

1906

**Description of new Ophiuroids Collected by the *Travailleur* and the *Talisman* during the Campaigns of 1880, 1881, 1882, & 1883: A Translation of *Description des Ophiures Nouvelles Recueillies par le Travailleur et le Talisman Pendant les Campagnes de 1800, 1801, 1802, & 1803***

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MÉMOIRES *de Gobius*  
DE LA  
SOCIÉTÉ ZOOLOGIQUE

DE FRANCE

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PARIS (VI<sup>e</sup>)

AU SIÈGE DE LA SOCIÉTÉ ZOOLOGIQUE DE FRANCE  
28, RUE SERPENTE (HÔTEL DES SOCIÉTÉS SAVANTES)

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Translator's note:

For a few characters, I have used the terms of Hyman (1955) that are more familiar today than those Koehler used. I have used *bursal slit* for Koehler's *fente génitale*. Koehler referred to the *pores tentaculaires* as a character of most species he described and to *ecailles tentaculaires*. I have translated these as *podial pairs* and *tentacle scales* to be consistent with Hyman (1955) who wrote "...the podia are reduced to small inconspicuous papillae that, protected by one or more tentacle scales, project on the oral surface between the oral and lateral arm shields." I have translated Koehler's *plaques génitales* as Hyman's *genital scales*.

Koehler referred to the repeating unit of an arm as an *article*. I have retained this because Hyman refers to "arm joints (corresponding to an internal ossicle)" and states "each vertebral ossicle corresponds to an external arm "joint".

Folin (1887) gave a general description of the voyages of the *Travailleur* and the *Talisman*. He provided the dates and general locations of the dredging stations. Koehler gave only the dates of collection and depths. Folin (1887) also provided figures of the *Travailleur* and the *Talisman* and a map of the campaigns that I have reproduced here.

I thank Richard L. Turner for his comments on Koehler's terms.

#### References

- Folin, L.A.G. 1887. *Sous les mers; campagnes d'explorations du "Travailleur" et du "Talisman"*. Paris, J.-B. Baillière et fils.  
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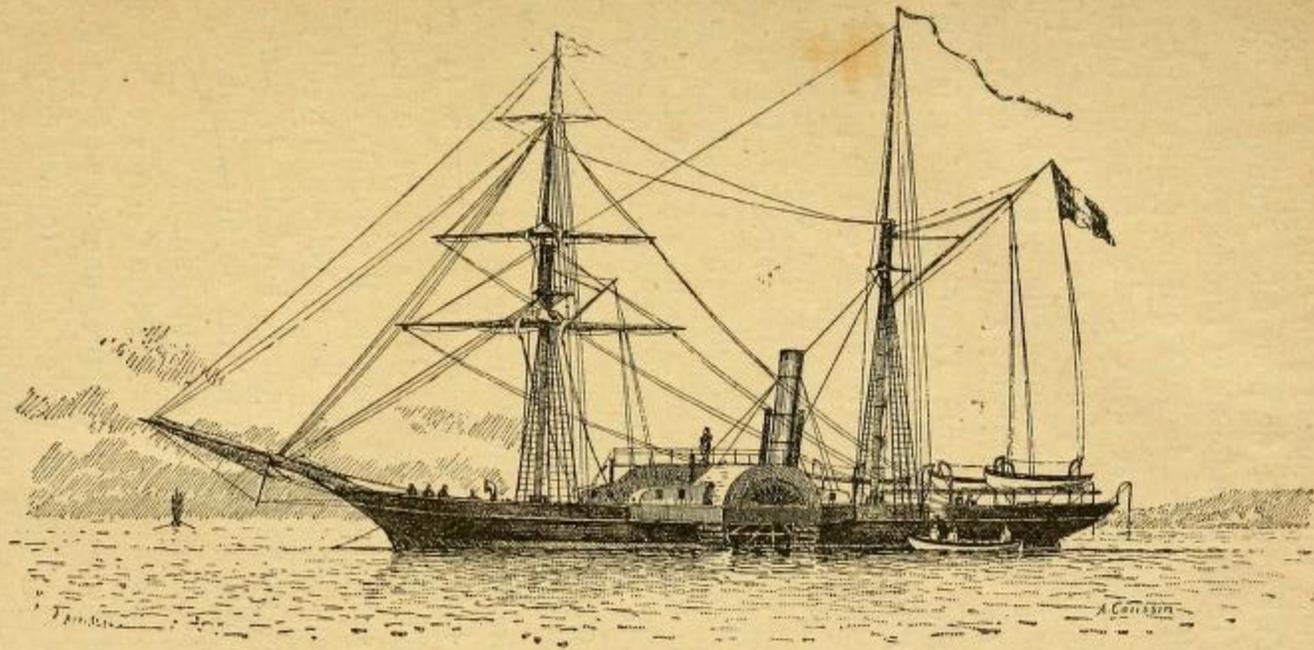


Fig. 1. — *Le Travailleur*.

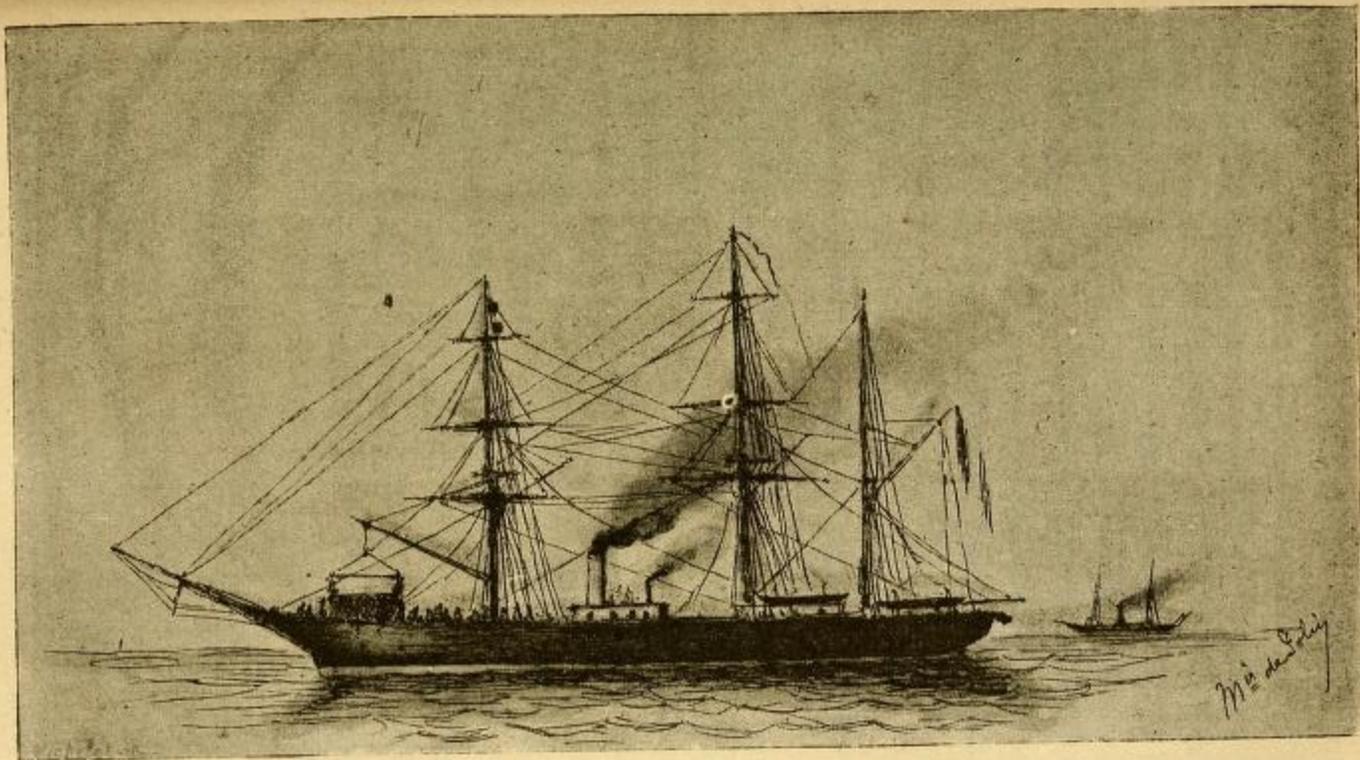


Fig. 26. — *Le Talisman*, éclaireur d'escadre.

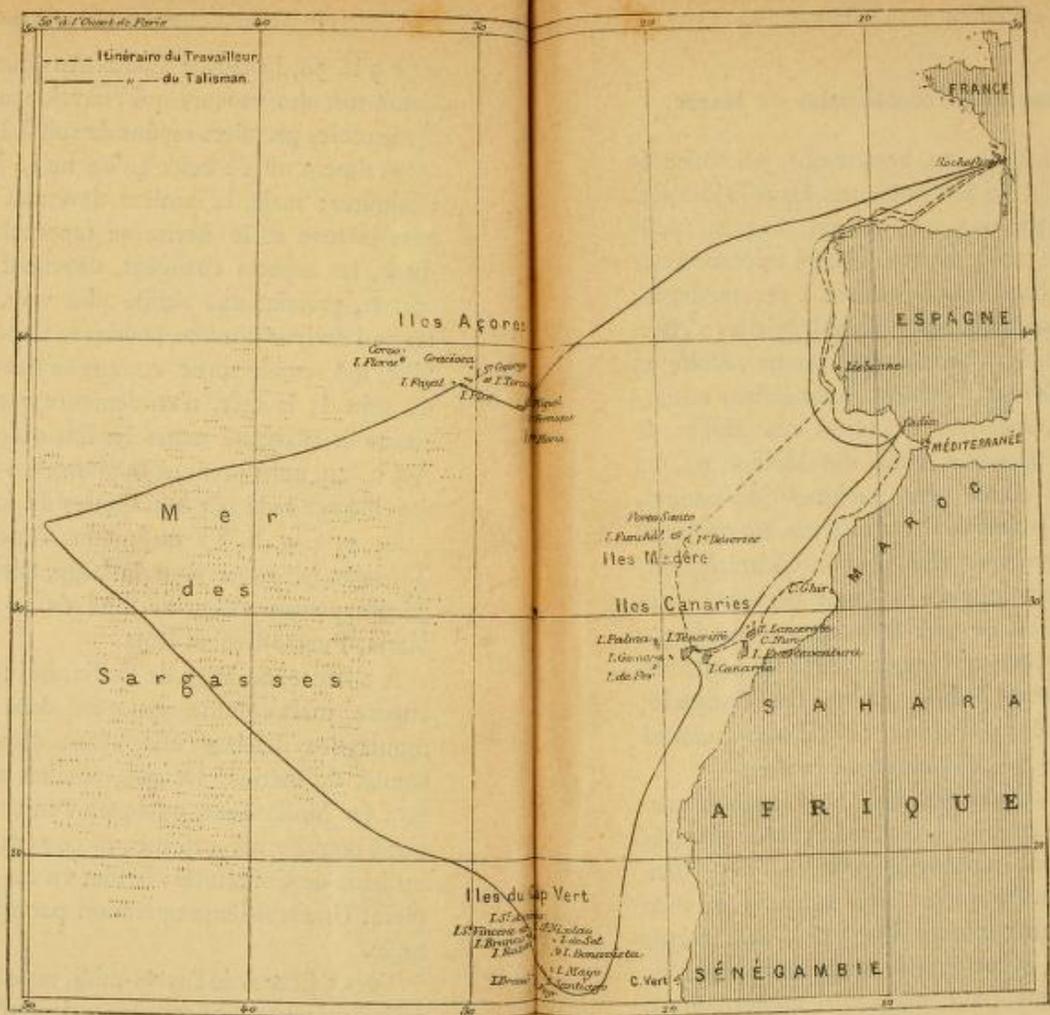


Fig. 34. — Itinéraire du Travailleur et du Talisman.



DESCRIPTION OF NEW OPHIUROIDS COLLECTED BY THE *TRAVAILLEUR* AND THE *TALISMAN*  
DURING THE CAMPAIGNS OF 1880, 1881, 1882, & 1883.

BY

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(Plates I to III)

The new species of ophiuroids coming from the dredges of the *Travailleur* and the *Talisman* during the years 1880, 1881, 1882, and 1883 are not very numerous, only eighteen. Most are in already known genera. Only two are types of new genera that I describe under the names *Ophiomedea* and *Ophioleda*.

The small number of new species is not surprising because, during the long period since the dredges of the *Travailleur* and the *Talisman* were made up to the moment the collections were sent to me (January 1904), several submarine explorations resulted in different publications. There are several species *effectively* captured for the first time by the *Travailleur* and the *Talisman* that were encountered in other, more recent explorations. These species have thus been named and described. I have found up to fourteen species in this case in the collections of the *Travailleur* and the *Talisman*.

Here is a list of the new species I shall describe here:

- |  |  |
|--|--|
| 1. <i>Pectinura elata</i> .                          | 11. <i>Ophiocamax dominans</i> .                 |
| 2. <i>Ophioglypha imprudens</i>                      | 12. <i>Ophiacantha decipiens</i> .               |
| 3. “ <i>mundata</i> .                                | 13. ” <i>notata</i> .                            |
| 4. <i>Ophizona sincera</i> .                         | 14. “ <i>parcita</i> .                           |
| 5. <i>Ophiocten latens</i> .                         | 15. <i>Ophioleda</i> (nov. gen.) <i>minima</i> . |
| 6. <i>Ophiocrates secundus</i> .                     | 16. <i>Ophiothrix indigna</i> .                  |
| 7. <i>Ophiochiton solutum</i> .                      | 17. “ <i>inducta</i> .                           |
| 8. <i>Amphiura digna</i> .                           | 18. <i>Astroschema inornatum</i> .               |
| 9. “ <i>instructa</i> .                              |  |
| 10. <i>Ophiomedea</i> (nov. gen.) <i>duplicata</i> . |  |

On the other hand, here is the list of species already known that were encountered by the *Travailleur* and the *Talisman*. (I have marked with an asterisk the species dredged for the first time by the *Travailleur* and the *Talisman* and as a consequence discovered by these vessels but that have been described afterwards from other collections):

<i>Ophioderma longicauda</i> Retzius.	<i>Amphiura grandis</i> * Koehler.
<i>Pectinura semicineta</i> Studer.	“ <i>iris</i> Lyman.
<i>Ophioconis Forbesi</i> (Heller).	“ <i>longispina</i> * Koehler.
<i>Ophiozona molesta</i> * Koehler.	“ <i>palmeri</i> Lyman.
<i>Ophiotypha simplex</i> * Koehler.	“ <i>Richardi</i> * Koehler.
<i>Ophioglypha bullata</i> Wyville Thompson.	<i>Ophiomyces grandis</i> Lyman.
<i>Ophioglypha carnea</i> Lütken.	<i>Ophioscolex purpureus</i> Düben and Koren.
“ <i>clemens</i> * Koehler.	<i>Ophiotrema Alberti</i> * Koehler.
“ <i>concreta</i> * Koehler.	<i>Ophiacantha abyssicola</i> G. O. Sars.
“ <i>flagellata</i> Lyman.	“ <i>aristata</i> * Koehler.
“ <i>inornata</i> Lyman.	“ <i>Bairdi</i> Lyman.
“ <i>Ljungmanni</i> Lyman.	“ <i>bidentata</i> Retzius
“ <i>texturata</i> Lamarck.	“ <i>setosa</i> (Retzius).
<i>Ophiomusium planum</i> Lyman.	“ <i>composita</i> * Koehler.
“ <i>pulchellum</i> Lyman.	“ <i>Valenciennesi</i> Lyman.
“ <i>scalare</i> Lyman.	<i>Ophiomitrella globulifera</i> * (Koehler).
<i>Ophiocten abyssicolum</i> (Forbes)/	<i>Ophioplinthaca carduus</i> (Lyman).
<i>Ophiopsila aranea</i> Forbes.	“ <i>chelys</i> (Lyman).
<i>Ophonereis reticulata</i> (Say).	<i>Ophiothrix Lütkeni</i> Wyville Thompson.
<i>Ophiactis Balli</i> Wyville Thompson.	<i>Ophiobyrsa hystericis</i> Lyman.
“ <i>corallicola</i> * Koehler.	<i>Ophhiomyxa pentagona</i> (Lamarck).
<u><i>Amphilepis norvegica</i> Ljungmann.</u>	<i>Astronyx Locardi</i> * Koehler.
<i>Amphiura bellis</i> Lyman.	<i>Astrodia tenuispina</i> * (Verrill).
“ <i>chiajei</i> Forbes	
“ <i>filiformis</i> (Müller).	

Various comments could be made about some of these species. These will be made in a more extensive work that will appear later. However, I shall describe here two little known species, *Ophiothrix Lütkeni* and *Astrodia tenuispina*, for which I can give a complete description as well as figures thanks to the materials that I have had in hand.

I am happy to thank my excellent friend, Professor L. Joubin, who has confided to me the study of the ophiuroids collected by the *Travailleur* and the *Talisman*.

### 1. PECTINURA ELATA nov. sp.

(Pl. I, fig. 1–3)

St. 75. 10 July 1883. A dozen specimens.

The specimens are of large size. The diameter of the disk can exceed 30 mm. The arms reach 20 cm in length.

The disk is pentagonal. The dorsal surface is covered with very fine, dense granules that leave bare a small oval plate toward the border of the disk. In the middle of each interradial space are two or three small rounded plates between the two radial shields of each pair. These are rather small, triangular, with rounded angles and the borders. They are widely separated and very near the borders of the disk. The radial notches are shallow.

On the ventral surface of the disk, the granules are less dense and have several rounded bare plates in the proximal region. The bursal slits are very narrow.

The buccal shields are large and triangular with rounded edges and a very slightly convex distal border. They are as long as wide. The secondary plate is small and oval. The adoral plates are small and quadrangular, located completely outside the buccal shield between it and the first arm shield. They have on their free border some granules that more or less hide the edges. There are seven lateral buccal papillae. The external one is small, short and conical. The second is very large, wide and obtuse. The third is smaller but still obtuse. The following four are small and conical. The terminal unpaired papilla is a little sturdier.

The arms are strongly keeled. The dorsal arm plates are large and quadrangular. The lateral sides are slightly divergent. The proximal and distal borders are parallel. These plates cover a part of the lateral surfaces of the arms.

The first ventral arm plate is small, trapezoidal, transversely enlarged, with a very wide proximal border. The second is very large, strongly notched inside by the tentacle scales of the first pair that are very developed. The following ones are hexagonal with a small proximal border that are followed by two divergent sides. The two lateral sides are indented by the tentacle scales. The wide, slightly convex distal border is slightly sunken in the middle. At first they are as long as wide or wider than long. Finally, they become longer than wide. The second plate is strongly shrunken in its proximal region because of the extreme development of the first two tentacle scales. Sometimes it is even separated from the first plate by these two tentacle scales that that end up touching each other in the median line.

The narrow lateral arm plates have three spines that are very stout and pointed. On the first arm articles, these spines are longer than half the article. But beyond the disk they are shorter. These spines are nearer the ventral border of the plate.

There are no ventral pores.

The podial pores have a single scale. Those of the first pair are extremely large, wide and oval. Wider inside than outside, arranged obliquely and very near each other to the point of strongly reducing the distal part of the second ventral plate. Sometimes they are even contiguous. The scales of the second pair are larger than the following. They are more ovoid and widened inside.

SIMILARITIES AND DIFFERENCES. — *P. elata* is near *P. heros* Lyman. It differs from it by the less elongated buccal shields that are as long as wide, by the triangular radial shields, by the considerable development of the tentacle scales of the first pair and the form of the following as well as by the pointed arm spines that are longer than half the article at the beginning of the arms.

## 2. OPHIOGLYPHA IMPRUDENS nov. sp.

(Pl. I, fig. 7–8)

St.123. 13 August 1883. Depth 360 m. One specimen.

The round disk has a diameter of 5.5 mm. The dorsal surface is covered with very unequal plates, among which we can distinguish a rosette of large primary plates. The centro-dorsal is rounded. The triangular radial plates are nearly as large as it and are contiguous to it by their proximal angle. On the sides, they are separated by two small successive plates. In the middle of each interradial space, we see a large triangular plates. Another plate enlarged transversely is seen at the edge of the disk. The rest of the disk is filled with unequal, polygonal plates. The radial shields, of medium dimensions, are triangular. They are contiguous for half their length and separated inside by a triangular plate. They are very enlarged inside and their length is greater than a third of the radius of the disk. The radial combs are form of sparse papillae, cylindrical, elongated, and rounded at the end.

The ventral surface has, outside the large buccal shields, several rows of unequal imbricated plates. The narrow genital scales have conical papillae.

The buccal shields are very large, pyriform, with an elongated proximate point and a strongly convex distal border. The adoral plates are elongated and very narrow, especially inside. The oral plates are small and oval. There are three buccal papillae. The two external ones are enlarged and obtuse. The internal one is more elongated and conical. I cannot distinguish the terminal unpaired papilla.

The dorsal arm plates are first quadrangular, then triangular, wider than long with an obtuse proximal angle and a nearly straight distal border.

The first ventral arm plate is large and triangular, with rounded angles. It is a little wider than long and larger than the following ones. They are also triangular with an obtuse proximal angle and a rounded distal border. They are widely separated from each other. Between the first and the second plate, there is a slight depression.

The lateral plates have three small, thin, very pointed spines that are equally spaced.

The podial pores of the first pair are very large and have five interradial scales and four to five radials. The following ones have two or three scales on each side. Beyond, the pores have two proximal scales and further only one.

SIMILARITIES AND DIFFERENCES. *O. imprudens* is separated from the other species with elongated, slender radial papillae by its pyriform buccal shields and by the arrangement of the dorsal plates of the disk. It is easily distinguished from other species such as *O. variabilis* and *sculptilis*, whose buccal shields have an analogous form.

### 3. OPHIGLYPHA MUNDATA nov. sp.

(Pl. I, fig. 4–6)

Several specimens from different stations, at depths between 1,935 and 2,125 m.

The specimens are nearly all the same size. In the largest, the disk diameter does not exceed 8 mm. The arms about 15 mm in length.

The disk is rounded or sub-pentagonal. It is thick. The dorsal surface is covered with stout plates, unequal and polygonal, not imbricated. We see a rosette of large primary spines: the centro-dorsal is rounded. The radials, a little smaller and enlarged transversally, are separated from each other and from the centro-dorsal by a row of plates. We also recognize in the interradial spaces, a larger plate located toward the middle of these spaces and, at the border of the disk, another plate enlarged transversally. The other plates are irregularly polygonal. The radial shields, are medium size, triangular, close together on the outside and strongly divergent inside. Their length is a little greater than a third of the disk radius. The radial papillae are small, obtuse, low and little developed.

The ventral surface of the disk has small, thick, imbricated plates. The bursal slits are narrow. The genital scales have a row of small rounded papillae.

The buccal plates are large, stout and often slightly convex. They are as long as wide in the large specimens, pentagonal with a very open proximal angle bounded by two straight sides. Their lateral borders, slightly convergent, have a very slightly marked notch at the base of the bursal slit. The distal border is very slightly curved. The very large oral plates have parallel borders. The four lateral buccal papillae are small, low and elongated. The unpaired terminal papilla is a little less stout.

The first dorsal arm plates are quadrangular, wider than long. The following ones are triangular with a convex distal border and straight lateral borders. They are longer than wide and are separated at some distance from the disk.

The first ventral arm plate is very large, triangular or trapezoid with a wide distal border. The two of three following ones are large, quadrangular with a narrow proximal border, a wide and convex distal border, and very divergent lateral borders that are strongly notched by the podial pores. These plates are contiguous up to the third. Beyond, they are separated at the same time that they become triangular with an obtuse proximal angle and a very convex distal border. They are wider than long.

The wide, tall lateral plates have three small spines located equidistant and near the ventral border of the plate.

The podial pores of the first pair are large and have five scales on each border. Those of the second pair have four scales on the external border and three on the internal border. The third has four external scales and one of two internal ones. Those of the fourth have three scales on their external or proximal and only one on the internal or distal border. Beyond, the pores have two proximal scales.

SIMILARITIES AND DIFFERENCES. — *O. mundata* is near *O. irrorata* Lyman, but it is distinguished from it by its thick disk covered with stout plates and without the least trace of spines, while, according to Lyman, *O. irrorata* has a thin disk covered with delicate plates with small spines. The buccal shields of *O. irrorata* are wider than long, while in *O. mundata*, they are as long as wide.

*O. mundata* is also near *O. lienosa* Lyman. It differs from it by the very much larger dorsal plates of the disk and by the form of the buccal shields.

#### 4. OPHIOZONA SINCERA nov. sp.

(Pl. I, fig. 11 and 12)

St. 39. 15 August 1881. Depth 953–1,225 m. Three specimens.

St. 7. 6 July 1882. Depth 608 m. one specimen.

Diameter of the disk 4 mm; length of the arms 12 mm.

The disk is rounded. The dorsal surface has few, very unequal plates. We distinguish first a rosette of very large primary plates containing a polygonal centro-dorsal plate surrounded in all the specimens by six large plates instead of five. This arrangement is without doubt abnormal. We find in addition in the radial spaces one or two large plates. The last is triangular and separates the two radial shields of each pair. In the interradial spaces are two large plates of which the last reaches the border of the disk with, on each side, two of three very small plates. The radial shields are very large, but smaller than the primary plates. They are irregularly triangular and contiguous only outside by their internal angles. They are widely divergent and their length is smaller than a third of the disk radius.

The ventral surface of the disk is filled by very unequal, polygonal plates. The genital scales are narrow. The bursal slits are very narrow and scarcely distinct. The buccal shields are elongated, longer than wide, pentagonal with the lateral sides widely notched and the distal border rounded. The adoral plates are very large, a little narrower inside than outside. There are five lateral buccal papillae.

The first is very small. The second is much larger and the three following ones are a little smaller. All these papillae are obtuse and rounded. There is in addition a terminal, very large papilla.

The dorsal brachial plates are large, first quadrangular, then triangular, with the distal border rounded. The first plates are contiguous. They are separated at some distance from the disk.

The first ventral arm plate, of medium dimensions, is triangular and wider than long. The following ones are very large, triangular, with the distal border a little rounded and longer than wide. On the first, the proximal angle is slightly truncated. After the fifth or sixth, the plates are separated by a narrow interval.

The lateral plates have two very thick and obtuse spines. The lower one is a little longer than the upper one.

The single tentacle scale is large.

SIMILARITIES AND DIFFERENCES. — *O. sincera* differs from other *Ophiozona* with a single tentacle scale by the form of the buccal shields that are longer than wide.

#### 5. OPHIOCTEN LATENS nov. sp.

(Pl. I, fig. 9–10)

St. 134. 24 August 1883. Depth 4,060 m. Several specimens.

The specimens are all of the same dimensions, nearly equal. The diameter of the disk is about 9 mm. The arms are broken nearly at the base.

The disk is rounded, slightly notched at the base of the arms. The dorsal surface has some large, rounded plates separated by numerous much smaller plates. We distinguish a rosette of primary plates, likewise rounded, separated from each other by two or three rows of small plates. In the radial spaces we note from two to four rounded plates and, toward the middle of each interradial space, a large oval plate. In the area of the border of the disk, the plates become larger and those that are found at the periphery are much larger than the others. They are moreover unequal and irregular. The radial shields are very large, triangular, elongated, nearly two times longer than wide. They are slightly divergent and widely separated by several rows of plates. Their length is equal to a third of the disk radius. At the base of the arms, we find on the border of the disk, a few papillae that are continued on the distal border of the radial shields, but that are not extended onto the articles of the arms.

The ventral surface of the disk has numerous small, imbricated and sub-equal plates. The bursal slits are narrow.

The buccal shields are large and pentagonal, with the proximal angle very obtuse, the lateral sides short and rounded, the distal border wide and convex. They are much wider than long. The adoral plates are small, short and narrow, thin on the outside. The oral plates are large and wide, elongated, much larger than the adoral plates. Their borders are parallel. The lateral buccal papillae are small

and low, indistinct. We generally count five of them. The three external ones are more obtuse than the internal ones. The terminal papilla is larger and conical.

The dorsal arm plates are very large, quadrangular, with the lateral borders slightly divergent. The distal border is a little enlarged and a little curved. They are first wider than long and they then become longer than wide.

The first ventral arm plate is large, quadrangular with a narrow and straight proximal border, a very wide and curved distal border and lateral sides divergent and indented by the large buccal podial pores. The following ones are very small, triangular, with a very obtuse proximal angle. They become more and more obscured so that the plates become semi-circular at the same time as their size decreases.

The large lateral arm plates have three unequal, thin and very pointed spines that, on the first articles, reach nearly the length of the article and then become smaller.

The first very large podial pores have two external scales and one internal. These scales are small and oval. The following pores are large and rounded. Each has two small, pointed scales, one external and one internal.

SIMILARITIES AND DIFFERENCES. — *O. latens* is near *O. abyssicolum* (Forbes) from which it is distinguished immediately by the form of the buccal shields that are wider than long. The large plates of the dorsal surface of the disk are comparatively smaller and the small plates are more numerous. Finally, there are no papillae on the first dorsal arm plate.

## 6. OPHIOCRATES SECUNDUS nov. sp.

(Pl. I, fig. 13 and 14)

St. 73. 10 July 1883. Depth 2,325–2,518 m. One small specimen.  
Coast of the Sahara. Depth 2,638 m. Two specimens.

The disk diameter of the two large specimens is 10 and 13 mm, respectively. The arms are broken near the base.

The disk is very thick, sub-pentagonal. In the largest specimen, the dorsal surface is nearly completely covered with fine granules that hide the underlying plates, while in the second, we distinguish nearly all the plates of this surface, the granules being less dense. In the smallest, finally, they form only a network around the plates. These plates are small and rounded. A larger plate enlarged transversely is noted at the periphery of the disk in the middle of the interradial space. The radial shields are large and wide, triangular, as long as wide with slightly rounded borders. They are widely separated.

The ventral surface of the disk has small rounded plates, surrounded by a circle of granules identical to those of the dorsal surface. The bursal slits are narrow and are extended to the border of the disk, even in the smallest specimen.

The buccal shields are large, much longer than wide, with very rounded angles. The lateral borders are slightly sinuous and the distal side has in its middle a wide lobe, very prominent thanks to which the shield takes a nearly lozenge shape. The adoral plates are small and quadrangular with a very elongated and pointed proximal angle. They are limited to the sides of the buccal shield, between this shield and the first lateral arm plate. The oral plates are tall, triangular and have some granules toward the top. There are at least seven lateral buccal papillae. The external one is small, the two following are larger, wider and obtuse. The others are smaller. The terminal papilla is larger and conical.

The first dorsal arm plates are large, quadrangular, wider than long with divergent lateral sides and a rounded distal border. In the following ones, the proximal side becomes smaller and smaller and the plates take a triangular form with a truncated top. They are then as wide as long. They finally become longer than wide. They are all contiguous.

The first ventral arm plate is small, pentagonal, with an obtuse proximal angle and a narrow distal border. The following ones are large, longer than wide, with a narrow proximal side, divergent lateral sides indented by the podial pores and a wide and slightly rounded distal border. They are elongated beyond the disk and are all contiguous.

The lateral plates, wide and prominent, have three spines equally spaced on the distal border of the plate. The median one is a little longer than the other and slightly exceeds half the length of the article.

The podial pores are covered with a large, rounded scale.

SIMILARITIES AND DIFFERENCES. — *O. secundus* differs from the only species presently known of the genus, *O. lentus* Koehler, discovered by the “Siboga” in the Sunda seas, by the shorter radial shields, as long as wide, by the wider interradiial spaces, by the more numerous granules that cover nearly completely all the dorsal surface of the disk in the large specimens, by the form of the buccal shields, by the reduction in adoral plates and finally by the three arm spines instead of two.

## 7. OPHIOCHITON SOLUTUM nov. sp.

(Pl. II. Fig. 22 and 23)

St. 30. 16 June 1883. Depth 1,435 m. One specimen.

St. 80. 11 July 1883. Depth 1,139 m. One specimen.

St. 120. 16 August 1883. Depth 2,220 – 2,155 m. One specimen.

In the largest specimen (station 80), the disk diameter is 18 mm. The arms are very long, judged by the detached pieces.

The dorsal surface is covered with small plates, a little unequal and irregular, becoming larger towards the periphery where they form a very regular marginal row in the middle of which we see a plate larger than the others and transversally widened. We distinguish a rosette of six round, very small primary plates separated from each other by several rows of plates and, in the radial spaces one of two

rounded plates. The radial shields are small, narrow, pointed inside, three times longer than wide, non-contiguous outside and widely separated inside by several rows of plates. Their length is equal to a third of the disk radius.

The ventral surface is covered with small unequal plates, irregularly polygonal, slightly or not imbricated. The bursal slits are narrow.

The buccal shields are large, wider than long, triangular with two rounded lateral angles. The distal border has in its middle a projecting lobe that sometimes gives the shield a lozenge form. The adoral plates are narrow, very elongated, widened outside and widely separating the buccal shield from the first lateral arm plate. The oral plates are narrow and elongated. The lateral buccal papillae number six. The external one is small. The following one is large. The third is a little smaller and the others are still smaller and pointed. The unpaired papilla is larger and conical.

The arms have a keel on the ventral surface but not on the dorsal surface which is simply convex. The dorsal arm plates are quadrangular with the distal border wide and convex, the proximal border narrower and straight and the lateral sides slightly curved. They are first wider than long and then become longer than wide.

The first ventral arm plate is very small and triangular. The following ones are very large and quadrangular, with a very wide proximal border and swollen in its middle. The lateral sides are divergent and strongly notched by the large podial pores.

The lateral plates have three pointed spines. The upper one is longest and exceeds the article. The others are shorter and equal to the article.

The podial pores are large and have two large scales that, on the pores of the first pair or two first pairs are usually equal but that become unequal in the following ones, the external scale always being larger than the internal scale that is sometimes very reduced.

SIMILARITIES AND DIFFERENCES. — *O. solutum* is near *O. ambulator* Koehler. It differs from it by the narrow, elongated radial shields, by the larger plates of the disk, by a dorsal spine longer than the two others that are equal, while in *O. ambulator* the spines are equal.

#### 8. AMPHIURA DIGNA nov. sp.

(Pl. III, fig. 36 and 37)

20 July. Depth 2,431–2,650 m. One specimen.

Diameter of the disk is 4 mm. The arms, thin, are about 25 mm in length.

The disk is very deeply notched in the interradial spaces. The dorsal surface is covered with very unequal plates, among which we recognize six large primary plates. The radials, except one, touch the centro-dorsal. They are sometimes separated from each other by one or two small intercalated plates. The other plates, imbricated, are first very large, then they become small as they approach the disk

border. The radial shields are small, triangular, with a pointed summit two times longer than wide. Their length is smaller than half the disk radius. They are contiguous outside, very strongly divergent inside and separated by two or three rows of plates.

The ventral surface of the disk has, toward the border, some row of thin, imbricated plates. The rest of the surface is bare. The bursal slits are narrow.

The buccal shields are small, triangular, with a rounded proximal angle and a distal lobe more or less prominent and rounded. They are as long as wide. The adoral plates are wide, triangular, widened outside, non-contiguous inside, with rounded angles. The oral plates are small and thick. The buccal papillae number two. The internal one is short, thick and study. The external one is sturdier and slightly conical. On the upper surface, we see a smaller papilla.

The dorsal arm plates are very large and strongly convex. They cover nearly all the dorsal surface of the arms. They are contiguous.

The first ventral arm plate is very small, trapezoidal, wider inside. The following ones, of medium dimensions, are pentagonal with rounded distal angles. They are longer than wide.

The lateral plates are very little developed on the dorsal surface of the arms. They have four very thin spines, elongated and equaling the article. The number falls to three at some distance from the disk.

The podial pores are bare.

SIMILARITIES AND DIFFERENCES. — *A. digna* belongs to the section *Amphiura* s. str. It is easily distinguished from the other species with bare podial pores and a ventral surface bare in part, by the arrangement of the dorsal plates on the disk and by four arm spines only at the base of the arms.

#### 9. AMPHIURA INSTRUCTA nov. sp.

(Pl. II, fig. 24 and 25).

St. 106. Depth 210 m. One specimen.

Disk diameter is 3 mm. The arms are broken at the base.

The dorsal surface is damaged, but the species can be sufficiently characterized and recognized as new.

The disk is rounded. The dorsal surface has very large, imbricated, sub-equal plates without distinct primary plates. The radial shields are small, elongated, contiguous nearly their entire length and separated inside only by a small triangular plate. They are four times longer than wide and their length is equal to a third of the disk radius. Some rare thick, short and obtuse spines are seen on the dorsal surface of the disk and some others are seen at the periphery.

The ventral surface of the disk has thin, imbricated plates. They have equally some spines toward the periphery. The bursal slits are wide.

The buccal shields are small, triangular with a very open proximal angle and a very convex distal border. They are a little wider than long. The dorsal plates are short and thick, a little wider outside than inside. The oral plates are extremely small and low. The buccal papillae number three on each side. The external one is wide and quadrangular. The following one is very narrow. The internal one is more elongated and thick.

The dorsal arm plates are very large, semi-circular and cover nearly all the dorsal surface of the arms. They are contiguous.

The first ventral arm plate, triangular or pentagonal, is extremely reduced. The following ones are pentagonal, as long as wide, and of medium dimensions.

The lateral plates have three thick, obtuse spines, shorter than the article and equal.

SIMILARITIES AND DIFFERENCES. — *A. instructa* is distinguished from all the other species of the group *Amphipholis* by the presence of spines on the disk.

#### OPHIOMEDEA nov. gen.

This new genus belongs to the family Ophiacanthidæ.

The dorsal surface of the disk is covered with distinct plates. Outside the buccal papillae of the oral plates, we see a very developed spiniform papilla on the adoral plates and covering the opening of the second buccal podium. There are no tooth papillae. The podial pores have two scales. The main, spiniform scale is supported by the lateral arm plate. The other smaller one is inserted on the ventral plate.

The genus *Ophiomedeia* is distinguished from other ophiacanthids by the presence of a papilla on the adoral plates and by the presence of two tentacle scales..

#### 10. OPHIOMEDEA DUPLICATA nov. sp.

(Pl. II, fig. 20 and 21)

St. 43. 25 June 1883. Depth 2,075 m. One specimen.

The diameter of the disk is 4 mm. The length of the arms is 13 mm.

The disk is rounded. The dorsal surface is covered with equal, imbricate plates, very strong, each having a very developed and pointed spine. The radial shields are distinct, but they are not larger than the other plates of the disk. They are separated by a row two plates lacking a spine.

The ventral surface has plates identical to those of the dorsal surface and also has spines. The bursal slits are narrow.

The buccal shields are large, triangular, with an obtuse proximal angle, rounded lateral angles and a very convex distal border. We see toward the border some short, thick spines. The adoral plates are large and wide, with parallel borders, two times longer than wide. They have a narrow distal lobe that is insinuated between the buccal shield and the first lateral arm plate. The oral plates are tall and triangular. The three buccal papillae on the oral plates are very thin and pointed. The external papilla, that is inserted at the angle of the adoral and oral plates, is very elongated and spiniform. The unpaired terminal papilla is strong and thick.

The arms are moniliform. The dorsal arm plates are very small, triangular, with an obtuse proximal angle and a slightly rounded distal side. They are widely separated.

The first ventral arm plate is large, triangular with a convex distal border. It is a little wider than long. The following plates are elongated, a little longer than wide, pentagonal, with an open proximal angle, lateral borders deeply indented by the large podial pores and a convex distal side. They are widely separated after the second.

The lateral plates, very prominent, have at first six thin spines, very pointed and very finely toothed. The first ventral is equal to the article and the last dorsal is equal to two and a half articles. The two lateral rows of spines are very close together on the first arm article.

The podial pores are very large, oval. They have two scales. One is very large and spiniform, inserted on the lateral plate and directed toward the arm axis. The other is shorter and conical, inserted on the ventral plate and directed transversally.

## 11. OPHIOCAMAX DOMINANS.

(Pl. I, fig. 15 and 16)

St. 72. 3 July 1883. Depth 882 m. Two specimens.

The arms are broken very near the disk. The arm spines are nearly totally missing.

The diameter of the disk is 17mm.

The disk is rounded. The dorsal surface has large plates, irregularly rounded or polygonal, each with a large spine, very thick, elongated and obtuse. These spines are rugose, but not toothed. Some plates have two of them. The radial shields are very large and very enlarged. They are backed their entire length by the radial border. The interradial border is strongly convex. Their length is equal to half the radius of the disk.

The ventral surface of the disk has plates a little smaller than those of the dorsal surface, having like them a large spine. The bursal slits are narrow.

The buccal shields are small, triangular, a little wider than long. The adoral plates are large, thick, wider outside than inside and separating the first lateral arm plate from the buccal shield. The oral plates are very tall. The lateral buccal papillae number four to five.

The external one is small and conical. The others are elongated and spiniform. A group of some dental papillae end the oral plates. We sometimes find some shorter papillae toward the point of union of the oral and adoral plates.

The dorsal arm plates are very large, triangular, a little longer than wide. The two first ones are contiguous. The following ones are separated by a narrow interval.

The first ventral arm plate is extremely small and quadrangular. The following ones are very large and very wide, triangular, with a very wide distal border having in its middle a small lobe and very divergent lateral sides. They are separated after the second ones.

The prominent lateral plates have six spines. The first ventral spine is equal to the article and the length of the others increases progressively. But the dorsal spines are all torn off. The spines that are preserved are not toothed.

The three tentacle scales are spiniform.

SIMILARITIES AND DIFFERENCES. — *O. dominans* is near *O. fasciculata* Lyman. It differs from it by the much larger radial shields and by a different form of dorsal arm plates.

## 12. OPHIACANTHA DECIPIENS nov. sp.

(Pl. II, fig. 26 and 27)

St. 127. 15 August 1883. Depth 1,257 m. One specimen.

The diameter of the disk is 14 mm. The arms are broken at 30 mm, but they appear very short.

The disk is rounded. The dorsal surface is covered with plates, small, imbricated and dense. Each has a very long and pointed spine. We distinguish small and pyriform radial shields, nearly contiguous outside.

The ventral surface has imbricated plates that has spines only in the external half. The bursal slits are very wide.

The buccal shields are small, triangular, with a very open proximal angle and a rounded distal border. They are wider than long. The adoral plates are very wide, short, scarcely two times longer than wide, with nearly parallel lateral borders. The oral plates are low. The three lateral buccal papillae are very small and conical. The unpaired papilla is larger.

The dorsal arm plates are small and triangular, with a distal convex border. They are as long as wide, and contiguous.

The first ventral arm plate is quadrangular, as long as wide. The following ones are triangular with an obtuse proximal angle and a convex distal border. They are separated after the second one.

The lateral plates are not prominent. At the base of the arms they have seven to eight spines that are not near the median line. The length of the last dorsal spine is equal to three or four articles. The spines are slightly thinner at the end. They are nearly smooth. However, the ventral spines have on their external border some unequal and irregular teeth that become more marked as they are separated from the disk.

The very developed tentacle scale is conical and obtuse.

SIMILARITIES AND DIFFERENCES. — *O. decipiens* is very near *O. segesta* that Lyman described after a specimen of only 3 mm. It recalls this species by the spines on the disk, by the form of the buccal pieces, etc., but it is distinguished from it by the larger tentacle scale, by the teeth on the ventral spines, by the larger and contiguous dorsal arm plates, and especially by the armature of the disk that consists exclusively of spines below which we distinguish the plates of the disk, while in *O. Segesta* the spines are mixed with rods.

### 13. OPHIACANTHA NOTATA nov. sp.

(Pl. II, fig. 28 to 30)

St. 30. — 15 August 1881. Depth 953– 1,225 m. One specimen.

The diameter of the disk is 8 mm. The arms are broken near the base.

The disk is rounded. The dorsal surface is covered with very dense rods, very thick, short and swollen at the end that has seven or eight thin and divergent spinules. At the periphery of the disk, the rods elongate and become thin. The radial shields that are not covered are small and triangular.

The ventral surface is completely covered with rods identical to those of the dorsal surface. The bursal slits are very wide.

The buccal shields are small, longer than wide, with an obtuse proximal angle, two convergent lateral sides and a small distal border. The adoral plates are short and stocky, wider outside than inside, but not separating the buccal shield from the first lateral arm plate. The oral plates are tall. The lateral buccal papillae number three. They are very thick and rugose. The terminal papilla is a little larger.

The dorsal arm plates are rather small, triangular, with a very narrow proximal angle, concave lateral borders and a rounded distal side. They are separated from the first.

The first ventral arm plate is small and trapezoidal. The second is large, pentagonal, with a narrow proximal border, two divergent lateral sides and two distal sides uniting in an obtuse angle. It is wider than long. The following ones are nearly quadrangular because the proximal angle is so obtuse that it nearly forms a straight border. The two lateral sides are straight and the distal border is very convex or breaks into two sides united by a rounded obtuse angle. Then they become wider than long. They are contiguous.

The very prominent lateral plates have at first nine to ten spines, very thick, cylindrical and keeping nearly the same width up to the end that is obtuse. The ventral spines are finely toothed their entire length, while the dorsal spines show teeth only toward their end. The length increases from the first spine that is equal to the article, up the last that equals three articles.

The spines of the first article are near the median line, but without forming a continuous row from one side of the arm to the other.

The tentacle scale is very large, elongated and cylindrical and keeps the same width up to the end that is sometimes even a little enlarged. The surface of the scale is rugose and we even see distinct teeth toward the end.

SIMILARITIES AND DIFFERENCES. — *O. notata* is distinguished from other true *Ophiacantha* by the particular form of the buccal shields that are longer than wide, a form that we see only in *O. rosea* and *cuspidata*. The tentacle scale and the ventral arm plates also make it recognizable.

14. OPHIACANTHA PARCITA nov. sp.

(Pl. II, fig. 33–35)

St. 114. 30 July 1883. Depth 663–598 m. One specimen.

The diameter of the disk is 9 mm. The arms are broken at 40 mm from the base, but they appear to be much longer.

The disk is rounded. The dorsal surface is uniformly covered with thin, elongated rods, narrow, terminated by some slightly divergent spinules. The radial shields are distinct. They are small, triangular and widely separated. The ventral surface has distinct plates that, in the distal region of this surface, have rods identical to those of the dorsal surface but that are bare in the proximal part. The bursal slits are narrow.

The buccal shields, of medium dimensions, are as long as wide. They have a triangular proximal region with a proximate angle so open that the two sides form a single curved line. The rounded lateral angles and a distal region forming a lobe that projects very strongly into the interradiial space. The very small adoral plates are slightly curved, a little thicker outside than inside, two times longer than wide. The oral plates are tall. The three lateral buccal papillae have a rugose surface. The external one is enlarged and the two others are conical. The unpaired papilla is more developed.

The dorsal arm plates are triangular, wider than long and very large, with a very open proximal angle, straight lateral borders and a slightly convex distal side. They are separated.

The first ventral plate is small and triangular. The following ones are pentagonal with an obtuse proximal angle. They are as long as wide and separated after the second plate.

The very prominent lateral plates have nine spines at the base of the arms. These spines are very thick and slightly pointed at the end. The two lateral rows are widely separated from each other on the dorsal surface of the first arm article. The ventral spine is equal to the article. The last dorsal one is at first equal to three articles and then to two. The ventral spines are finely toothed on a more or less large part of their length, principally in their distal half. The dorsal spines are very few or even absent.

The very developed tentacle scale is enlarged, obtuse and rugose at the end.

SIMILARITIES AND DIFFERENCES. — *O. parcita* is easily recognized by the size of the tentacle scale and the form of the buccal shields.

OPHIOLEDA nov. gen.

This genus is distinguished from the genus *Ophioplinthaca* as defined by Verrill by the absence of large marginal plates all along the interradial notches of the disk. The adoral plates are enlarged outside and separate the buccal shield from the first lateral arm plate. The external buccal papilla is very enlarged and rectangular. The radial shields are contiguous.

These characters have appeared to me so important to make it necessary to create a new genus distinct from the genus *Ophioplinthaca* and other genera taken by Verrill from the genus *Ophiomitra*.

15. OPHIOLEDA MINIMA nov. sp.

(Pl. II, fig. 31 and 32)

St. 39. 15 August 1881. Depth 1,037 m. Several specimens.

St. 47. 19 July 1882. Depth 1,350 m. Four specimens.

The species is very small and in none of the numerous specimens collected does the disk diameter exceed 3.5 mm. The arms are thin and moniliform and measure 20 to 25 mm in length.

The disk is profoundly notched in the interradial spaces and very projected from each side of the base of the arms. The central part has small plates irregularly rounded and become a little larger outside the radial shields. There are no large marginal plates. Several of these plates have a conical and pointed spine, except in the central region of the disk. The radial shields are very large, triangular and contiguous outside, slightly divergent inside and separated by a small triangular plate. They are larger than half the disk radius.

The ventral surface of the disk is covered with very large polygonal plates. Those in the periphery of the disk have spines. The bursal slits are narrow but very apparent.

The buccal shields are small, triangular, as long as wide or a little wider than long with slightly rounded borders. The adoral plates are remarkably large and elongated, wider outside than inside. They separate the buccal shields from the first lateral arm plate. The oral plates are small and triangular. The lateral buccal papillae number three. The distal one is very large, widened and rectangular. The second is nearly square. The proximal one is small and pointed. The terminal papilla is very developed, thick and conical.

The dorsal arm plates are relatively very large and triangular, with slightly rounded borders. They are separated after the first.

The first ventral arm plate is very small and pentagonal. The following one are large, pentagonal, as long as wide and widely separated.

The lateral plates are very prominent. They give the arms their moniliform aspect. They have at first seven to eight spines that, on the first article, are united in a continuous row on the dorsal surface of the arm. These spines are thin, elongated and smooth and the

dorsals reach the length of three articles. Then the number of spines decreases like their size and falls to five. The ventral spines then equal the article and the dorsal spines do not exceed one and a half articles.

The tentacle scale is at first very wide on the two first articles. Then it becomes thin and pointed beyond the disk.

16. OPHIOTHRIX INDIGNA nov. sp.

(Pl. III, fig. 38–42)

St. 36. 29 July 1882. Depth 130 m. One specimen.

The diameter of the disk is 13 mm. The length of the arms is about 73 mm.

The disk is rounded. The dorsal surface has, between the radial shields, small dense rods, short and thick, having at their end some unequal, slightly divergent points that extend toward the periphery. The radial shields are large and triangular. Their radial border are parallel and separated their entire length by a row of elongated plates whose proximal parts alone have rods identical to those of the rest of the dorsal surface. These shields are granulose and absolutely bare. Their length is equal to three quarters of the radius of the disk.

The ventral surface is bare except on the small triangular space at the edge of the disk.

The bursal slits are narrow. The genital scales are slightly prominent.

The buccal scales are small, triangular and stocky. The proximate angle is slightly marked. The lateral angles are rounded and the distal border is very convex. The adoral plates are short, very thick, slight rounded and as wide inside as outside. The oral plates are small. The small toothed papillae form two external rows and two median rows.

The arms are flat. The dorsal arm plates have, at least in the first third of the arm, a very particular form. They are much wider than long, elliptical with rounded lateral angles. Then they become smaller and take little by little a fan shape (fig. 40) with the proximal angle truncated, the distal border convex and the very sharp lateral angles as we usually see in the group of *O. fragilis*. All three plates are contiguous. The surface of the enlarged plates at the beginning of the arm is coarsely granular.

The two first ventral arm plates are quadrangular, a little longer than wide. The following ones are wider than long, with the distal border wide and indented, the proximal border narrower, and the lateral sides slightly divergent. They are separated by a narrow membranous space.

The prominent lateral plates have at first nine spines. The number then decreases to eight. Their length increase progressively up to the eighth that equals two articles. The ninth is generally shorter. The dorsal spines are remarkably enlarged and thick in the proximal half, while thin in the other half. All are strongly toothed, especially in their distal half. They are white and opaque.

The tentacle scale is small and rounded.

The color of the specimen is pink gray with a brown patch on nearly all the dorsal arm plates.

SIMILARITIES AND DIFFERENCES. — *O. indigna* belongs to the group *fragilis*. It is distinguished from all the species of this group by the short, thick spines, by the form of the dorsal arm plates and by the brown patches on these plates.

I assigned to *O. indigna* two specimens collected 10 August 1882 at 360 m depth that have the same characters as the type specimen but that are smaller (the disk diameter is respectively 8 and 9 mm). The dorsal arm plates have at the base of the arms and on their entire length the fan shaped form that the large specimen shows only beyond the first third. The dorsal spines are also less enlarged. Without doubt these specimens still have not acquired their definitive characteristics, but it appears to me difficult to separate them from *O. indigna*.

17, OPHIOTHRIX INDUCTA nov. sp.

(Pl. I, fig. 17–19)

St. 69, 9 July 1883. Depth 400 m. One specimen.

The diameter of the disk is 11 mm. The length of the arms is 60 mm.

The disk is rounded, slightly projecting in the interradial spaces. The dorsal surface is nearly completely filled by very large radial shields that are triangular and longer than four fifths of the disk radius. The shields of each pair are separated by one or two rows of thin, elongated plates. They are very slightly divergent. The interradial spaces have four to five rows of plates, each with a small conical granule. The central region of the disk has analogous plates, but smaller, so that the granules are denser. At the periphery of the disk, the granules are elongated into small rods ending in some short, unequal spinules.

The ventral surface of the disk is bare. The bursal slits are narrow. The genital scales are very projecting.

The buccal shields, of medium size, are lozenge shaped, much wider than long, with the sharp proximal angle limited by slightly notched sides and two slightly sinuous borders. The adoral plates are short, thick and very wide. The oral plates are short and thick. The tooth papillae have two external rows and three or four median rows. They are small.

The dorsal arm plates are large, wider than long. The prominent distal angle and the sides that limit it are slightly indented. They slightly imbricated and not keeled.

The first ventral arm plate is small, triangular and longer than wide. The second is also rectangular, longer than wide and a little wider outside than inside. The following ones become wider than long. Their proximal and distal borders are slightly concave. These plates become hexagonal by the development of each of lateral borders into two small sides. They are separated from each other by a narrow membranous interval.

The lateral plates project and have eight spines whose length and especially the thickness increases from the first ventral that is very slender to the sixth that is equal to two articles. The seventh and eighth spines are a little smaller. These spines are thin, obtuse, relatively short and covered with fine teeth.

The tentacle scale is very strong. It is rather quadrangular with an obtuse free border.

SIMILARITIES AND DIFFERENCES. — *O. inducta* belongs to the *fragilis* group, but it is easily characterized by its remarkably large radial shields, by its distinct dorsal plates of the disk and finally by its sort and thick arm spines.

I consider as belonging to *O. inducta* four small specimens from station 103. The diameter of their disk varies between 6 to 9 mm, but the characters of these specimens are not sufficiently clear for the determination to be certain.

#### 18. ASTROSCHEMA INORNATUM nov. sp.

(Pl. III, fig. 45 and 47)

Station 141. 30 August 1883. Depth, 1,480 m. Two specimens.

The diameter of the disk is 6 and 7 mm, respectively. The arms do not appear to be very long, but it is impossible to evaluate their length because of the very tight coiling.

The disk is very notched in the interradial spaces. The radial sides are wide and very apparent. The bursal slits are wide, but scarcely visible from the dorsal surface of the disk. The dorsal surface of the arms is very convex and the ventral surface is flat. The height is first equal to the width, then it becomes a little larger. From their origin at the disk, the width of the arms decreases in a nearly insensible way to their end.

The entire animal, disk and arms, is covered with fine, contiguous granules, rounded or slightly conical. These granules are a little more developed along the bursal slits. The teeth are conical.

The first podial pores do not have a scale. The four or five following ones have only one and the second does appear only as a general rule at the seventh pore. The internal scale is elongated very rapidly, but it never becomes very long and its length is not quite that of an article and a half. It is swollen toward its end that has some conical points. Toward the end of the arms, this scale becomes very small, without however transforming into a hook. The external scale always remains very small and has the form of a conical spine.

The color of the specimens in alcohol is whitish.

SIMILARITIES AND DIFFERENCES. — *A. inornatum* is near *A. salix* Lyman that it recalls by the first podial pores with a single scale. It differs from it by the very distinct radial sides and forming a very marked projection, by the arms not abruptly decreasing in width at a short distance from their origin and finally by the whitish color of specimens preserved in alcohol.

19. OPHIOTHRIX LÜTKENI Wyville Thompson.

(Pl. III, fig. 43–45)

St. 8. 12 July 1882. Depth 400 m. Several specimens.

This species still has been described only very summarily and it has never been figured. It appears to me useful to give a detailed description and figures.

The specimens reach a very large size. The diameter of the disk can measure from 15 to 20 mm and arms reach 150 mm in length.

The disk is rounded, more or less prominent in the interradi al spaces. It has, between the large radial shields, some very distinct plates, round in the central part, a little elongated in the radial and interradi al spaces. Each plate has a spine usually strong and very elongated. These spines are longer in the central region and they become smaller toward the periphery. They end sometimes in an obtuse point, sometimes in two or three small divergent spinules. The radial shields are very large, nearly contiguous outside and slightly divergent inside where they are separated by three or four rows of plates. We always find on their surface some small spines analogous to those of the rest of the disk but more slender and shorter. These spines are irregularly distributed on the surface of the shields and they are more or less numerous according to the specimen.

The ventral surface of the disk has spines analogous to those of the dorsal surface, but that become smaller and smaller and rarer toward the buccal shields. The bursal slits are very wide. The genital scales are projecting.

The buccal shields are small, triangular, much wider than long, with a sharp proximal angle, rounded lateral angles and a convex distal border having in its middle a small, more or less marked lobe. The adoral plates, of medium size, are slightly arced, narrow inside and enlarged outside. The oral plates are short and wide. The dental papillae are arranged in an enlarged oval, having two external rows and three median rows.

The dorsal arm plates are large, much wider than long and keeled. Their form is very variable. Ordinarily they are fan-shaped, with a very wide and convex distal border and strongly divergent lateral sides. Sometimes the distal border is separated into three sides and the plates become hexagonal. They are slightly imbricated and contiguous. In the adult specimens, we always find on the surface of these plates, and especially near the distal border, small fine spines that are more or less numerous according to the specimens and that resemble those of the radial shields.

The first ventral plate is very large and trapezoidal. The two or three following ones are longer than wide, but then they become wider than long with a straight proximal border, narrower than the distal border that is notched and connected by a rounded angle to the divergent lateral sides.

The lateral plates are projecting. At the base of the arms they have eight spines whose length increases from the first to the seventh that is equal to two and a half articles. The first two ventral spines are very slender and the eighth dorsal spine is often very small. All these spines are transparent.

The tentacle spine is very large with a truncated distal border.

The specimens in alcohol are slightly pink.

SIMILARITIES AND DIFFERENCES. *O. Lütkeni* was placed by Lyman in the *fragilis* group. It recalls, in fact, by its characteristics some forms of this very polymorphic species, notably *O. pentaphyllum*. But it cannot be maintained in this group characterized by Lyman himself by the bare radial shields.

The young specimens generally do not have spines on the dorsal arm plates. Also I believe I can refer to *O. Lütkeni* some specimens of small size coming from different stations, whose dorsal arm plates are bare but that by other characters are better referred to *O. Lütkeni*.

## 20. ASTRODIA TENUISPINA (VERRILL).

(PL. III, FIG. 48–50)

- St. 3. 15 June 1881. Depth 3,307 m. One specimen.
- St. 5. 15 June 1881. Depth 3,165 m. One specimen.
- St. 13. 27 June 1881. Depth 2,365 m. Two specimens.

This species was first described by Verrill under the name of *Astronix tenuispina* and then under that of *Hemieuryale tenuispina*. This author later believed the genus *Astrodia* should separate this ophiuroid from the two genera above. As the descriptions of Verrill are very summarized and are not accompanied by figures, it seems to me useful to describe with some details this interesting ophiuroid and to publish figures.

In the largest specimen from station 13, the diameter of the disk is about 6 mm. The arms are very long, but they are strongly twisted and their length cannot be evaluated exactly. The disk is pentagonal and even a little notched in the interradial spaces. The dorsal surface is covered with spines excessively thin, rounded, unequal, not imbricated and with a rough surface. The radial sides are elongated, but they do not reach the center of the disk. They are widened outside, slightly prominent in their distal region that is not covered by scales. The two sides of each pair are widely separated.

The ventral surface of the disk has scales analogous to those of the dorsal surface. The bursal slits are very short and narrow, located outside the adoral plates.

The buccal shields are small and triangular, with an obtuse proximal angle and a rounded distal border. They are wider than long. The adoral plates are very developed, very long, a little wider inside than outside. The oral plates are very large and triangular. There are three or four buccal papillae, arranged in a regular row. They are very low and their limits are not distinct. Their free border is finely toothed. The lower tooth is not different from the following ones. It is large, triangular with finely toothed borders.

I cannot distinguish on my specimens the thin scales that Verrill reported on the dorsal surface of the arms and that, according to this author, are identical to those that we find on the disk. I recognize them only on the first brachial article.

We distinguish easily the contours of the first ventral arm plate that is very large and trifoliate, with rounded angles. The following ones are indistinguishable.

The arm spines begin to be seen on the third article. There are at first two and then three. The internal spine is more developed than the others and its length comes to equal the article. It is enlarged in its terminal part and has several teeth. The other spines are much shorter, especially the external one. Their end is not enlarged but has nevertheless some teeth.

## EXPLANATION OF THE PLATES

### PLATE I

- Fig. 1. *Pectinura elata*. Ventral surface. X2
- Fig. 2. *Pectinura elata*. Lateral surface of the arm. X2
- Fig. 3. *Pectinura elata*. Dorsal surface. X6
- Fig. 4. *Ophioglypha mundata*. Dorsal surface. X6
- Fig. 5. *Ophioglypha mundata*. Ventral surface. X6
- Fig. 6. *Ophioglypha mundata*. Lateral surface of the arm. X6
- Fig. 7. *Ophioglypha imprudens*. Dorsal surface. X6
- Fig. 8. *Ophioglypha imprudens*. Ventral surface. X6
- Fig. 9. *Ophiocten latens*. Dorsal surface. X6
- Fig. 10. *Ophiocten latens*. Ventral surface. X6
- Fig. 11. *Ophiozona sincera*. Dorsal surface. X11
- Fig. 12. *Ophiozona sincera*. Ventral surface. X11
- Fig. 13. *Ophiocrates secundus*. Dorsal surface. X3
- Fig. 14. *Ophiocrates secundus*. Ventral surface. X3
- Fig. 15. *Ophiocamax dominans*. Dorsal surface. X2
- Fig. 16. *Ophiocamax dominans*. Ventral surface. X2
- Fig. 17. *Ophiothrix inducta*. Dorsal surface. X5
- Fig. 18. *Ophiothrix inducta*. Ventral surface. X5

Fig. 19. *Ophiothrix inducta*. Arm spines. X13.

## PLATE II

- Fig. 20. *Ophiomedia duplicata*. Dorsal surface. X10  
Fig. 21. *Ophiomedia duplicata*. Ventral surface. X10  
Fig. 22. *Ophiochiton solutum*. Dorsal surface. X 2  
Fig. 23. *Ophiochiton solutum*. Ventral surface X2  
Fig. 24. *Amphiura instructa*. Dorsal surface. X11  
Fig. 25. *Amphiura instructa*. Ventral surface. X11  
Fig. 26. *Ophiacantha decipiens*. Dorsal surface. X3  
Fig. 27. *Ophiacantha decipiens*. Ventral surface. X3  
Fig. 28. *Ophiacantha notata*. Dorsal surface of arms. X5  
Fig. 29. *Ophiacantha notata*. Ventral surface. X5  
Fig. 30. *Ophiacantha notata*. Rods of the dorsal surface of the disk. X50  
Fig. 31. *Ophioleđa minima*. Dorsal surface. X 13  
Fig. 32. *Ophioleđa minima*. Ventral surface. X3  
Fig. 33. *Ophiacantha parcita*. Dorsal surface. X5  
Fig. 34. *Ophiacantha parcita*. Ventral surface. X5  
Fig. 35. *Ophiacantha parcita*. Rods of the dorsal surface of the disk. X40

## PLATE III

- Fig. 36. *Amphiura digna*. Dorsal surface. X8  
Fig. 37. *Amphiura digna*. Ventral surface. X8  
Fig. 38. *Ophiothrix indigna*. Dorsal surface. X3  
Fig. 39. *Ophiothrix indigna*. Ventral surface. X3  
Fig. 40. *Ophiothrix indigna*. Dorsal surface of the arms toward the middle of their length. X3  
Fig. 41. *Ophiothrix indigna*. Arm spines. X8  
Fig. 42. *Ophiothrix indigna*. Rods of the dorsal surface of the disk. X16  
Fig. 43. *Ophiothrix Lütkeni*. Dorsal surface. X3  
Fig. 44. *Ophiothrix Lütkeni*. Ventral surface. X3  
Fig. 45. *Ophiothrix Lütkeni*. Rods of the dorsal surface of the disk. X15

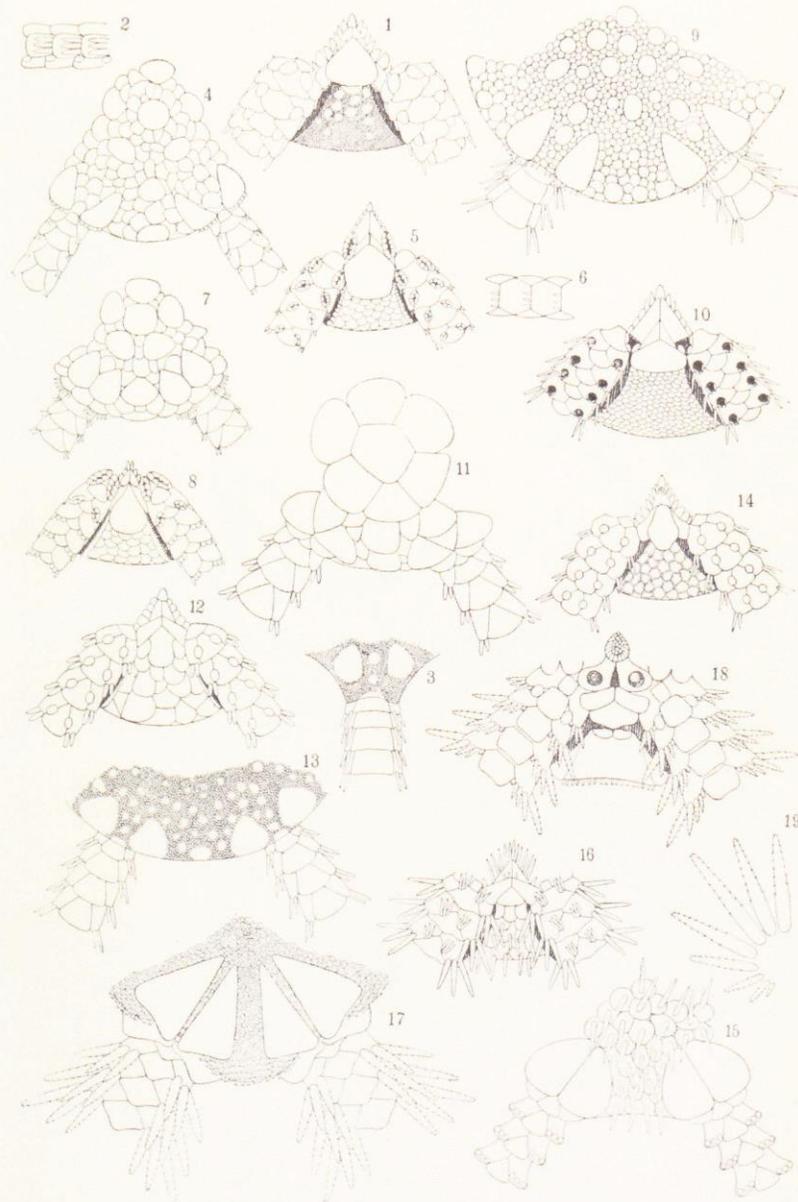
Fig. 46. *Astroschema mornatum*. Ventral surface. X4

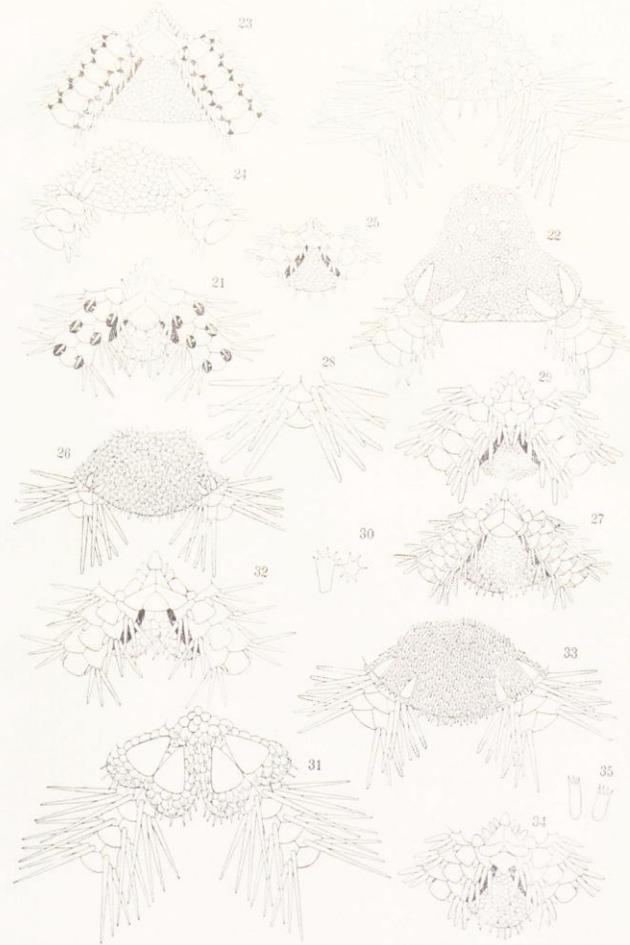
Fig. 47. *Astroschema mornatum*. Lateral surface of the arm. X20

Fig. 48. *Astrodia tenuispina*. Dorsal surface. X 3

Fig. 49. *Astrodia tenuispina*. Ventral surface. X7

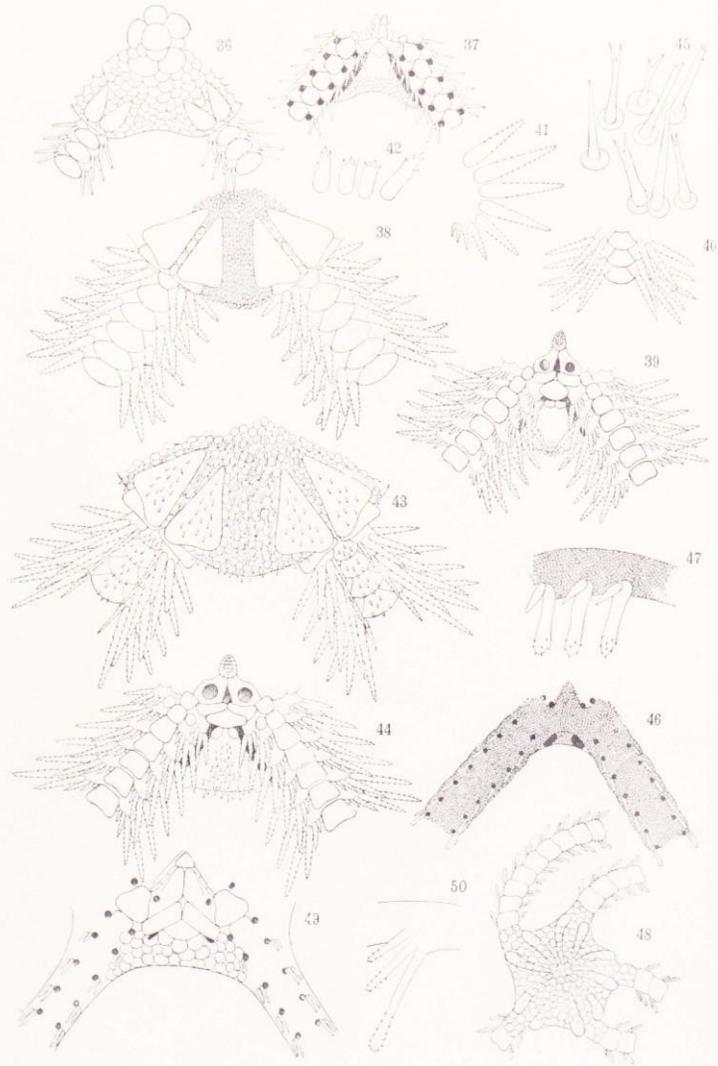
Fig. 50. *Astrodia tenuispina*. Lateral surface of the arm. X8





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