

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

May 25, 1847.—Harpur Gamble, Esq., M.D., in the Chair.

The following communications were made to the Meeting:—

1. NOTE ON THE EARLY GENERATIVE POWER OF THE GOAT. BY JOHN DAVY, M.D., F.R.S., INSPECTOR-GENERAL OF ARMY HOSPITALS.

In the young salmon, the par, we have the remarkable example, now well-authenticated, of the precocious development of the testes with functional activity. What I have witnessed in the young male goat in this island (Barbadoes) as regards its generative power, is hardly, it appears to me, less remarkable. I shall briefly notice the few circumstances which have come to my knowledge illustrating it; such as I can state with certainty as facts.

On the 2nd of May, 1846, a goat which belongs to me gave birth to two kids, a male and a female. When less than a month old, the former exhibited strongly the sexual propensity. When about five weeks old, the penis was protruded in his attempts to copulate. When four months old the mother was in heat, and was then covered and impregnated by her offspring. Five months after, viz. on the 2nd of February, 1847, she gave birth to four kids—three females, one male, all of the usual size and vigorous. On the 10th of February I had the male kid castrated: each testis was about the size of a French bean. A little transparent fluid was obtained from the vas deferens, which under the microscope, viewed with a high power, exhibited some granules, a few fine fibres, and one that had the appearance of a pretty well-formed spermatozoon. The fluid procured from the incised substance of the testis contained many blood-corpuscles, some dark granules and a few small spermatozoa; these were best seen after having been dried on the glass support.

The young female received the male shortly after the mother, but was not then impregnated.

It is said here that the goat breeds at six months old. It is also said that both male and female are two years in attaining their full size.

The goat of Barbadoes appears to resemble in every respect the common goat of Europe, from whence it is supposed to have been originally brought.

The precocity of the young male, as I have described it, and of the effect of which in its generative power there can be no doubt, as the female had access to no other male, is here not considered extraordinary. Whether the same function at so early an age is exercised in a cooler climate, I am ignorant. Should it be found to be so exercised, it may perhaps be considered a provision of nature to secure the preservation of the species, endangered by the localities

the animal in its wild state inhabits amongst precipitous rocks, subject to the attacks of birds and beasts of prey. In accordance with this idea I may remark, that the young pair of kids when five weeks old, when they began to eat grass freely, kept constantly together, and were more frequently absent from than with the mother. The colostrum and the milk of the goat, I may add, containing an unusual proportion of nutritive matter, as indicated by their specific gravity, may also be considered in accordance with this idea. The colostrum first drawn, I have found of the high specific gravity 1088; it coagulated at about 170° . The milk drawn the following day was of the specific gravity 1041; it formed a soft coagulum at about 182° , and a firm one at about 190° . The milk drawn two days later was of specific gravity 10343. After this it underwent very little change; some drawn a week after was of specific gravity 10333, and some drawn three weeks later was of the same specific gravity.

Barbadoes, April 15th, 1847.

2. DESCRIPTIONS OF SOME NEW GENERA AND SPECIES OF ASTER- RIADÆ. BY JOHN EDWARD GRAY, ESQ., F.R.S. ETC.

In the 'Annals and Magazine of Natural History' for November 1840 I published a monograph of the species of this group then known to me, and divided them into five families and several genera; since that time the British Museum has received numerous specimens further illustrative of those which we then possessed, and many other specimens, several of which are the types of new genera. Some of these I shall proceed to describe in the following communication, intending on a future occasion to send the remainder.

I may remark, that for several years before the publication of that paper, I had been engaged in the study of these animals, with the intention of publishing an illustrated monograph of the order. The preparation of the plates has occupied many years, but I hope it is now in the course of fulfilment.

In the same year in which I published my paper, Professors J. Müller and D. Troschel read at the Berlin Academy a paper on the same subject, and in 1842 they published a 4to work, with the description of various species.

M. Müller has there reduced the number of genera to eighteen, and for these has most unnecessarily changed the generic names, much to the confusion of the science. I do not know why the *Stellonia* of Forbes is not to be used for *Asterias glacialis* and its allies. If the generic name of *Asterias* is to be erased from the list, I do not see in what respect *Asterocanthion* is preferable to either of these names, or why he rejects Link's name of *Pentaceros* for *Oreaster* (he says Cuvier has used *Pentaceros* for a genus of fish, but I do not find this name in any of Cuvier's works; and if it had been so used, Link has the priority over Cuvier), or why *Astrogonium* is preferable to *Goniaster*, or *Asteropsis* to *Gymnasteria*.

The Star-fish have generally been described as having no vent. Colonel Sabine, in figuring *Asterias polaris*, represented a projecting

tube near the middle of the back, and Professor Müller in his 'System' uses the presence or absence of this tube, which he regards as a vent, as a character to separate the class into two divisions; but I think his table of genera shows that this division can scarcely be considered as natural, for he has been obliged to separate species of *Astropecten* from their allies, and to place them, on this single character, in another division of the family. Secondly, it is very difficult to observe the presence or absence of this part, especially in *Astropecten*, on account of the *paxilli*, and some species, which are said to be without it, may have it; for it is to be observed, that Müller and Troschel place the genus in which Sabine first observed the vent, in the family characterized as not having one.

I must consider their work as a retrograde movement, after the publication of my paper, which they quote; for though they might not adopt the genera, yet it cannot but be allowed, that what I have considered as genera are natural groups; and it would have facilitated the making out of the species they have described, if they had used them as sections; they have done so in a few instances (thus after the publication of their paper they have divided the genus *Goniaster* into two, adopting my sections as their genera; but as in the case of *Asterias*, because they have divided it, they blot the names from the system); thus their first section of *Ophidiaster* is the same as my genus, and their second is my genus *Linkia*, and the second section of *Asterocanthion* appears to be my *Tonia*.

It has always appeared to me, that the great advantage of dividing the species into small groups (let us call them genera or sections, as we may) is, that it enables one more accurately to determine and neatly describe and distinguish the species, and prevents the necessity in each description of repeating what has been given as the character of the group, as is the case in the system of Star-fish.

Lastly, I suspect that had M. Müller had the opportunity of examining and comparing the number of specimens of this genus to be found in English collections, he would have come to the same conclusion as I have done with regard to the distinctness of several species which in the work above referred to he has regarded as mere synonyma of some well-known species. At the same time it is remarkable that it should not occur to M. Müller, that when the specimens on which a certain number of species have been established are contained in a single collection, and divided into minute groups, and arranged side by side, it is not so easy to make mistakes in this particular as when the materials are to be collected from various scattered museums; as the differences and the similarities are then more easily to be seen, and any errors which may have been made, more easily discovered.

Thus I am convinced, if he had seen the series of specimens of *Asterias Helianthus* and *Cumingii*, and *A. multiradiata*, which have passed through my hands, and the selection of them in the Museum collection, it is quite impossible that he could have confounded them into a single species. The same may be observed with regard to *Linkia Typus*, *L. Brownii*, *L. bifasciatus* and *L. unifasciatus*; with

Asterina gibbosa and *A. Burtonii*; with *Pentaceros grandis*, *P. gibbus* and *P. reticulatus*; with *P. turritus* and *P. Franklinii*, &c. &c.

CULCITA, Agassiz.

This genus chiefly differs from *Randasia* and *Pentaceros* in having no upper series of marginal ossicules. It agrees with *Randasia* in the back being nearly flat.

CULCITA SCHMIDELIANA. *La?*

A. Schmideliana, Retz. Dis.; *Schmidel's Naturf.* xvi. t. 1. good. *A. discoidea*, Lam.

Body subcircular, flat above when dry (very convex subglobose when alive). The back coriaceous, without any apparent reticulations, covered with scattered, small, conical spines. The oral surface rather convex (when dry), closely and minutely granular, and with larger conical tubercles; those near the ambulacra and oral angles much the largest and ovate.

Inhab. —?

There are distinct indications of the lower marginal ossicules in this species, but they and the ossicules of the oral surface are not sufficiently large and close to force the dry specimen to assume the pentangular form of the following species.

CULCITA PENTANGULARIS. *t262*

Body pentangular; back flat when dry, convex beneath, minutely and closely granulated; back with obscure reticulations, the reticulations armed with small conical tubercles; the interspaces closely and minutely porous. The oral surface protected with distinct well-defined ossicules, defining the lower edge of the margin, covered with close and minute granules and larger round-topped tubercles, those near the ambulacra and the oral angles being largest and highest.

Inhab. Reef of Oomaga.

This species is very distinct from the former, and forms the passage to the genus *Randasia*, but there is a series of concave, minutely porous spaces in place of the upper marginal plates.

RANDASIA, Gray.

Body pentagonal, depressed, minutely granular; back nearly flat, minutely granular, reticulated; reticulations rather tubercular, interspaces sunken (when dry) and covered with very minute close perforations. Dorsal tubercles roundish, single, subcentral. Margins furnished with an upper and lower series of oblong ossicules, the upper one narrower internally, with a central series of tubercles, the lower ones oblong, close together and convex. The oral surface protected by close, regular, squarish, convex ossicules, covered with short crowded granules. The ambulacral spines in rounded groups; the series of tubercles nearest the ambulacra larger, crowded, and placed in groups of three or five, and those in the oral angles largest and flat-topped.

This genus differs from *Pentaceros* in the back being flat, elevated,

and not angular; it is in several respects intermediate between *Culcita* and *Pentaceros*.

RANDASIA GRANULATA, n. s. 6211

Body five-sided; back minutely granular, with roundish convex subconical tubercles in the reticulations; the marginal plates fourteen on each side, the upper ones with a central series of tubercles.

Inhab. Reefs of Attagor, Torres Straits.

There are two specimens of this species in the British Museum, one in a very bad state.

RANDASIA SPINULOSA, n. s.

Body five-sided; back and upper marginal plates covered with numerous small, conical, acute spines, without any larger tubercles; the upper marginal plates indistinct.

Inhab. —?

This species is very like the former in shape, size and appearance, but is very easily known from it by the numerous mobile acute spines with which the back and upper part of the margin are covered, appearing to take the places of the small granulations, and by the absence of the tubercles on the elevated ribs of the back.

ASTERODISCUS.

Body pentagonal, coriaceous, depressed, covered with numerous close, flat-topped, unequal, small tubercles; back convex; dorsal wart roundish, subcentral; arms short, rounded, with a pair of large convex kidney-shaped ossicules on each side of the tip above. Margin simple, rounded, beneath concave; ambulacra with a series of short linear spines, placed in groups of four or five, each group on a separate ossicule, and with two series of larger, blunt, club-shaped spines on the outside of the ambulacral spines. The young specimens have indistinct inferior marginal ossicules.

ASTERODISCUS ELEGANS.

Pale brown when dry; tubercles of the back unequal, the larger ones truncated, those nearest the mouth on the underside larger, club-shaped, rather crowded.

Inhab. —? Brit. Mus.

PENTACEROS GRANULOSUS. 6613

Five-rayed; rays as long as the diameter of the disc, rounded at the tip. Back rather convex. Ossicules convex, rounded, all covered with close rounded granules, the two or three central ones on the top of each ossicule being larger, those on the middle of the back largest and subtubercular. The marginal ossicules convex, rounded.

Inhab. Western Australia.

Young? Arms more slender, and the lower marginal ossicules near the tip of the arm each with a group of two or three spines, the one nearest the tip largest.

The dorsal surface of this species is furnished with abundance of *pedicellaria*, one arising from each hole between the ossicules.

STELLASTER INCEI. L 581

Purplish, minutely granular; back with scattered, conical, convex tubercles, those down the centre of the arm largest. The lower marginal plates are flattish.

Inhab. North Australia.

This species is very like *Stellaster Childreni*, Gray, Ann. and Mag. Nat. Hist. 1840, 278; Müller, Aster. 62. 128. t. 4. f. 3; *Asterias equestris*, Retzius, Diss. 12; but it is purplish when dry; the back is tubercular; the whole surface is minutely granular; while the Japanese species is always white, the back smooth, and the granules of the surface are so minute and thin that they are very easily eroded, and the lower marginal plates are more convex and the central ones much larger than the others.

STELLASTER BELCHERI. L 711

Back convex, with two or three large conical tubercles on the line extending to the centre of the arms. Arms slender, tapering, rather longer than the diameter of the disc.

Inhab. Amboina or New Guinea.

This species is intermediate between *S. Childreni* and *S. Incei*, having the white colour and the slender arms of the former, and the convex back and tubercles of the latter, but the tubercles are larger and fewer, and the arms are more slender, having only a single series of plates between the marginal ones.

There are two specimens in spirits and one dry, in the British Museum collection.

CALLIDERMA.

Body flat, five-sided, rays rather elongated; attenuated end only formed of the marginal plates. Ossicules all minutely granulated; the dorsal ossicules flat-tipped, six-sided, some with a larger, globular, central tubercle-like granule. The marginal ossicules broad, gradually becoming smaller near the tip, short-edged, minutely granular, those of the upper and lower series alternating; the edge of the upper ones with some indistinct spines on the margin, the lower ones with scattered mobile spines on the oral surface. The ossicules of the oral surface three-, four-, or six-sided, granular, with one (rarely two) central, compressed, acute, mobile spines. The ambulacral spines very small, close, fourteen or sixteen on each ossicule, forming a rounder group, with two or three series of large, scattered, mobile, acute spines on the outer side.

This genus resembles *Stellaster*, but differs from it in the oral surface being furnished with scattered spines.

There is a fossil species very like the one here described found in the chalk, and figured in Mr. Dixon's work on the fossils of Worthing, which I propose to call *Calliderma Dixonii*. There are probably several other fossil species from the same locality; they have been referred to the genus *Tosia*, but the ossicules are granular and the oral surface spinose.

CALLIDERMA EMMA. 6 f

Flat, pentangular, the sides concave, the arms elongated, produced, tapering to a fine point, about two-thirds the length of the diameter of the disc. The dorsal ossicules six-sided, regular, flat-topped, covered with minute roundish granules; the central granules of the central ossicules and those down the centre of the arms larger, globular, tubercular-like. The margin sharp-edged, concave in the centre; the ossicules of the upper and lower series alternating, minutely granular, with one or two larger subspinose granules on the middle of the upper margin. Marginal ossicules about fifty on each surface on each side, the lower series with scattered, acute, compressed spines on their oral side.

The ossicules of the oral side four- or six-sided, rather irregular, minutely granular, each armed with a central, compressed, acute, mobile spine.

Inhab. — ?

This species most nearly resembles a fossil found in the chalk, which has hitherto been referred to the genus *Tosia*, and figured in Mr. Dixon's forthcoming work on the fossils of Worthing.

I have named this fine species in compliment to my daughter Mrs. J. P. G. Smith, who before her marriage commenced a series of plates to illustrate a monograph of this genus.

ANTHENEAE.

This genus may be divided into two sections, one having a very large two-lipped pore on each ossiculus of the oral surface; the back netted and chaffy, as in *A. chinensis* and the following new species.

ANTHENEAE TUBERCULOSA. 6 w f 1

Back obscurely netted, rather chaffy, with scattered, long, flat-backed tubercles. Marginal ossicules with some moderate granules, the upper ossicules with one or more large flat-topped tubercles on their upper part.

Inhab. Port Essington.

This species is very like *Anthenea chinensis*, Gray (*Asterias pentagonula*, Lam. ?), but differs from it in being more convex and netted and more distinctly tubercular, and in the upper marginal tessera being armed with tubercles.

Like the Chinese species, all the ossicules, both marginal and discal, of the oral surface, are furnished with large, elongated, two-lipped pores.

The second section contains the following species, which have one or more small two-lipped pores on some of the ossicules of the oral surface; the back subtubercular, and the ossicules all covered with large roundish granules.

ANTHENEAE GRANULIFERA. 6 5 f 2

Both surfaces covered with small roundish granules, the back with

rather convex ossicules; the arms as long as the diameter of the body; back with one or two scattered tubercles.

Var. Back with a blunt tubercle on the centre of each of the ossicules of the middle of the back.

Inhab. — ?

This species is easily known from the former by the smaller granules on the surface, the length of the arms, and the small size of the two-lipped pores; those of the dorsal surface are very minute.

HOSIA SPINULOSA. 2462

Body flat, pentagonal, sides concave; arms not half the length of the diameter of the body; ossicules large, subequal, six-sided, very minutely granular. Marginal ossicules $\frac{10}{10}$ on each side, convex, deeply separated from each other with a series of two or three small, acute, spine-like tubercles in the centre of each. The ossicules of the oral surface flat, minutely granular, with small two-lipped pores.

Inhab. Indian Ocean; Philippines.

This species nearly resembles the shape of *Tosia australis*, but is at once known from that species by the granular ossicules, the spines on the margin, and the two-lipped pores beneath; it differs from *Hosia flavescens* in its being five-sided instead of five-armed, and in having no spines on the middle of the back.

ASTROGONIUM (restricted).

Body pentangular, flat above and below. Back and oral surface protected by triangular ossicules, each covered with numerous erect, cylindrical, truncated tubercles or granules, those of the oral surface longest. Margin strengthened with regular, oblong, four-sided ossicules, covered with small regular granules, except on the most convex part of their centres, those of the upper and lower series opposite each other. Dorsal wart single. Ambulacra with cylindrical truncated spines, in groups of four on each ossiculus of equal size, not forming a rounded group, and with a series of similar, rather larger spines on their side, and a series of small ossicules with terminal granules on their outer sides. Bilabiate slits are on either surface.

Messrs. Müller and Troschel have proposed a genus under this name, which I have here restricted to smaller limits, to more accurately distinguish the species. I have described all we have in the Museum.

A. *Body flat, five-sided; granules short; ossicules flat-topped, not tubercled.*

ASTROGONIUM GRANULARIS. *Asterias granularis*, Retz. Dis.; Müller, Zool. Dan. t. 92. f. 1. 2162

Pentagonal, sides rather concave. Back bright crimson; oral surface yellowish; marginal ossicules oblong, $\frac{14}{14}$ on each side, rather convex, covered, except at the most convex part of the upper and lower surface, with very minute granules. Dorsal ossicules hexagonal, flat-topped, with short flat-topped granules; ossicules of oral surface similar, but granules longer.

Inhab. North Sea. British Museum.

This species is very like *Tosia australis*, but is at once known from it by the granules covering the greater part of the surface of the marginal ossicles.

ASTROGONIUM MILIARE. 6163

Flat, dark red, pentangular; rays rounded at the end, about one-third the length of the diameter of the disc. Margin rounded, ossicles $\frac{20}{20}$ or $\frac{22}{22}$ on each side, covered with uniform, close granules. Dorsal ossicles rather convex, covered with uniform granules.

Inhab. New Zealand.

Like *A. granularis* in form, but the margin is round, and the marginal plates are more numerous.

ASTROGONIUM INÆQUALE. ~~6164~~

Pentagonal, sides rather concave. Arms acute. Dorsal ossicles rather convex, covered with small roundish granules. Marginal ossicles $\frac{8}{8}$ on each side, the two central ones small, narrow; four others large, convex, the two at the tip very small.

Inhab. New Guinea? or Amboina? Capt. Sir E. Belcher.

B. *Back rather convex, the marginal and dorsal ossicles with a small central convexity or rounded tubercle; the granules of the oral surface rather elongate, rounded.*

ASTROGONIUM TUBERCULATUM. 6112

Body pentangular, sides concave; arms rather produced, acute, tapering; the ossicles of the dorsal surface, of the upper and lower marginal series, each furnished with a small, central, rounded tubercle. Marginal ossicles $\frac{28}{28}$ on each side, the dorsal tubercles on the middle of the back and down the centre of each arm rather larger.

Inhab. Port Natal.

C. *Body flat; ossicles of the dorsal, marginal and oral surface entirely covered with rather elongated uniform granules; marginal ossicles small, erect, rounded above.*

ASTROGONIUM PAXILLOSUM. 6111

Blackish (perhaps discoloured). Pentagonal, flat. Arm nearly as long as diameter of disc, rounded at the end. All the ossicles of the back, edge, and oral surface, covered with regular, uniform, rather long, erect granules, forming a level surface; granules of the oral surface longest. The marginal ossicles narrow, erect, rounded above. Ambulacral spines elongate.

Inhab. Port Essington.

This species, from the length of the granules, passes towards the *Astropectens*, the elongated tubercles having much the appearance of those which are called *paxilli* in that genus.

PENTAGONASTER DÜBENI. 6312

Body flat, five-rayed; rays two-thirds the length of the diameter

of the disc, rounded at the end; ossicules all convex, rounded. Marginal ossicules $\frac{1}{10}$, large, round, those near the end of the arms largest and most convex.

Inhab. W. Australia.

This species differs from *P. pulchellus* in the marginal ossicules being more equal, and in the arms being much longer and more slender. The ossicules of the dorsal disc are unequal in size and rather irregularly formed; those near the margin on the middle of the sides are oblong and narrow, those of the oral surface are more regular and not so convex, those near the angles of the mouth being the largest and subtriangular.

I have named this beautiful species in memory (I regret to say) of M. W. Von Düben, who has lately published a very admirable paper on the northern species of this family.

TOSIA, Gray.

The granules between the ossicules are deficient in the dead and washed specimens. It has been thought that the fossil species found in the chalk belonged to this genus, but the surface of the ossicules of most of the specimens I have seen show, from the scars with which their surface is covered, that they were covered with granules, therefore they rather belong to the restricted genus *Astrogonium*.

In some species of this genus the ossicules of the oral disc are more or less entirely covered with crowded, flat-topped granules.

TOSIA GRANDIS. E 3/1

Dorsal ossicules very unequal, flat-topped. Marginal ossicules $\frac{1}{14}$ or $\frac{1}{16}$ on each side, rather convex; the ossicules of the oral surface are furnished with two or three rows of crowded granules, and those near the ambulacra are most covered.

Inhab. Western Australia.

Link, under the name of *P. regularis*, t. 13. f. 22, 23, copied (E. M. t. 96. and *Seba*, iii. t. 8. f. 4) a species like the above, but it has only ten marginal plates. Müller, who thought he examined Link's specimen at Leipsic, describes it as having seven upper and five under marginal plates.

TOSIA AURATA.

Golden yellow. Dorsal ossicules flat-topped, the five in the centre, between the central lines of the arms, largest, and round; the marginal ossicules $\frac{1}{10}$, or $\frac{1}{12}$, rather convex and nearly equal (that nearest the top not being longer than the others); the ossicules of the oral disc, all except a few in the middle of each area, entirely covered with flat-topped granules.

Inhab. Australia. Brit. Mus., three spec.

In others, the ossicules of the oral surface are only edged with a single series of granules, like those of the back.

TOSIA TUBERCULARIS. E 6

Yellow, edges reddish. The dorsal ossicules convex, subtubercular,

those of the centre of the arms highest, those between the arm in the centre largest, nearly flat. The marginal ossicles $\frac{6}{8}$ or $\frac{8}{8}$ on each side, convex, subtubercular, the one near the top of the arm largest and oblong, longitudinal, convex. The ossicles of the oral surface small, each surrounded with a single series of granules.

Var. ? or young ? The ossicles of the oral surface near the edges covered with granules.

Inhab. Swan River.

There is a specimen in the British Museum with six marginal ossicles very like the above, but differing from it in the dorsal ossicles being only convex and rounded ; it has the same convex and large marginal plate.

TOSIA RUBRA.

Red brown. Dorsal ossicles rather convex, rounded. Marginal ossicles $\frac{10}{10}$ on each side, rather convex, equal, that at the tip of the arms smaller, narrow. The ossicles of the oral surface flat-topped, with a single series of marginal granules.

Inhab. Australia.

TOSIA AUSTRALIS, Gray, Ann. Nat. Hist.

Yellowish or reddish. Dorsal ossicles rather convex, rounded. Marginal ossicles $\frac{6}{8}$ on each side, rather convex, equal ; the ossicles of the oral surface flat-topped, with a single series of marginal granules.

Inhab. W. Australia, Swan River.

PETRICIA.

Body convex, five-rayed. Skin above and below varnished and spineless. Back strengthened with numerous, sunken, moderate-sized ossicles ; the margin with two series of larger oblong ossicles, but spineless ; the oral surface with rather regularly disposed smaller ossicles. Ambulacral spines subulate, placed in pairs, with a second series of similar but rather larger spines on the outer side of them.

This genus is very like *Porania*, but the back does not appear to be angular, the margin is edged with spines, and the ambulacral spines are in pairs, and not single as in that genus. The ossicles of the back and oral surface are punctured, and one of them situated near the edge of the back, in the middle space between the arms, is furnished with a linear pore edged with convex lips.

PETRICIA PUNCTATA. E-681

Orange, when dry.

Inhab. the Reef of Attagor. J. B. Jukes, Esq.

There is a single species of this genus in the British Museum collection.

I may here remark, that the specimen of *Porania gibbosa*, the *Asterias gibbosus* of Leach, and *Goniaster Templetoni* of Forbes, in the British Museum from Arran, are exactly like *Asterias pulvillus* of Müller, received from Norway, in the same collection.

PATIRIA.

The upper side, between the angles of the arms, is covered with small, roundish groups of spines.

This genus may be divided into three sections :

1. *Body pentagonal ; the dorsal ossicules lunate, narrow ; the edge of the arms acute.*

PATIRIA COCCINEA, Gray.

Asteriscus coccineus, Müller & Trosch. 43.

The roundish group of spines between the lunate ossicules are very abundant.

2. *Body five-rayed ; rays thick, rounded ; dorsal ossicules lunate, sub-triangular ; arms convex above and rounded on the sides.*

PATIRIA GRANIFERA.

? *Asterias granifera*, Lam. n. 24 ? ; var. à petits grains, Oudart, t.

Brown. Back rather convex. The arms broad, rounded at the end, nearly as long as the diameter of the disc, rounded above, flat beneath ; the lunate dorsal ossicules covered with short, crowded spines, and with only a few small tufts of spines between them, the ossicules of the oral surface each with a transverse line of six or eight spines.

Inhab. — ?

Variety, the arms more slender, about one-third longer than the diameter of the disc.

Inhab. — ? Brit. Mus.

The variety may be a distinct species, but the specimen is not in sufficiently good preservation to determine this point with accuracy.

3. *The body five-rayed, rays thick, rounded ; the dorsal ossicules, especially those at the end of the arms, broad, rounded, the back covered with two or three beaked pedicellaria nearly hiding the tubercles.*

PATIRIA OCELLIFERA.

Asterias ocellifera, Lam. 45 ; Oudart, t. . fig. .

Body five-rayed ; arms thick, rounded, as long as the diameter of the disc, bluntish at the end ; the dorsal ossicules broad, oblong or roundish, reddish, covered with short, crowded spines ; the oral surface with transverse rows of three to five mobile spines.

Inhab. — ?

This species much more nearly resembles Oudart's figure than the species I have described under the name of *Nectria oculifera*.

PATIRIA OBTUSA.

Brown, depressed, five- to six-rayed ; rays depressed, rounded at the end ; dorsal surface with lunate ossicules crowded with short spines ; oral surface with circular groups of crowded spines in the middle of each ossicule.

Inhab. Panama. Sandy mud, six to ten fathoms.

PATIRIA? CRASSA.

Pale yellow (dry), five-rayed; rays thick, rather tapering, about half as long again as the diameter of the disc. Dorsal surface formed of convex, subhemispherical ossicules, covered with crowded minute spines. The oral surface with roundish groups of short, crowded spines, like *paxilli*.

Inhab. W. Australia. Mr. Gould.

PTERASTER CAPENSIS.

Body subpentagonal, swollen, edge very thick, rounded; back convex, reticulated, with rounded groups of very small ossicules at the junction of the reticulations.

Inhab. Cape of Good Hope.

The spines of the ambulacra are like those of *Pteraster militaris*, but they are longer, and the series of webbed spines on their outer margins are scarcely longer than those of the ambulacra, while in the northern species they are much longer and thicker, and there is no appearance of the two long glassy spines at the angle of the mouth, so distinct and peculiar in that species.

GANERIA.

Body flat, five-rayed. Back coriaceous, strengthened with numerous small, linear and curved series of very short cylindrical spines. Margin perpendicular, with two series of narrow ossicules, each armed with a central, erect, linear series of short cylindrical spines. Oral surface covered with diverging spines, one being placed on each ossicule. Ambulacra linear, with two series of tentacles, and edged with subulate spines, two on each ossicule, and with a series of diverging spines at the angles near the mouth.

GANERIA FALKLANDICA.

Body five-rayed; rays as long as the diameter of the disc, rather blunt at the tip.

Inhab. Falkland Islands. Captain Sir James Ross.

3. DESCRIPTION OF A NEW SPECIES OF FULGORA.

BY ARTHUR ADAMS, Esq., R.N.

FULGORA (HOTINUS) SULTANA, Adams and White. *Fulg. thorace superiore et rostro sanguineis; elytris ad basin nigro-fuscis lineis ochreis venosis, ad apicem ochreo-fuscis; alis ad basim intense carmineis, ad angulum analem roseis, ad apicem fuscum quatuor vel quinque maculis rotundatis albis ornatis.*

Rostrum and upper surface of thorax of a rich blood-red colour. The form of the beak intermediate between that of *H. clavatus* of Westwood and *H. pyrorhynchus* of Donovan. Elytra blackish brown at the base, traversed by ochraceous veins, with the tip ochraceous brown. The wings with the base of a deep carmine fading to pale pink towards the anal angle, the tips brown, with four or five roundish white spots. Body above straw-coloured.

Body covered, when alive, with a white mealy substance. Lantern not luminous by day or night. Remains in a torpid state during the heat of the day, and becomes more active in the evening.

Forest of Borneo near Tampasook.

4. SHORT DESCRIPTIONS OF SOME NEW SPECIES OF CRUSTACEA IN THE COLLECTION OF THE BRITISH MUSEUM. BY ADAM WHITE, F.L.S.

Family PARTHENOPIDÆ.

CRYPTOPODIA DORSALIS, White and Adams, n.s.

Carapace narrower and wider than the same part in the *Cryptopodia fornicata*, the greater part of the back covered with slight pustules; on the posterior part of the carapace are two deep grooves placed longitudinally and slightly bent, so as to have a lyre-shaped form; posterior edge of the carapace with coarser and rounder crenations than in *C. fornicata*; the ridges on the chelæ with blunter tubercles.

This distinct and beautiful species of a singular genus was found by Mr. Adams in the Sooloo Sea, where the bottom was stony.

When alive, it is of a dirty flesh-colour, with brown markings and minute black specks; on each chela there is an orange linear spot: under surface of a dead white, on the breast reddish.

Mr. Adams informs me that the species of this genus resemble those of *Calappa* in their habit of simulating death when disturbed, folding the chelæ close to the front of the carapace and concealing their legs under the dilated sides of the carapace. They are always found in deep water, while the *Calappidæ* are found on sandy flats, sometimes buried under the sand.

Family OCYPODIDÆ.

GELASIMUS CRASSIPES, White, Cat. Crust. in Brit. Mus. p. 36.

Carapace very much arched, suddenly narrowed behind; four hind pair of legs thicker and stronger than in other species; front with a lobe, without narrow stalk.

Hab. Philippine Islands (Siquejor). From Mr. Cuming's collection.

GELASIMUS BELLATOR, White, l. c.

Carapace with the fore-part just behind the insertion of eye-peduncles sinuated, the front slightly dilated into a rounded lobe. Larger hand with the fingers very long, the moveable with the sides nearly parallel, two or three larger tubercles on the edge near the base; fixed finger margined on the under side; the cutting edge with a very wide shallow tubercular sinus at base; at the end of sinus beyond the middle a strong wide tooth, which gradually slopes down to the end, which curves up.

Hab. Philippine Islands. From Mr. Cuming's collection.

GELASIMUS CULTRIMANUS, White, l. c. p. 35.

Front between the eyes with a small dilated rounded lobe. Edge

of lower orbit very distinctly crenated; carapace with the upper surface smooth; the lateral edges rounded, without any sharp keel from the outer orbital angle. Larger hand with the fingers wide, both at the end slightly curved outwards, the lower finger with a very wide sinus in the middle; near the end a wide lobe serrato-crenated on the edge; moveable finger with the lower edge nearly quite straight.

Hab. Philippine Islands. From Mr. Cuming's collection.

GELASIMUS PORCELLANUS, White, l. c. p. 36.

Eye-pedicels very long; the frontal portion of carapace not narrowed at base; the hind part of carapace much longer than the side. Lower finger thickened at the end, the inner margins of both fingers with four larger tubercles amongst the small crenules.

Hab. Borneo. Presented by the Lords of the Admiralty.

Family MAIADÆ.

TYCHE, Bell.

TYCHE EMARGINATA, White, l. c. p. 10.

Carapace with the dilated part behind, deeply notched in the middle; the tubercles on the sides of the depressed part with hairs.

The genus *Tyche* was established by Professor Bell in the Zoological Transactions for a species from Panama, which he has described and figured under the name of *T. lamellifrons*. The specimen from which the above brief description is taken is very much mutilated, but is clearly distinct from Mr. Bell's.

Hab. West Indies. British Museum.

Family THELPHUSIDÆ.

VALDIVIA, n. g.

Outer jaw-feet with second joint wider than long; third joint longer than wide, slightly notched at the end. Carapace depressed, rather more rounded in the outline than in *Thelphusa*; the latero-anterior edge with four sharp teeth directed forwards; legs very long, last joint very long, smooth.

This genus is closely allied to *Trichodactylus*.

VALDIVIA SERRATA, White, l. c. p. 31.

Front quite straight; a strong distinct keel from last tooth on side of carapace to hind part; the whole upper surface of carapace and legs is covered with a brownish epidermis.

Hab. —? British Museum.

Family GRAPSIDÆ.

UTICA, White, n. g.

Carapace somewhat eight-angled, tabular, the latero-anterior margin with three teeth; the latero-posterior part of the carapace oblique; carapace behind very straight; behind the middle there is a

very strong transverse ridge. Outer jaw-feet with the third joint on the outside straight, not dilated. Fore-legs small; hind-legs very long; tarsus not particularly dilated, somewhat elongated, fringed with hairs, as is the preceding joint.

This genus, which is shortly characterized above, belongs to the family *Grapsidæ*, being nearly allied to *Trichopus*, De Haan, which is synonymous with *Varuna*, M. Edwards.

UTICA GRACILIPES, White, l. c. p. 43.

Front wide, fore-edge very straight; behind it, and extending to the middle of the carapace, there is a considerable, wide, somewhat three-sided elevation, separated from the transverse ridge by a deep lunated depression, from the ends of which a slight impressed line proceeds to the side of the ridge where it deepens; legs very slender and fringed with hair.

This species is a native of the Philippine Islands, from which it was first brought by Mr. Cuming. He found it in a freshwater rivulet among the mountains of the island of Negros. Mr. Adams found it also in the island of Mindanao, and from his journal has given me the following description, taken from the crustacean when alive:—

“Carapace dark liver-colour; legs reddish brown; under surface dark brown, on the legs with a lighter tinge; abdomen also of a lighter colour, with a yellowish line down the middle. ♀. Frequents the deep, still, muddy freshwater rivers of the island of Mindanao, hiding under weeds and rotten wood. When caught this singular crustacean feigns death, contracting its limbs and rendering them rigid, as if it were in a catalepsy.”

5. DESCRIPTIONS OF SEVERAL NEW SPECIES OF SPONDYLUS. BY
G. B. SOWERBY, JUN.

SPONDYLUS UNICOLOR. *Spond. testâ solidâ, obliquè ovali, rubro-violascente; costis 6 principalibus, squamis crassis, arcuatis; subtùs concavis, paululùm palmatis, propè marginem numerosis; costis interstitialibus spinis crassis, brevibus, arcuatis ornatis; inter costas sulcis nonnullis.*

Hab. —? Mus. M. Grüner; G. B. Sowerby.

SPONDYLUS CUMINGII. *Spond. testâ liberâ, regulari, subrotundatâ, subdepressâ; areâ cardinali parvâ; costis principalibus 6 elevatis, lævibus, squamis subelongatis, lævibus, arcuatis, palmatis, ad latera palmarum undulatim fimbriatis; interstitiis imbricatim striatis; colore fusco rubescente.*

A free-growing species, with short cardinal area, in some degree resembling *S. regius* and *S. imperialis*, but most remarkable for the beautiful manner in which the arched palmated scales are frilled and fluted at the sides.

Hab. —? Mus. H. Cuming.

SPONDYLUS LIMBATUS. *Spond. testâ ovali, crassâ, vix costatâ, squamis depressis, lævibus, palmatis, brevibus, irregularibus, inæ-*

qualibus, 9 ad 11 dispositis; interstitiis minutissimè striatis, cardine magno; colore squamarum croceo, interstitiarum obscure violaceo; intus limbo purpureo.

Hab. Persian Gulf. Mus. Grüner. Brit. Mus.; G. B. Sowerby.

SPONDYLUS SINENSIS. *Spond. testâ lævi, elongato-ovali, areâ cardinali plerumque elongatâ; costis 5 ad 6 principalibus, vix elevatis, squamis lævibus, depressis, palmatis; interstitiis lævibus, costis inæqualibus et squamis minoribus; colore pallidè fulvo, vel roseo, vel albo, prope umbonem fusco variegato.*

Remarkable for the smooth, depressed, palmated, spoon-shaped scales on the five or seven principal ribs, which are repeated in miniature in the interstices.

From China.

SPONDYLUS LINGUA-FELIS. *Spond. testâ ovali, crassâ, areâ cardinali et auriculis magnis; costis numerosis, vix elevatis, spinis brevibus, æqualibus, numerosis armatis; colore fusco, subtùs croceo.*

A much more solid shell than *S. asperrimus*, with the hinge large; the colour is a uniform dark brown, which is shown in the interior by a well-defined border. The shell is covered by nearly equal ribs, which are armed by short, thick, slightly curved prickles.

Hab. —? Mus. M. Grüner.

SPONDYLUS DIGITATUS. *Spond. testâ subrotundatâ, tenui, costatâ; costis 6 ad 9 principalibus, vix elevatis, squamis rectiusculis, arcuatis, ad terminos palmatis, aculeatim divisis; interstitiis spinosis; colore fusco, vel rubro, vel purpureo, ad umbones rubro variegato.*

The peculiarity of this species consists in the beautifully branched and digitated palmations which terminate the erect and arched scales.

Hab. Bermudas; Belcher. Mus. H. Cuming.

SPONDYLUS ASPERRIMUS. *Spond. testâ subrotundatâ; costis numerosis vix elevatis, subæqualibus, aculeis brevibus, erectis, creberrimis, subtùs canaliculatis; interstitiis scabriculis et spinosis, colore valvæ superiori fusco, prope umbonem variegato; valvæ inferiori croceo.*

Hab. —? Mus. H. Cuming.

SPONDYLUS TENUISPINOSUS. *Spond. testâ ovali, tenui, costis principalibus 8 spinis elongatis, tenuibus, erectis, numerosis, spinis interstitialibus minutis; interstitiis minutè imbricatis; laminis valvæ superioris elegantissimè foliaceis; colore pallidè cinereo, prope umbonem rubro variegato, valvæ inferioris albo, prope umbonem flavido rubro radiato.*

This species is distinguished by the thin, sharp, erect, white spines which ornament the numerous ribs. The upper valve is of a pale ashy colour, variegated with red near the umbo, and the under valve is white, with beautifully foliated laminæ and a few graceful spines.

Hab. Australia. Mus. Cuming.



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