, Gray.

Rays cylindrical, formed of 7 series of granular convex roundish ossicula, each of the upper ones with 3 or 4 unequal and the lower ones with a central short blunt spine.

1. *Tamaria fusca.* Brown; rays rather tapering.

Inhab. Migupou. *H. Cuming, Esq.*

22. Cistina, Gray.

Rays cylindrical, nearly smooth, formed of rows of 3-lobed flat ossicula, each furnished with a central mobile spine; dorsal warts (1 or 2) oblong.

1. *Cistina Columbiæ.* Yellow, arms rather more than 4 times as long as the width of the body, with 7 rows of spines.

Inhab. West Coast of Columbia. *H. Cuming, Esq.*

The larger specimen has two very distinct dorsal warts, but I can only see one very obscure one in the smaller specimen. It may be a monstrosity in the large specimen.

23. Ophidiaster, Agassiz.

Rays cylindrical, elongate, uniformly granular all over, without any spines; back with a small central group of larger tubercles; dorsal wart concave with radiating or twisting grooves.

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† *Rays cylindrical, blunt.*

1 *Ophidiaster aurantius.* Orange, rays with 7 rows of rounded tubercles, about 4 times as long as the width of the body; spines near the ambulacra short, ovate, club-shaped.

Inhab. Madeira, rocks on Porto Santo Laurenço. *Rev. R. T. Lowe.*

2. *Ophidiaster Leachii.* Rays elongate (smooth?) with 8 or 9 irregular rows of unequal tubercles. The spines near the ambulacra club-shaped, rather dilated and more compressed at the tip.

Inhab. "Isle of France." *Dr. W. E. Leach.*

3. *Ophidiaster Guildingii,* Gray. Pale brown (dry), rays cylindrical, 4 times as long as the width of the body, with 7 series of moderate tubercles; the spines near the ambulacra compressed, thin ovate. *Var.* 1. female? Rays thick, spaces between the tubercles large, with numerous dots. *Var.* 2. male? Rays thin, spaces between the tubercles small, with 4 or 6 dots.

†† *Rays round, tapering, acute.* Hacelia.

4. *Ophidiaster attenuatus.* Rays rounded, elongate, nearly 4 times as long as the width of the depressed body, broad at the base and tapering, with 9 rows of triangular tubercles; spines near the ambulacra large, ovate, blunt.

Inhab. ——. Brit. Mus.

††† *Rays triangular, tapering, with* 3 *interrupted bands of pores on each side.* Pharia.

5. *Ophidiaster pyramidatus.* Rays subangular, elongate, nearly 4 times as long as the width of the pyramidical body, with 7 rows of tubercles; the central dorsal series much the largest; spines near the ambulacra ovate, subacute.

Inhab. Bay of Caraccas, West Colombia, on the rocks. *H. Cuming, Esq.*

** *Series of spines near the ambulacra nearly of the same size as the ambulacral ones.*

24. Linckia (not Micheli), Linkia, Nardo and Agassiz, not Persoon nor Cav.

† *Rays* 5, *cylindrical, with the groups of pores scattered on the whole surface.*

1. *Linckia Typus,* Nardo. Pentadactylosaster miliaris, *Linck,* t. 28. f. 47. Ast. lævigata, *Linn., Lam.* 39. Pale yellow (dry), rays cylindrical, elongate, rather tapering at the end, nearly 7 times as long as the width of the body; back and sides with equal-sized tubercles, and moderate sized dotted interspaces on the sides; apical tubercles moderate. *Distorted*; Asterias cometa, *Blainville.*

Inhab. Mediterranean, *Linn.* Egypt, *Sir J. G. Wilkinson.*

See also Linckia franciscus, *Nardo,* and Asterias multiforas, *Lam.* n. 37.

2. *Linckia crassa.* Rays elongate, thick, cylindrical, blunt at the

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ends, nearly 3 times as long as the width of the body; apical tubercle indistinct.

Inhab. —— ?

3. *Linckia Brownii*, Rumph. Amb. t. 13. f. E ? Seba, Mus. iii. t. 6. f. 13, 14. Grew, Mus. t. 8. f. 1, 2 ? Rays elongate, cylindrical, rather tapering at the end, 4 times as long as the width of the body; back of the arms with 3 or 4 rows of small tubercles; sides with 4 rows of large pierced spots; apical tubercle moderate.

Inhab. New Holland. *Rob. Brown, Esq.*

4. *Linckia Leachii.* Rays elongate, slender, cylindrical, rather tapering; sides with 3 or 4 rows of rather convex tubercles; apical tubercle indistinct ?

Inhab. "Isle of France." *Dr. W. E. Leach.*

Very like *L. Typus.* Our specimens, which are almost all young of the *Comet variety*, are only to be distinguished from that species by the arms being slenderer. The adult may differ more.

5. *Linckia Guildingii.* Brown, olive varied; rays slender, elongate, cylindrical, nearly equal, largely granular; back and sides with groups of 3 or 4 holes between the interspaces of the tubercles, apical tubercles large and convex. *Monstrosity* 6-rayed.

Inhab. St. Vincent's. *Rev. L. Guilding.*

Differs from *L. Typus* principally in being much smaller and slenderer.

6. *Linckia pacifica.* Rays elongate, cylindrical, rather tapering at the end, 6 times as long as the width of the body, with close oblong convex ossicula, apical tubercle indistinct; the series of spines near the ambulacra crowded together with them.

Inhab. Tahiti on the reefs. *H. Cuming, Esq.*

7. *Linckia Columbiæ.* Rays elongate, cylindrical, rather tapering at the end, covered with large coarse granulations; series of spines very close to the ambulacral spines, oblong and truncated. *Monstrosity*, with 1 of the rays long, rest small, reproduced.

Inhab. West coast of Columbia. *H. Cuming, Esq.*

†† *Rays 5, rather trigonal, with 1 or 2 continued bands of pores without any intervening tubercles on each side.* Phataria.

8. *Linckia unifascialis.* Rays trigonal, tapering; back with 3 rows of flat ossicula; sides with a single broad band of pores; rather more than 3 times as long as broad.

Inhab. Bay of Caraccas, West Columbia, on the rocks at low water. *H. Cuming, Esq.*

9. *Linckia bifascialis.* Rays trigonal; back with 4 or 5 rows of irregular convex ossicula at the base, and many at the end of the ray, sides of the ray with 2 broad bands of pores at the base and 1 at the end.

††† *Rays depressed, with a single pore between each dorsal ossicule, and a narrow band of a few pores along each side of the arm.* Acalia.

10. *Linckia pulchella.* Brown, rays flat, nearly 3 times as long

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as the width of the body; the spines near the ambulacra oblong, compressed, truncated.

Inhab. ——.

11. *Linckia intermedia.* Rays elongate, cylindrical, rather tapering at the end, formed of oblong convex ossicula; pore on the back single, on the sides in 2 rows of groups of 3 or 4, the series of spines on the side of the ambulacra separate from it and from one another.

Inhab. ——.

12. *Linckia Erythræa.* Rays elongate, cylindrical; the row of small spines near the ambulacra double in some part of its length.

Inhab. Red Sea. *James Burton, Esq.*

c. *Ambulacra with a series of short filamentous spines, placed in groups of* 4 *or* 5 (1 *group on each ossicule*); *rays formed of series of tubercles with* (1 *or* 2) *small holes between them, and covered with granules.*

* *Rays with only* 1 (*or* 2) *series of small blunt spines on the side of the ambulacral spines.*

25. Fromia, Gray.

Rays 5—8, flat, triangular, formed of flat-topped granular tubercles.

1. *Fromia milleporella.* Asterias Sebæ, *Blainv., Seba, Thesaur,* t. 8. f. *a. b.* Asterias Millepora, *Lam.* Rays flat, pale yellow (dry.).

Var. 1. Rays 6, rather slender; *Var.* 2. rays 7, slenderer; *Var.* 3. larger, 5 or 6-rayed.

Inhab. Isle of France, *Dr. W. E. Leach.* Indian Ocean, *Gen. Hardwicke.* Red Sea. *James Burton, Esq.*

26. Gomophia, Gray.

Rays elongate, cylindrical, tapering, with a terminal tubercle; back with large rounded tubercles; back of the rays with series of large conical convex tubercular spines; the spines near the ambulacra small, crowded.

1. *Gomophia Egyptiaca.* Rays tapering, acute, 4 times as long as the width of the body, with 5 irregular rows of conical acute tubercles.

Inhab. Egypt. *Sir J. G. Wilkinson.*

** *Rays with the series of spines on the side of the ambulacra gradually passing into the granulations which crowd on them.*

27. Nardoa, Gray.

Rays cylindrical, spineless, formed of large granular convex ossicula.

1. *Nardoa variolata.* Asterias variolatus, *Lam.* 36; *Oudart,* t. f. . Pentadactylosaster variolatus, *Linck,* t. 8. f. 10. Linckia variolosa, *Nardo.*

Inhab. Mediterranean Sea.

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2. *Nardoa Agassizii*, Gray. Rays cylindrical, tubercles subequal.
Var. 1. 4-rayed, *Linck*, t. 1. f. 1; *Var.* 2. 6-rayed. *Monstrosity* 1, 7-rayed. *Monstrosity* 2, 3-rayed, with 2 short rays on the opposite side. *Monstrosity* 3, with 1 ray bifid, *Linck*, t. 14. f. 2. 4.
Inhab. Isle of France. *Dr. W. E. Leach.*

3. *Nardoa tuberculata*, Gray. Rays cylindrical, with scattered hemispherical larger tubercles.
Inhab. Island of Luzan, Port of Sual. *H. Cuming, Esq.*

28. Narcissia, Gray.

Body pyramidical, thin, coriaceous, uniformly granular; rays tapering, elongate, triangular on the base, formed of thin flattened ossicula.

1. *Narcissia Teneriffæ.* Rays tapering, elongate, acute, more than 4 times as long as the width of the body.
Inhab. Teneriffe. Brit. Mus.

29. Nectria, Gray.

Body rather pyramidical, coriaceous, scattered with truncated warts, granular at the top; rays roundish, produced, edged with 2 series of flat granular warts on each side, beneath largely granular.

1. *Nectria oculifera.* Asterias oculifera, *Lam.* n. 5; *Oudart*, t. f. .
Inhab. ——. Brit. Mus.

30. Nepanthia, Gray.

Body small, flat; rays very long, cylindrical, tapering, not margined, formed, above and below, of many regular longitudinal and transverse series of flat-topped tubercles, furnished at the top with a series of elongate spine-like granulations.
Intermediate between *Astropectinidæ* and *Cribellinæ*, but the rays are not margined, and the spines at the top of the tubercles are not regularly radiately disposed.

1. *Nepanthia tessellata.* Brown; rays elongate, slender, tapering, with series of square warts.
Inhab. ——. Brit. Mus.

2. *Nepanthia maculata.* Gray with black spots; rays rather depressed, blunt, middle of the back with oblong transverse, and the sides with squarish, warts.
Inhab. Migupou. *H. Cuming, Esq.*

d. *Ambulacra with very fine long hair-like spines placed in rounded groups, with a series of large spines near them.*

31. Mithrodia, Gray.

The rays cylindrical, elongate, spinulose; the skeleton netted with scattered small rugose spines, and series of large clavate spinulose spines regularly articulated to a broad expanded base on the sides of the arms.

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1. *Mithrodia spinulosa.* Asterias clavigera, *Lam.* n. 29? Pentadactylosaster reticulatus, *Linck*, t. 6. and 10. f. 16? Asterias reticulata, *Blainv. Man.*? not *Linn.* nor *Lam.* Arms 5 times as long as the width of the body, with a series of large spines on each side.

The series of spines next to those on the edge of the ambulacra are sometimes hatchet-shaped.

e. *The ambulacra with* 2 *or* 3 *series of equal equidistant filiform blunt spines on each side.*

32. Uniophora, Gray.

Body rather depressed; rays broad, blunt; skeleton formed of series of transverse oblong ossicula, each bearing a large unequal sized subglobular articulated spine placed in longitudinal series; dorsal wart convex, complicated.

1. *Uniophora globifera.* Rays short, broad, rounded with globular tubercles.

Inhab. Van Diemen's Land. *Ronald Gunn, Esq.*

See also Asterias granifera, *Lam.* n. 24.

Fam. 4. Asterinidæ, *Gray, Syn. Mus.* 62.

Body discoidal or pyramidical, sharp-edged; skeleton formed of flattish imbricate plates; dorsal wart single, rarely double.

1. Palmipes, Linck.

Body flat, thin, nearly membranaceous; margin radiately striated; the dorsal ossicula with a radiating tuft, and the oral ones with a transverse line of many thin mobile spines; ambulacral spines in oblique rounded groups.

1. *Palmipes membranaceus, Linck*, t. 1. f. 2. 2. Ast. membranacea, *Retz. and Lam.* Ast. placenta, *Pennant.* Ast. cartilaginea, *Fleming.* Ast. rosacea, *Lam. a broken specimen*?—Rays 5 broad.

Inhab. British Ocean, Plymouth Sound. Mediterranean?

2. *Palmipes Stokesii.* Rays 15, acute. Mus. Mr. Stokes.

See also *Asterias pulvillus*, Muller, Zool. Dan. t. 19. f. 1, 2; *Ast. equestris* and *Ast. militaris*, Muller, of the North Sea; and *Ast. Luna*, Linnæus, from India. All species I have not been able to see.

2. Porania, Gray.

Body pyramidical, thick, five-rayed, skin above and below varnished, spineless; dorsal ossicula irregular; the margin with 2 series of large ossicula, the lower ones produced sharp-edged, and each furnished on the edge with a series of mobile spines; the ambulacra with 2 series of mobile spines, each pair on a separate ossicule; the upper marginal ossicula trigonal, imbricate; the dorsal ones unequal, irregular, the central of the lower marginal ossicula with 4 and the apical ones with a pair of spines.—Allied to *Gymnasteria.*

Porania gibbosa. Asterias gibbosus, *Leach, Brit. Mus.* 1817.

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Ast. Equestris? *Thompson, Mag. Nat. Hist.* ix. 237. Goniaster Templetoni, *Forbes, Wern. Trans.* 1839. 6.

Inhab. Isle of Arran and Plymouth Sound, *Dr. W. E. Leach*, 1817. Isle of Man, Douglas Bay, *J. R. Wallace, Esq.*

2. Asterina, Nardo.

Body rather pyramidical, 5-rayed; the back convex; the oral surface flat; the ossicula of each surface furnished with 1 or more mobile tapering spines; the margin sharp-edged, each of the ossicula with a marginal series of spines; ambulacral spines placed in groups of 4 or 5.

1. *Asterina gibbosa*, Forbes. Asterias gibbosa, *Pennant, B. Z.* iv. 121. n. 6; *Flem. B. A.* 486. Pentaceros plicatus et concavus, *Linck*, 25. t. 3. f. 20. Asteriscus exigua, *Pet. Gaz.* t. 16. f. 8. Ast. minuta, *Linn.*? Ast. stellata obtusa ciliata, *Linn. F. Suec.* 2112. Asterina minuta, *Agassiz*? Asterias pulchella, *Blainv.*? *Faun. Franc.* t. : *Man. Malac.* t. 22. f. 8.

Each of the ossicula of the oral surface with a central pair of mobile tapering spines. Each of the marginal ossicula of the dorsal surface with a pair of spines, of the discal one with many crowded pairs; back with series of distinct pores.

Inhab. Plymouth Sound, *Dr. W. E. Leach.* Ireland, *Linck.* Marseilles, *Dr. W. E. Leach.* Sicily, *W. Swainson, Esq.* Madeira, *Rev. — Bulwer.*

2. *Asterina Burtonii.* Rays elongate, convex, blunt at the end; each of the ossicula of the oral surface with a central group of 3 crowded mobile tapering spines, of the dorsal surface with a crowded group of short tubercles.

Inhab. Red Sea. *James Burton, Esq.*

3. *Asterina minuta.* Asterias minuta, *Linn., Gmelin*? Asterias exigua, *Lam.* n. 43; *Seba*, iii. t. 5. f. 15. 15.

Each of the ossicula of the oral surface with a single spine or a central group of 3 crowded mobile spines; of the dorsal surface granular, with a few very small spicula on the upper edge, and of the margin with a spreading tuft of spines.

Var. 1. Larger, each of the ossicula of the oral surface with 3 spines; *Var.* 2. smaller, each of the ossicula with one and rarely 2 spines. *Monstrosity* 1, rays 4; and 2, rays 6.

Inhab. America, *Linn.* West Indies, St. Vincent's, *Rev. L. Guilding.*

The specimens of the two varieties exactly resemble each other, except in the characters mentioned, and they appear to have been taken at the same time.

4. *Asterina Krausii*, Gray. Olive-green; the centre ossicula of the oral surface spineless, those near the margin with a single central triangular spine; the dorsal ossicula with a series of minute, very short blunt spines.

Inhab. Cape of Good Hope. *Dr. Kraus.*

5. *Asterina Gunnii*, Gray. The central ossicula of the oral surface

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with 1 and the marginal ones with a pair of cylindrical blunt spines; the dorsal ossicula with radiating groups of short cylindrical spinulose spines; body with 6 slightly concave sides.

Var. Body 5-sided. *Var.* or *Monstrosity* with 2 dorsal warts.

Inhab. Van Diemen's Land. *Ronald Gunn, Esq.*

6. *Asterina Calcar.* Asterias Calcar, *Lam.* 17; *Oudart*, t. . f. . All the ossicula of the lower surface with a single central cylindrical blunt spine; the dorsal ones with numerous short tapering spinulose spines; body convex, with 8 rather elongate blunt rays.

Inhab. Van Diemen's Land. *Dr. Lhotsky*, and *Mr. G. B. Sowerby.*

3. Patiria.

The body pyramidical, coriaceous, with five rays; the ossicula of the oral surface with uniform radiating groups of small spines; of the dorsal surface of two kinds, the one crescent-shaped with series of small bundles of spines, the others bearing irregular round bundles of spines between them.

Patiria coccinea. Scarlet, the body 5-rayed, sides concave, the end of the rays rather slender, blunt.

Inhab. Cape of Good Hope.

4. Socomia, Gray.

The body depressed; rays elongate, formed of imbricate plates; the margins broad, the upper and lower series of ossicules being separated by a groove.

Socomia paradoxa. Yellow.

Inhab. ——— ?

XXXIII.—*Some Remarks on the British Species of the Genus* Martes. By T. C. Eyton, Esq., F.L.S.

It has been long, and is now, I believe, a disputed point between the writers on British Mammalia, whether or not two species of Marten exist in the British Isles; thus, Mr. Bell in his excellent 'History of British Quadrupeds' gives them distinct; while, on the other hand, Mr. MacGillivray in the 'Naturalists' Library' is of the opposite opinion. With a view of doing something towards setting this question at rest, I requested several persons living in neighbourhoods where Martens are found to obtain some for me; within a short period I have received four specimens, one of which externally presented all the characteristics of the true Pine Marten, having the bright yellow breast of that species; another agreed with the descriptions of the Common Marten, was larger than the last, and had a white breast. Both of these I had made into skeletons. The other two specimens presented an intermediate character, having the breast slightly tinged with yellowish: I have merely kept the cranium of one of these. I have no hesitation in

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