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ILLUSTRATED CATALOGUE

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OF THE

MUSEUM OF COMPARATIVE ZOOLOGY,

AT HARVARD COLLEGE.

No. VI.

SUPPLEMENT TO THE OPHIURIDÆ AND ASTROPHYTIDÆ.

BY

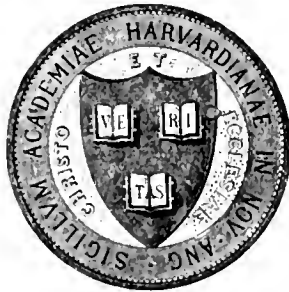
THEODORE LYMAN.

CAMBRIDGE:
PRINTED FOR THE MUSEUM OF COMPARATIVE ZOOLOGY.

1871.

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UNIVERSITY PRESS : WELCH, BIGELOW, & Co.,
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ERRATA.

IN No. I.

| | | | | | |
|------|--|------------|-------------|-------------|-------------------|
| Page | 9, 5th line from bottom, | <i>for</i> | Berthelet | <i>read</i> | Berthelot. |
| “ | 10, 13th “ “ “ | “ | abyssicola | “ | abyssiculum. |
| “ | 12, 5th “ “ top, | “ | isocanthum | “ | isaeanthum. |
| “ | 14, 22d “ “ “ | “ | Asterochema | “ | Asteroschema. |
| “ | 105, 15th “ “ “ | “ | Five arms | “ | Five or six arms. |
| “ | 118, 12th, 14th lines from top, | “ | innermost | “ | outermost. |
| “ | 197, 5th line from top, right column | “ | Asterochema | “ | Asteroschema. |
| “ | “ 7th “ “ “ “ “ | “ | Asteromyx | “ | Asteronyx. |
| “ | 198, 36th, 37th line from top, left column | “ | 52 | “ | 152. |

IN No. VI.

| | | | | | |
|------|------------------------------------|------------|---------------|-------------|---------------|
| Page | 7, 48th line from top | <i>for</i> | grandisquania | <i>read</i> | grandisquama. |
| “ | 8, 10th “ “ “ | “ | bevispina | “ | brevispina. |
| “ | 8, 30th “ “ “ | “ | Michlin | “ | Michelin. |
| “ | (18) Description Plates, figs. 1-6 | “ | Ophyoglypha | “ | Ophioglypha. |



IN the six years that have passed since the publication of the first number of this Catalogue, which treated of Ophiuridæ and Astrophytidæ, our knowledge of these families has considerably increased. Many new species have been discovered, among which the singular forms, brought up by the deep-sea dredgings off Florida, and described in Bulletin No. 10, Vol. I., are of particular interest. In the present Supplement to the Catalogue, figures are given of the most important of these deep-sea Ophiurans; and there are added descriptions of one new genus and of five new species from shallow water. There are given, also, lists of the principal authors, and of the new species described by them, since 1865, making a continuation of similar lists published in Catalogue No. I.

LOUIS AGASSIZ.

October 10, 1871.

PRINCIPAL AUTHORS

SINCE THE PUBLICATION OF CATALOGUE No. I, IN MARCH, 1865.

To which are added some publications not before included. The new species are mentioned with each author.

- BRADY & ROBERTSON. Ann. and Magazine of Nat. Hist., III. p. 355.
A notice of *Ophianoplus annulosus*, Sars, from W. Coast of Ireland.
- DUCHASSAING, P. Animaux Radiaires des Antilles. 1850, p. 4.
Ophioderma variegata. (= *O. brevicauda* Ltk. ?)
" saxatilis. (= Young of *O. cinerea* ?)
Ophiolepis annulosa. M. T. (No such thing there.)
" trisquamosa.
" vicina.
" albida.
" Tancredi.
Ophiocoma scolopendrina. M. T. (No such thing there.)
" serpentaria. M. T. (= *O. echinata* Agass.)
" crassispina. M. T. (= " " "
" punctata (= *O. pumila* Ltk. ?)
Ophiarachna gorgonia. M. T. (No such thing there.)
Ophiothrix fragilis. M. T. (No such thing there.)
" quinquefissa. (= *O. orstedii* Ltk. ?)
Ophiura hexactinia. Lmk. (No such thing there.)
Euryale costosum. } (= *Astrophyton costosum* Seba. ?)
" muricatum. }
- Trichaster** Isis (= *Asterorporpa*, Ltk. ? vel *Astrogomphus* Lym. ?)
- I never saw this little pamphlet till recently, and it seems also to have escaped Dr. Lütken's notice. It antedates his descriptions of West Indian Ophiurans by several years; but the short Latin descriptions are so incomprehensible and so vague that I do not think they can be accepted as a basis for priority.
- DUJARDIN ET HUPÉ. Histoire Naturelle des Zoöphytes. 1862.
Astroporpa dasycladia. (= *Astroporpa annulata*.)
Astroschema affinis. (Good sp. ?)
- GRUBE, A. E. Über einige seltene oder neue Ophiuriden. Verhand. der Schlesischen Gessellschaft. 1867, p. 22.
Astrophyton levipelle. (= *A. asperum* ?)
Ophiolepis adspersa.
Ophiothrix melanostica.
" roseo-ceruleans.
" striolata.
- Zeitschrift für die Gesammten Naturwissenschaften, XXX. 1867.
Die Insel Lussin und ihre Meeresfauna. 1864.
- HELLER, C. Zoophyten und Echinodermen des Adriatischen Meeres. 1868.
Pectinura Forbesii. Lissa, p. 57.
Ophioglypha Grubei. (= *O. albida* ?) Lesina, p. 58.
Ophiothrix alopecurus. M. T. He considers different from *O. fragilis*. p. 63.
- HERKLOTS, J. A. Echinodermes de Kuhl, van Hasselt et Sal. Müller. Bydragen tot de Dierkunde. 1869.
Colored drawings of *Ophiomastix annulosa*, *Ophiolepis annulosa*, *Ophioplocus imbricatus*, *Ophiocoma pieta*, *Ophiarachna incrassata*, *Ophiothrix longipeda*, *Ophiothrix serrata*, K. & v. Has. Good colors, but no details.

- LIUNGMAN, AXEL.** Om några nya arter af Ophiurider. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. 1866. No. 6.
- Ophiogymna.** Gen. nov.
- Ophiogymna elegans.** Singapore, Hong Kong. p. 163.
- Ophiothrix clypeata.** Singapore. p. 163.
- Ophiactis megalanica.** Straits of Magellan. p. 164.
- " *fragilis.* Hawaii. p. 164.
- Ophiophragmus Loveni.** Rio Janeiro. p. 165.
- Amphipholis.** Gen. nov. (*Amphiura* pars.) p. 165. See Bulletin Mus. Comp. Zool., No. 10, Vol. I. p. 335.
- Amphipholis Januarii.** Rio Janeiro. p. 165.
- Ophioglypha Kimbergi.** Sidney, N. H. p. 166.
- Ophiuroidea** *Viventia huc usque cognita.* Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. 1866. No. 9.
- Ophiarachna stellata.** Singapore. p. 305.
- " *spinosa.* (= *Ophiopoeza fallax* ? See Ltk. Addit. III. 36.) Fona Is. p. 305.
- Ophioglypha multispina.** Sidney. p. 307.
- " *Tenori.* Mediterranean (*Ophiura*, Delle Chiaje). p. 308.
- Ophiopus.** Gen. nov.
- " *actiens.* Spitzbergen. p. 309.
- Ophionereis squamata.** Honolulu. p. 310.
- " *crassispina.* Honolulu. p. 311. (See Bulletin Mus. Comp. Zool., Vol. I., No. 10, p. 312, note.)
- Amphipholis** (vel *Amphiura*) *depressa.* Deep sea between Batavia and Singapore. p. 312.
- " " " *integra.* Port Natal, S. Af. p. 313.
- " " " *hastata.* Mozambique. p. 313.
- " " " *grisea.* Gulf of Guayaquil. p. 313.
- " " " *impressa.* Deep sea between Batavia and Singapore. p. 314.
- " " " *albida.* (= *A. Januarii* ?) Rio Janeiro. p. 314.
- " " " *subtilis.* (= *A. Januarii* ?) Rio Janeiro. p. 314.
- " " " *lobata.* Near Sidney, N. H. p. 314.
- Ophiophragmus antarcticus.** " In fretu Magalhaensi." p. 315.
- " *gibbosus.* Port Natal, S. Af. p. 316.
- " *echinatus.* Sea between Batavia and Singapore. p. 316.
- Amphiura** *divaricata.* Deep sea between Batavia and Singapore. p. 318.
- " *Eugenie.* Atlantic, opposite river La Plata. p. 318.
- " *candida.* Near Mozambique. p. 318.
- " *complanata.* Atlantic, off Rio Janeiro. p. 319.
- " *crassipes.* " " " p. 319.
- " *flexuosa.* Near Brazil. p. 319.
- " *verticillata.* Galapagos Islands. p. 320.
- " *capensis.* Near Port Natal and Cape of Good Hope. p. 320.
- " *magellanica.* Straits of Magellan. p. 320.
- " *latispina.* Atlantic, off river La Plata. p. 320.
- " *atlantica.* Near St. Helena. p. 321.
- Ophiocentrus.** Gen. nov.
- " *aculeatus.* Deep sea between Batavia and Singapore. p. 321.
- Amphilepis.** Gen. nov.
- " *norvegica.* Norway. p. 322.
- Hemipholis affinis** (*H. gracilis* Vll.) Guayaquil. p. 322.
- Ophiactis** (?) *Savignyi* (*Ophiolepis* M. T.) Egypt. p. 323.
- " *carnea.* Port Natal, S. Af. p. 324.
- Ophiacantha indica.** Deep sea between Batavia and Singapore. p. 326.
- Ophioscolex purpurea.** Düben and Koren, Norway. p. 327.
- Ophiocnemis obscura.** Straits of Malacca. p. 333.
- Tillägg till kännelomen af Skandinavians Ophiurider.** Öfvers. af K. Vet.-Akad. Förh. 1864. No. 7, with a plate.
- Ophiocten sericeum** Ljn. (= *Ophiura sericea* Forbes. = *Ophiocten Kroyeri* Ltk) p. 360.
- Amphiura tenuispina.** (= *Amphiura squamata*, var. ?) p. 360.
- " *norvegica.* Norway. p. 363.

- LJUNGMAN, AXEL. *Ophiactis clavigera*. S. Norway. p. 365.
Om tvänne nya arter Ophiurider. Öfversigt af Kongl. Vetenskaps Akademiens Förhandlingar. 1870. No. 5.
- Ophiacantha vivipara*. Atlantic, near E. Patagonia. p. 471.
Ophioglypha Lymani. " " " p. 472.
- LORENZ, J. R. *Physikalische Verhältnisse, etc. der Organismen in quarnerischen Golfe.*
- LÜTKEN, C. F. *Additamenta ad Historiam Ophiuridarum.* Part III. 1869, from the Vidensk. Selsk. Skr.
- Ophionepthys*. Gen. nov.
Ophionepthys limicola. St. Thomas. p. 98.
Ophionema. Gen. nov.
Ophionema intricata. St. Thomas. p. 98.
Amphipholis fissa. Amur. p. 98.
Ophiocoonis. Gen. nov. (= *Pectinura* Heller.) (*O. Forbesii*.) p. 98.
Ophiopsammus. Gen. nov. (= *Ohiopeza* Yoldii.) p. 98.
Ophiochæta. Gen. nov.
Ophiochæta setosa. Feejee Islands. p. 98.
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Ophiomastix mixta. Samoa Islands. p. 99.
" *asperula*. Feejee Islands. p. 99.
" *caryophyllata*. Feejee Islands. p. 99.
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Ophiacantha pentactrinus. (= *O. meridionalis* Lym.) W. Indies, deep sea. p. 99.
Ophiothrix striolata. Grube. New Guinea and China Sea. p. 99.
" *elegans*. China Sea. p. 100.
" *trilineata*. Samoa Island. p. 100.
" *capensis*. Cape of Good Hope. p. 100.
- Asteromorpha*. (Gen. nov.)
Asteromorpha Steenstrupii. Unknown. p. 100.
- LYMAN, THEODORE. *Preliminary Report on Ophiuridæ and Astrophytidæ dredged in deep water between Cuba and the Florida Reef, by L. F. de Pourtales.* Bulletin Mus. Comp. Zool., Vol. I, No. 13. Nov., 1869.
- Ophioglypha acervata*. (Illustr. Cat., No. VI., Pl. I., fig. 6.) p. 316.
" *falcifera*. (" " " Pl. I., figs. 3, 4, 5.) p. 319.
Ophiocten depressum. (" " " Pl. II., fig. 10.) p. 320.
Ophiomusium. Gen. nov.
Ophiomusium eburneum. (Illustr. Cat., No. VI., Pl. II., figs. 1, 2, 3.) p. 322.
Ophiacantha pentactrinus Ltk. (= *O. meridionalis* Lym.) p. 324.
Ophiomitra. Gen. nov.
Ophiomitra valida. (Illustr. Cat., No. VI., Pl. II., figs. 4, 5, 6.) p. 325.
" *sertata*. p. 326.
Ophiochondrus. Gen. nov.
Ophiochondrus convolutus. (Illustr. Cat., No. VI., Pl. II., fig. 7.) p. 328.
Ophiactis humilis. p. 329.
" *plana*. p. 330.
" *loricata*. p. 331.
- Amphiura semiermis*. p. 332.
" *grandisquamia*. p. 334.
" *pulehella*. p. 337.
- Ophiocnida olivacea*. (Illustr. Cat., No. VI., Pl. I., fig. 7, 8.) p. 340.
Ophiothamnus. Gen. nov.
Ophiothamnus vicarius. (Illustr. Cat., No. VI., Pl. II., figs. 8, 9.) p. 342.
Ophiomyces. Gen. nov.
Ophiomyces mirabilis. p. 343.
" *frutescens*. (Illustr. Cat., No. VI., Pl. II., figs. 11, 12, 13.) p. 345.
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Ophiocreas lumbricus. (Illustr. Cat., No. VI., Pl. I., figs. 19, 20, 21.) p. 347.
Astrophyton mucronatum. p. 348.
Astrogomphus. Gen. nov.
Astrogomphus vallatus. (Illustr. Cat., No. VI., Pl. I., figs. 16, 17, 18.) p. 350.
- Illustrated Catalogue of the Museum of Comparative Zoölogy. No. VI. Supplement to the Ophiuridæ and Astrophytidæ. 1871. Two plates.
- Ophiomaza*. Gen. nov.
Ophiomaza cacaotica. Zanzibar.

- LYMAN, THEODORE. **Ophiothela tigris**. Unknown.
Ophiocnida Putnami. Hong Kong (?).
Ophioglypha sinensis. " " "
Ophiomastix jannalis. Mexillones, Bolivia.
- The two plates give also figures of the chief species from the deep-sea Florida dredgings.
- MARTENS, E. v. Die Ophiuriden des indischen Oceans. Wiegmann's Archiv für Naturg. XXXVI. p. 244. 1870.
Ophiactis maculosa. South China Sea. p. 248.
" *incisa*. Singapore, Java, China Sea. p. 249.
Ophiomyxa bevis-pina. Amboina. p. 249.
Ophiocoma alternans. S. W. Java. p. 252.
" *ternispina*. Larentuka, Flores Is. p. 253.
Ophiothrix carinata. Singapore. p. 255.
" *punctolimbata*. Java. p. 257.
" *rotata*. Mindanno. p. 259.
" *cutaphracta*. Singapore. p. 260.
" *triloba*. Red Sea. p. 260.
- Ueber Ostasiatische Echinodermen. Wiegmann's Archiv für Naturg. XXXII. 1866. p. 87.
Trichaster flagellifer. (= *T. palmiferus* ?)
- Monatsbericht der Kön. Akad. Berlin. 1867. p. 345 and 481.
[**Ophiocoma ocellata**.] (= *Ophiarachna incrassata* M. T.) Cape York, N. Australia. p. 345.
Ophiothrix purpurea. Amboina. p. 346.
" *viridiabilis*. China Sea. p. 347.
Amphiura planispina. Rio Janeiro. p. 347.
Hemieuryale. Gen. nov.
Hemieuryale pustulata. West Indies ?? p. 484.
- MECZENIKOFF. Bullet. Acad. Imper. St. Petersburg. XIII. p. 285; also, Mem. Acad. Imper. St. Petersburg. XIV. No. 8. On the anatomy and metamorphosis of *Amphiura squamata*.
- MICHELIN, H. In Annexe to Notes sur l'île de la Renneion. *Astroschema Rousseaui*.
- NORDMAN. Notiz über die Gattung *Asterophyton* vorkommend in der Littoralfauna Russlands. Öfversigt af finska Vetenskaps-Societeten's förhandlingar. IV. 1856-57.
- NORMAN, A. M. On the Morphology of Ophiurans. Rep. British Assoc. 1863.
- PACKARD, A. Memoires Boston Soc. Nat. Hist. Vol. 1, Part 2, 1867. See also Canadian Naturalist and Geologist. 1863.
- SARS, M. Over det dyriske Livs Umbredning in Havets Dybder. Vidensk.-Selsk. Forhandlingar. 1868. p. 8.
Om Artiske Dyreformer in Christianiafjord. Christiania Videnskab. Selsk. Forhandl. 1865.
- SARS, G. O. Nye Echinodermter fra den Norske Kyst. Vidensk.-Selsk. 1871. p. 6.
Ophiacantha abyssicola. Lofoten Is., 120-300 fathoms.
" *spectabilis*. Bodoe (Norway), 80-100 fath.
" *anomala*. Sultenfjord, near Bodoe, 150-200 fath.
Ophiopeltis borealis. Lofoten Is. and Bodoe, 80-300 fath.
Ophioglypha gracilis. " " " 150-300 fath. Bay of Christiania. 100-120.
- SCHWALBE. Archiv. für mikrosk. Anatomie. V. Notice of the muscles of *Ophiothrix fragilis*.
- TSCHERNIAWSKY. Protocollen der Moskauer Naturf. Versammlung. 1869. *Amphiura Stepanovii*. Black Sea. The only echinoderm found in those waters.
- VERRILL, A. E. On the Polyps and Echinoderms of New England. Proceed. Boston Soc. Nat. Hist., X., p. 333. 1865.
Descriptions of Star-fishes and Ophiurans from the Atlantic coasts of America and Africa. Amer. Journ. Sc. Vol. II. 1871.
Amphipholis abdita (specimen with no disk). Near New Haven. p. 4.
Notes on Radiata. Trans. Connecticut Academy Arts and Sc., Vol. I., p. 251. March, 1867.
July, 1867, pp. 325, 341. Feb., 1868, p. 366. April, 1868, p. 372. Jan., 1871, p. 572.
Astrophyton panamense. Panama and Pearl Is. p. 251.
Ophiura Daniana. La Union, San Salvador. p. 254.
Hemipholis gracilis. (= *H. affinis* Ijn.) Panama. p. 262.
Ophiothela. Gen. (subgen.) nov.
Ophiothela mirabilis. Pearl Is., Panama Bay. p. 268.
- On new and imperfectly known Echinoderms. Proceed. Boston Soc. Nat. Hist., XII., p. 381. 1869, p. 387.
Astrophyton Stimpsonii. Ochotsk. p. 388.
Ophiarachna maculata. New Zealand. p. 389.
Ophiothela Danae. Feejee Islands. p. 391.

DESCRIPTION OF NEW SPECIES.

OPIIOMAZA.* GEN. NOV.

Teeth. Tooth-papillæ numerous, and arranged in a close vertical oval, as in *Ophiothrix*. No mouth-papillæ. Disk below naked, but covered above with large, swollen radial-shields and plates. Arm-spines stout, nearly smooth, as in *Ophiocomus*.

This curious genus has the dentition of *Ophiothrix*, the disk of *Ophiocnemis*, and the arms of *Ophiocomus*.

Ophiomaza cacaotica. SP. NOV.

Plate I., fig. 15.

Special Marks.—Five, sometimes six arm-spines, the two or three upper ones considerably largest. No tentacle-scale. Interbrachial plates on back of disk elongated and irregularly broken.

Description of a Specimen.—Diameter of disk, 11^{mm}; from outer side of mouth-shield to outer corner of opposite mouth-slit, 4.2^{mm}; distance from outer side of mouth-shield to inner points of tooth-papillæ, compared to that between outer corners of mouth-slits, 2.5 : 2. Width of arm, 2^{mm}; length of arm about 30^{mm}; tooth-papillæ small and crowded, about 26 to each angle of the mouth; four strong, square-edged teeth. Under arm-plates, beyond edge of disk, broader than long; their laterals and inner side slightly re-enteringly curved; outer side slightly curved; length to breadth (6th plate), 9 : 1.2. Within the disk there are six plates, of which the one next the mouth-slit is small and oval; those outside of it grow gradually broader and are shaped like those beyond the disk; side arm-plates stout, but not much projecting; upper arm-plates broader than long, somewhat irregular, broader without than within, outer side curved; length to breadth (8th plate), .9 : 1.6. The first two or three plates are narrow and wedge-shaped and fit in a notch in the disk; beyond the margin they grow wider, and have their

* **Ophis*, serpent; *μάζα*, a cake.

full width at the 7th or 8th plate; disk naked below and covered by thick, wrinkled skin; radial shields very large, pear-seed shape, length, to breadth, 4 : 2.5, separated by a band of three or four elongated, narrow, broken, and irregular plates, which come to the edge of the disk, and are continuous with the upper arm-plates. Interbrachial spaces covered by plates similar in form to those between radial-shields, but wider; in the centre, a rosette of small, very irregular pieces, one in the middle, and five close around it. The edge of the disk has a row of stout, swollen plates, three to five in each interbrachial space, of which one is opposite the radial-shield on either side, and from one to three are opposite the interbrachial plates. Arm-spines usually five sometimes six; the two or three upper ones much the longest; all stout, tapering, blunt, cylindrical; lengths, to that of the upper arm-plate (7th joint), 2.2, 2, 1.6, 1, 1, .5 : .9. Near end of arm, three or four spines, of which the under one is much swollen at the base, and slightly hooked at the end. Color, in alcohol: deep chocolate. Zam-zibar, collected by Mr. Cooke.

Ophiothela tigris. Sp. nov.

Plate I. figs. 10, 11, 12.

Special Marks. — Back of disk completely covered by the radial-shields, which are quite smooth, as are also the interbrachial spaces below. Five arms.

Description of a Specimen. — Diameter of disk, 7^{mm}; length of arm (which had been repaired), 12^{mm}; from outer corner of mouth-slit to outer edge of opposite mouth-shield, 3^{mm}; width of arm, including side arm-plates, 2^{mm}; distance from outer corner of mouth-shield to points of tooth-papillæ, to that between outer corners of mouth-slits, 1.6 : 1.5. Tooth-papillæ arranged in a close, vertical, oval clump; about fifteen in number; four stout, flattened, squarish teeth, which with the tooth-papillæ form a dentition like that in *Ophiothrix* (a generic character); mouth-shields irregular, sometimes in form only of a small swelling; but, when clearly defined, having an oval heart-shape, with outer side straight, and with length to breadth, .5 : 1. Side mouth-shields large and conspicuous; their free lateral sides re-enteringly curved; their inner laterals joined along their whole length; their inner sides making together a wide curve; under arm-plates covered with thick skin and seen indistinctly, except when dry. They have an irregular triangular form, with a peak within and a lumpy surface. They cover only a part of the arm, and differ in figure one from another. Side arm-plates

standing out independently, as pad-like ridges (a generic character), which are stout and swelled; upper arm-plates represented by a double row of irregular elongated warts, which just at the base of the arm are increased in number, so as to form a clump of different-sized pieces. At the tapering end of the arm there are still the two warts at the base of each joint, and between these a double row of fine grains. Disk wholly covered above by the ten great radial shields, which are regular, slightly swelled, and smooth; at the insertion of the arm and in the interbrachial space they form a slight notch or re-entering angle. Interbrachial spaces below covered with thick skin, without spines or scales; genital-slits with a large prominent scale at their outer end, whose edge can be seen from above. Arm-spines like little stumps, thorny at their ends; towards the end of the arm they become more flattened, and the three lowest ones are armed with three or four flattened hooks. The first joint outside the mouth-shield has two or three spines on each side; the second three, and the rest four. Color, in alcohol: upper surface lined and marbled with dark green and light yellow, interbrachial spaces below dark green; under surface light greenish.

Another specimen had a disk of 5.5^{mm}, and arms of 18^{mm}. The mouth-shields were all regular, except the madreporic, which was swelled. The back of the disk had a central pentagon of marbled bluish and yellow, surrounded by a band of yellowish. The animal doubtless has the power of *moving* the side arm-plates, which in this specimen were folded close on the arm.

Locality unknown, but supposed to have been brought from the Pacific by the Exploring Expedition.

Ophiocnida Putnami.* Sp. nov.

Plate I., fig. 9.

Special Marks. — Nine or ten flat arm-spines, the upper ones with broad ends; they closely cover the arm, as if with grains of rice regularly set in rows. Disk beset with similar, but smaller spines. Two swelled papillæ at the apex of the mouth-angle. Two tentacle-scales.

Description of the Specimen. — Diameter of disk, 16^{mm}. Width of arm, 2.5^{mm}; length of arm about 72^{mm}. From outer side of mouth-shield to outer corner of opposite mouth-slit, 4.8^{mm}; distance from outer corner

* Named after the late Captain W. H. A. Putnam, a man of a fine taste in natural history, and who enriched this Museum with remarkable collections made during his sea voyages.

of mouth-slit to inner point of mouth-papillæ, to that between outer corners of mouth-slits, 2.2 : 2.4 ; mouth-shields small, rounded, narrower without, length to breadth, 1.1 : .8 ; side mouth-shields small and not meeting within ; two large swelled mouth-papillæ at the inner apex of the angle ; they are pressed close together and present a re-entering grinding surface ; above, and partly covered by them, a swollen irregular tooth, followed by three more which are squeezed together and more or less thickened ; above these again are four flat, square-edged teeth separated from each other, the uppermost are longest. Outside each mouth-papilla stands the thick, club-like tentacle-scale of the first mouth-tentacle ; above which, and nearly hidden in the mouth-slit, is the tooth-like scale of the second mouth-tentacle. Under arm-plates small, nearly square, with slightly re-entering sides ; length to breadth (9th plate), .8 : .8. Upper arm-plates small, nearly round, but farther out on the arm, the inner side is straight ; length to breadth (12th plate), .8 : .9. Arm-spines 9 (near base of arm 10), white, flattened, upper ones broadened towards the end, like a narrow spatula ; lowest one broadest and stoutest, next two or three above it narrower than the rest ; length of uppermost, .8^{mm} ; 7th, 1.2^{mm} ; lowest, 1^{mm} towards point of arm. 5 or 6 spines which are flat and taper to a blunt point. No tentacle-scales ; tentacles large and long. Disk puffy and lobed, covered above and below with fine, regular scales, about 60 to a square ^{mm} ; beset above and below with numerous stout, flattened, spines, .8^{mm} long, and resembling the arm-spines. Radial-shields small, inclining to crescent-shape, separated and standing just over base of arm ; length to breadth, 2.6 : 1. Color, in alcohol : disk gray ; arms straw color.

Collected, almost without doubt, at Hong Kong, by Captain W. H. A. Putnam.

This handsome species is an *Amphiroa* with a thorny disk ; and I therefore place it in *Ophiocnida*, as an approximation to its natural position, without asserting that its affinities are thus exactly expressed. See Bulletin of the Mus. Comp. Zool., Vol. I. p. 335.

Ophioglypha sinensis. Sp. nov.

Plate I., figs. 1, 2.

Special Marks. — A pit or depression between the side arm-plates, on the under side of the joints within the disk (as in *O. lucertosa*). Only one tentacle-scale on most of the pores beyond the disk. An arm-comb along the edge of the radial-scale, but none on the arm itself.

Description of a Specimen. — Diameter of disk, 9^{mm} ; from outer corner of mouth-slit to outer side of opposite mouth-shield, 4.2^{mm} ; distance from outer side of mouth-shield to point of innermost mouth-papilla, to that between outer corners of mouth-slits, $2:2$; width of arm, 1.4^{mm} . Mouth-papillæ, six to each angle, whereof the two outer ones on each side are thin and triangular, and the innermost is stouter and more elongated, approaching the form of the teeth, which are four in number, stout, and formed like a blunt spear-head. Mouth-shields large, "lyre-shaped," that is to say, bounded by a curve without, an angle within, and by re-entering curves on the sides; so that the inner corners, at the heads of the genital-slits, make little peaks; length to breadth, $1.7:1$. Side mouth-shields very narrow, meeting within, and running along inner angle of mouth-shield to its corner, where they run across the head of the genital-slit to the side arm-plate. Under arm-plates small, much wider than long, with an angle within and a curve without. This is their general form, except that the first two or three are squeezed laterally; length to breadth (8th plate), $.2:.5$, a little way out they become very minute. Side arm-plates large, meeting below along a line longer than the under arm-plate; those within the disk are indented at their juncture, making a little pit. They make a re-entering curve where the tentacle-scale is fixed, and at little peak between it and the under arm-plate. Upper arm-plates strongly arched, wider without than within; bounded by straight lines on the sides and by a curve without; length to breadth (8th plate), $.6:.8$. Disk covered with larger and smaller irregular scales, among which may be seen the larger, round, primary plates. Radial-shields pear-seed shape, nearly or quite touching without; length to breadth, $1.3:1$. Radial-scales carrying a close comb of rounded tapering papillæ, in form like the arm-spines, which grow smaller as they pass below the disk and end in a row of fine grains, midway the genital-slit. Arm-spines, three, slender, rounded, regularly tapering, not quite so long as the joint; length to that of under arm-plate (8th joint), $.8, .7, .7:.2$. Tentacle-scales thin and nearly round. On the first pair of great pores, three or four on each side; on the second and third, three on one side and two on the other; on the fourth, two on one side and one on the other. The next four or five pores have one large scale, and a very small one, which last stands on the side arm-plate. Color, in alcohol: straw yellow.

Collected, almost without doubt, at Hong Kong, by Captain W. H. A. Putnam.

Variations. — All the specimens had broken arms, but by their character they had probably about the proportions of *O. Sarsii*, say a length of three or four times the diameter of the disk. There were two specimens in which the side mouth-shields were broader; the pits on

the under side of the base of the arm, little marked or wanting, and no little peak in the under arm-plate next the tentacle-scale. Perhaps another species, perhaps only a variety.

O. sinensis looks a good deal like *O. laevifosa* of Europe, but is distinguished by wanting the additional comb of papillæ on the base of the arm, and in having fewer tentacle-scales.

Ophiomastix janualis. Sp. nov.

Plate I., figs. 13, 14.

Special Marks.—Disk-scales conspicuous below, but obscured by thick skin on the upper surface of disk, which is beset with sharp tapering spines; but none below. Three round tapering arm-spines, the uppermost longest.

Diameter of disk, 5.5^{mm}; arm nearly cylindrical, 1.2^{mm} wide; very slowly tapering to a length of 24^{mm}, where it is broken off. From outer corner of mouth-slit to outer side of opposite mouth-shield, 2.5^{mm}; distance from outer side of mouth-shield to inner points of tooth-papillæ, to that between outer corners of mouth-slits, 1.2 : 1.5. Tooth-papillæ four, arranged in a close clump, directly below the teeth, which are as in *Ophiocoma*. Mouth-papillæ, 8, arranged in a close half-circle round the mouth-angle; outer ones flat, rounded, as long as broad; inner ones narrower and smaller. Mouth-shields longer than broad, narrower within than without, angles rounded; length to breadth, .9 : .6. Side mouth-shields triangular, lying along the sides of the mouth-shields, but not meeting within. Under arm-plates wider without than within, with a little peak without, and their sides a little re-enteringly curved; length to breadth (6th joint), .6 : .5. Farther out, the plates become more elongated, with a clean curve without, re-entering sides, and a truncated angle within. Side arm-plates projecting but slightly; at base of arm they meet neither above nor below, but, at the 11th upper arm-plate, they meet above. Upper arm-plates wedge-shaped, with a curved outer side, and laterals re-enteringly curved; length to breadth (6th plate), .7 : .6. Disk finely scaled in the interbrachial spaces below, each about $\frac{1}{8}$ ^{mm} long; above the scaling is covered except near the edge, round the radial-shields, and at the base of the arm, to which it extends. Scattered over the upper surface are a few sharp spines, 1.5^{mm} long, which are mounted on slight elevations and stand over the places of the primary plates. The radial-shields project close to the arm as little, irregular, triangular, swellings about .7^{mm} long. Arm-spines three, rounded, slightly tapering, blunt;

under a lens, finely grooved; lengths (5th joint). 2.3, 2, 1.2. Tentacle-scales usually two, of which the outer is nearly oval, the inner small, narrow, and tooth-like. Color, in alcohol: chocolate brown, dappled with yellowish.

Mexillones, Bolivia: Captain Putnam.

As to the genus of this specimen, it may be called a spiny *Ophiocoma*, or an *Ophiomastix* wanting the club-shaped arm-spine. Müller & Troschel, in characterizing *Ophiomastix*, say (Syst. Asterid., 107). "Disk beset with scattered spines. . . . On the arms, above the spines, club-shaped bodies running out at their ends into several projections"; and their original, *O. umbrosa*, has a fine imbricated scaling, from which stand out little naked radial-shields. Lütken (Addit. ad Hist. Oph., Pt. III. p. 26) has shown that the club-shaped spine is not a constant feature in the genus, which therefore is hardly to be set off from *Ophiocoma*, and that, moreover, the disk may be beset either with spines of various sorts, or with spines and grains. With the addition of this species, his view of the genus would stand thus:—

| | |
|--|--------------------------------|
| A. Disk smooth or with very few short spines, | <i>O. venosa</i> Pet. |
| B. Disk closely beset with grains and moderately long spines, | <i>O. mixta</i> Ltk. |
| C. Disk densely beset with very short spines, | <i>O. asperula</i> Ltk. |
| D. Disk on both sides beset with long thin spines, | ♂ <i>O. annulosa</i> M. T. |
| | ♀ <i>O. caryophyllata</i> Ltk. |
| E. Disk beset on its upper surface, only, with slender spines; arm-spines all slender and tapering, | ♀ <i>O. janualis</i> Lym. |

The species under A, B, C, and D all have certain of the arm-spines either club-shaped or forked at the end, but that under E has no thickening of these spines.

NOTE ON NOMENCLATURE AND CLASSIFICATION.

Dr. Lütken, in a foot-note on page 68 of his *Additamenta* (Part III.), remarks: 1. That names prior to Linnæus have no place in present nomenclature. 2. That, when an author has described a species, his name must always be put after that species as the authority, no matter if the *generic* name be *changed*. As to the first of these propositions, I may say, that Linnæus first contrived what is called binomial nomenclature, in which each animal has two names, the generic and the specific. Consistency is the first duty of a naturalist, therefore it was the first duty of the followers of Linnæus to respect and to adopt such binomial names as may be found in ante-Linnæan authors, of whom some were among the most celebrated of zoölogists. When, then, I find the name *Astrophyton costosum* distinctly used by Seba (III. Pl. IX., Fig. 1, p. 16, 1758), and moreover an excellent figure given, I shall certainly apply that name to the West Indian species to which it belongs. Did not

Seba, more than a century ago, publish a fine folio, with figures that are better than some of those we see nowadays, and shall we ignore his names when they are such as may properly be taken? In putting such a name as *Ophiopholis bellis* for *Ophiopholis aculeata*, I think I have gone too far, because the name *bellis* of Linck is used as part of a diagnosis and not as a name. I was, however, encouraged in the selection by the usage of Johnson and of Forbes.

As to the second point, Dr. Lütken expresses great astonishment, "after all that has been written," that anybody should change the *authority* with each change in the *combination* of a name. For instance, we have, in 1854, *Ophiura nodosa* Ltk. I afterwards attempted to show that *Ophiura* was preoccupied, and made a name, *Ophioglypha*, to take its place; and the question now is, Shall it be written *Ophioglypha nodosa* Ltk. or *Ophioglypha nodosa* Lym.? Dr. Lütken has no cause for astonishment. There are two parties to this question. That to which he belongs insists on considering *credit* or *honor* the real reason for using names of authors; and always speaks of the "injustice" done when an author's name is lost sight of. The party whose views I hold maintains that nomenclature is *a system of exact registration*, and that, with the present enormous mass and confusion of titles, no other guide is possible; and further, that the credit of a zoologist does not rest on his monogram, but on something better. Will the reputation of John E. Gray be greater because his name thus appears often; or will that of Lacaze-Duthiers be less because his appears seldom? After what I have said in the Bulletin (Vol. I. p. 336, note), I can add nothing more to the point than a quotation from Alexander Agassiz (American Naturalist, Vol. V. p. 354):—

"The history of the present confused condition of nomenclature is an interesting one; it is the attempt to show by the binomial system, not only the correct name of any animal, but, at the same time, give a short historical sketch of the changes the name has undergone. The name of an animal or plant is that binomial combination which it has first received, let us say *A b* from Linnaeus; [*A* (generic) *b* (specific)]. Subsequent changes, such as the transfer of this to a different genus, *B*, by Cuvier, are simple matters of registration, a part of the *history of the science*, showing what Cuvier thought of the affinities of the species named *A b* by Linnaeus. When, then, we speak of this species as *B b* Cuvier, we are recording his views as an investigator, and this does not lessen whatever credit there may be in the original description of *A b* by Linnaeus. If afterwards Blainville comes and says that Cuvier should have referred *A b* to the genus *C* of Latreille, and quotes this species hereafter as *C b* Blainville, he is only recording his opinion, and so on through indefinite time. *Changes which the progress of science render necessary in the position of A b of Linnaeus are or should be quoted under the*

authority of the author who proposes them as expressing the actual condition of our knowledge of the affinities of the species A b of Linnaeus."

At any rate, let the decision be what it may. Dr. Lütken need have no fear that his own reputation rests on any such unstable basis. To sum up, *Astrophyton costosum* Seba, and *Ophioglypha nodosa* Lynnan, mean just what they should mean, and nothing more; to wit, that in the writings of these two persons will be found these names definitely, used for the *first time*. They do not distinguish these persons as good or as poor zoölogists, nor do they show that such names are the correct ones; but they are simply the "trade-marks" of workmen.

As to the "Synopsis" of *Ophiuridae* presented by Dr. Lütken (l. c. p. 87), I have no objection to it, provided it be understood as a movement towards a true classification, or as a really convenient tabulation of genera. But inasmuch as it rests on the structure of the mouth parts it cannot be expected to be an exposition of nature, any more than can a classification of fishes based on their scales; of mammalia, on their nervous centres; or of molluska, on the character of their shells. Any one who will examine the single original genus *Amphiura* will be convinced how impossible it is to arrange it only on the *number* of the mouth-papillæ. In fact, the species of *Ophiuridae* are now so numerous, that some one man must examine them all with his own eyes, before we can hope for a good arrangement. And especially do the genera *Ophiocoma* and *Ophiothrix* need severely to be weeded.

DESCRIPTION OF THE PLATES.

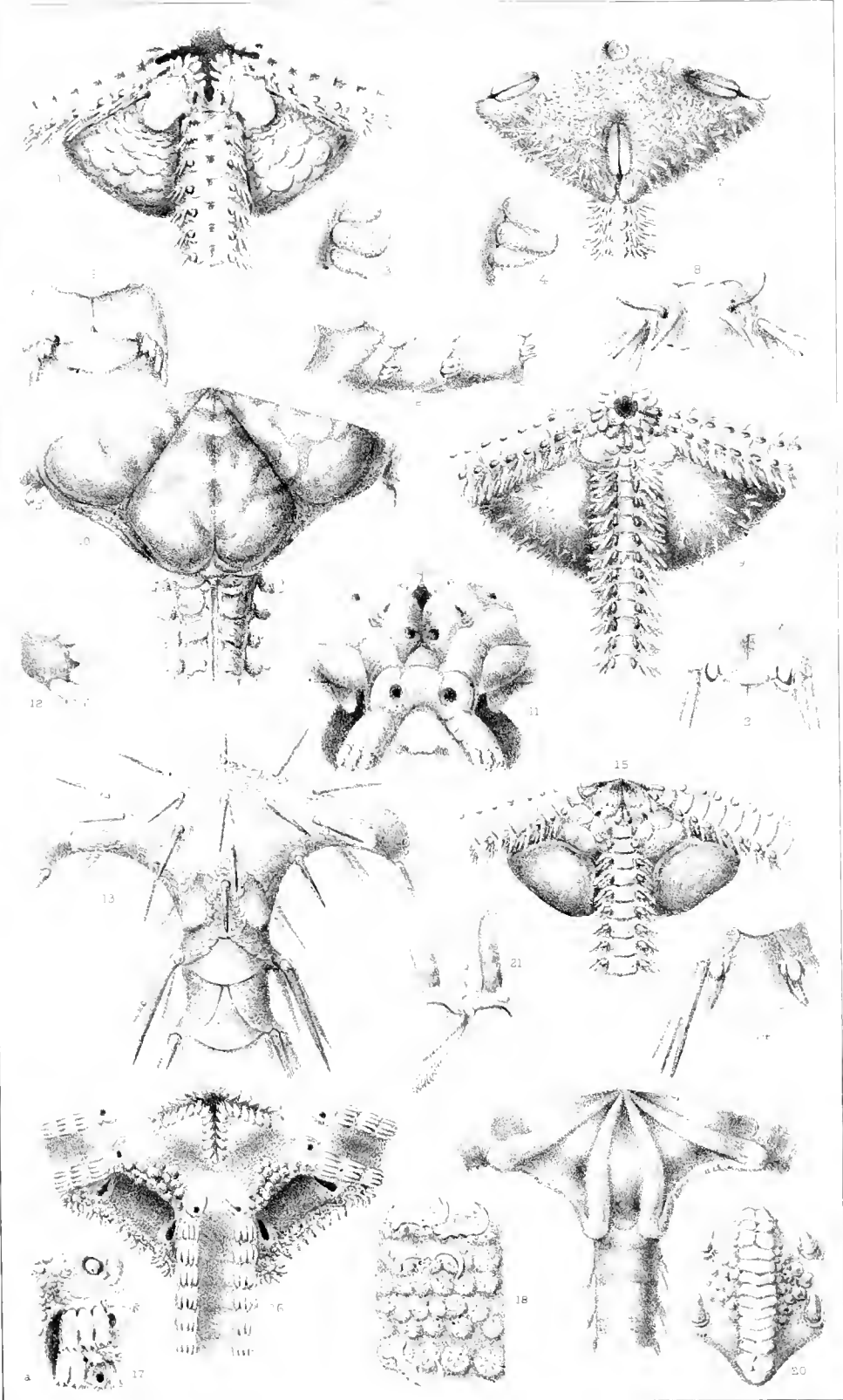
These are all alcoholic specimens; but, in drawing them, the spirit was allowed to evaporate, so that the details could be properly seen.

PLATE I.

- Fig. 1. *Ophioglypha sinensis*.
 " 2. " " under side of sixth arm-joint, to show the position of the tentacle-scales.
 Figs. 3, 4. *Ophioglypha falcifera*; arm-spines of the basal joints.
 Fig. 5. " " base of the arm in profile, with edge of disk and comb of papillae.
 " 6. *Ophioglypha acervata*: under side of an arm-joint. (The lobe on the outer side is not made distinct enough.)
 " 7. *Ophiocnida olivacea*.
 " 8. " " under side of an arm-joint showing the spine-like tentacle-scale.
 " 9. *Ophiocnida Putnami*. The little organs at the outer corners of the mouth-slits are the mouth-tentacles.
 " 10. *Ophiothela tigris*.
 " 11. " " enlarged view of the parts near the mouth, and of the first and second under arm-plates, and the first set of arm-spines.
 " 12. *Ophiothela tigris*. One of the pad-like side arm-plates bearing its arm-spines.
 " 13. *Ophiomastix janualis*.
 " 14. " " under side of an arm-joint, showing the small and great tentacle-scales.
 " 15. *Ophiomaza caecotica*.
 " 16. *Astrogoniphus vallatus*.
 " 17. " " first sets of arm-spines magnified; *a*, head of the genital-slit.
 " 18. " " a piece near the tip of the arm, highly magnified, showing the granulations on the arm-joints, and the ridges of larger granules, between the joints, on which stand the hooks.
 " 19. *Ophiocreas lumbricus*.
 " 20. " " an angle of the mouth seen from within, showing the column of teeth, and on each side a bunch of granules or small papillae, beyond which appear the two pairs of mouth-tentacles.
 " 21. *Ophiocreas lumbricus*; an arm-joint showing the thorny arm-spines.

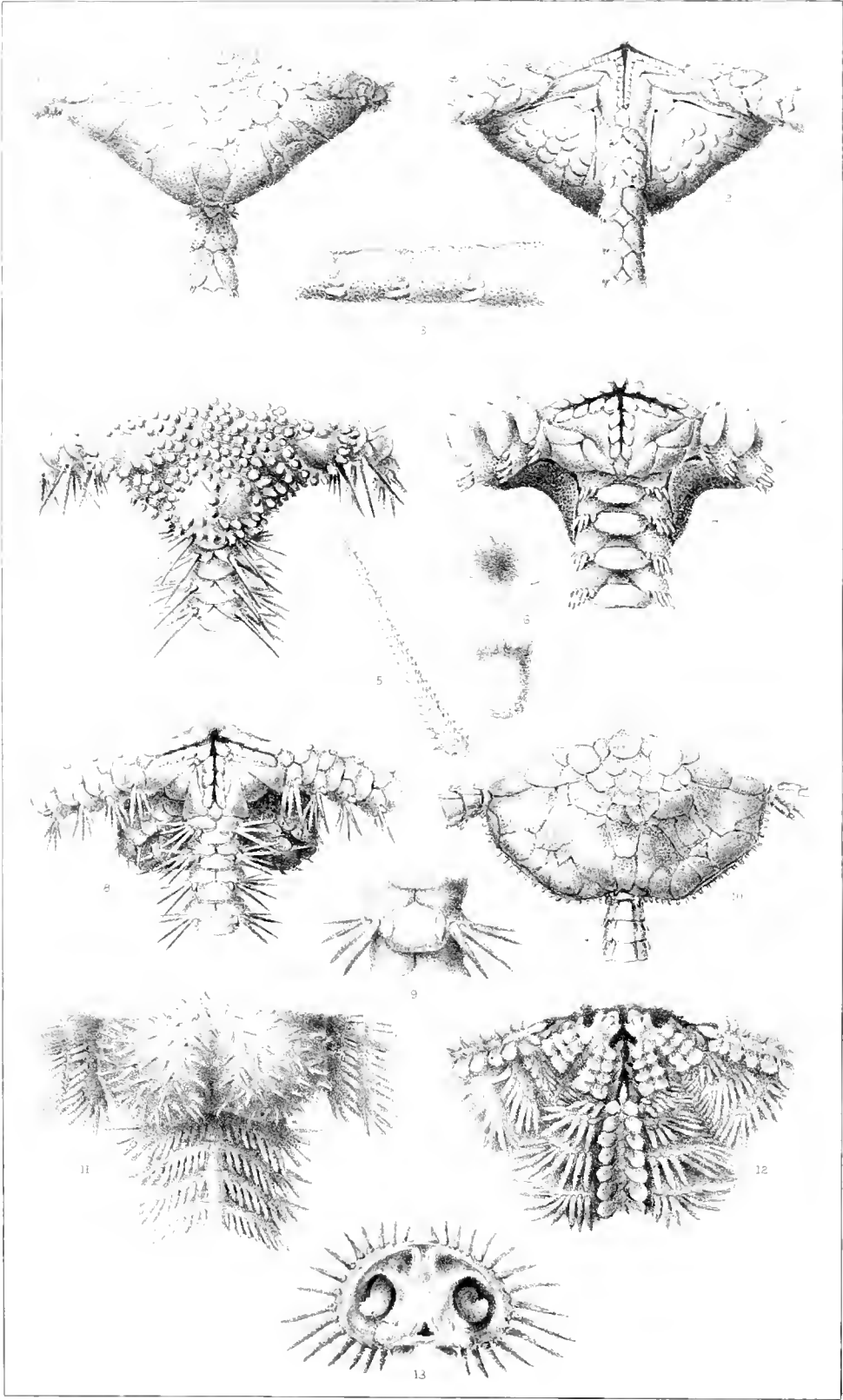
PLATE II.

- Figs. 1, 2. *Ophiomusium eburneum*, from above and below.
 Fig. 3. " " arm from the side.
 " 4. *Ophiomitra valida*.
 " 5. " " an arm-spine.
 " 6. " " thorny stumps from the disk.
 " 7. *Ophiochondras convolutus*.
 " 8. *Ophiothannus vicarius*.
 " 9. " " an arm-joint from below.
 " 10. *Ophioceten depressum*.
 Figs. 11, 12. *Ophiomyces frutescens*, from above and below.
 Fig. 13. " " arm-joint in section showing the retracted tentacles and the arrangement of the arm-spines.



P Roetter on stone from ...

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