1900

Ophiuroids Collected by the Investigator in the Indian Ocean. II.
The Littoral Ophiuroids: A Translation of *Ophiures Recueillies par*
l'Investigator dans l'Océan Indien. II. Les Ophiures Littorales

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OPHIURES

RECUEILLIES PAR

L'INVESTIGATOR

DANS

L'OCÉAN INDIEN

PAR

R. KOEHLER,

PROFESSEUR DE ZOOLOGIE A L'UNIVERSITÉ DE LYON.

II. LES OPHIURES LITTORALES.

CALCUTTA.

1900.

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Translator's note.

The illustrations of the ophiuroids collected by the Investigator are not in this publication. They were published separately in "Illustrations of the shallow-water Ophiuroidea collected by the Royal Indian Marine Survey ship Investigator".

Køehler's name is spelled Koehler on the cover, Køehler in the text. I have not changed these.

OPHIUROIDS
COLLECTED BY THE "INVESTIGATOR"
IN THE INDIAN OCEAN.

By **R. KOEHLER.**

PROFESSOR OF ZOOLOGY AT THE UNIVERSITY OF LYON

THE LITTORAL OPHIUROIDS.

The plates included in the present fasciculus represent the new species and some species already known of littoral species collected by the INVESTIGATOR in the Indian Ocean. The reader is asked to refer, for the description of the species figured to the work that I published in 1898 in the *Bulletin Scientifique de la France et de la Belgique*, volume XXXI under the title *Echinodermes recueillis par l'Investigator dans l'Océan Indien. Deuxieme mémoire: les Ophiures littorales*. A single species, *Ophiothrix innocens*, is not mentioned in this memoir. Its description was published in the *Bulletin de la Société Zoologique de France*, 1898, under the title *Description d'une Ophiure nouvelle de l'Océan Indien*.

I include in the littoral ophiuroids all the species that the "Investigator" captured at depths to 40 fathoms. This distinction between the littoral forms and deep-sea forms was all the better indicated because between this depth of 40 fathoms and 112 fathoms that is the upper limit of deep-sea species studied in a previous memoir, the "Investigator" did not collect any ophiuroids.

The fauna of littoral ophiuroids in the Ind-Pacific domain has already been the subject of numerous works, among which those of von Martens, of Brock, of P. de Loriol and of Döderlein come first. This fauna is remarkably rich and varied. Some genera are represented by numerous species. The genus *Ophiothrix* notably has at this time at least fifty representatives in this large ocean domain. Brock, who gave in 1888 a review of all known species at that time in the Indo-Pacific region, arrived at a total of 132 different forms, from which we must remove some synonyms. We can add to the list this author gave and in addition some species that he forgot, the ophiuroids of the Korean Sea, Duncan, and around forty others that have been reported since the publication of his work by P de Loriol, by Studer, by Döderlein, etc., following the investigations of Bedot at Amboin, of Semon in the Torres Strait and at Amboin, as well as the discoveries of the "Gazelle" and of the "Pinguin." Finally, to complete this enumeration, it is appropriate to add

eighteen species collected by the “Investigator” and that are new or that had not been mentioned in the Indo-Pacific domain. I have found some species that have already been reported by Duncan in the seas of China. It is probably that the other species found in these seas will be collected in the Indian Ocean.

The list of presently known ophiuroids in the Indo-Pacific domain contains thus 193 species.

Fifty species were collected by the “Investigator” that can be divided into:

Ophiuroids strictly speaking.....47
Astrophytonidæ..... 3

There are 15 new species or varieties, with 14 true ophiuroids and one Astrophytonidæ. The latter belongs to a new genus.

The fourteen new species or varieties, of new ophiuroids are distributed into genera in the following manner:

<i>Ophiolepis</i>	1 species.
<i>Amphiura</i>	1 species.
<i>Ophiopsila</i>	1 species.
<i>Ophiocoma</i>	1 species.
<i>Ophiacantha</i>	2 species.
<i>Ophiomaza</i>	1 species.
<i>Ophiothela</i>	1 variety.
<i>Ophiothrix</i>	5 species.
<i>Ophiomyxa</i>	1 variety.

A special mention should be made for the two new species of *Ophiacantha*. This genus had until this day very few littoral species being, in particular, very poorly represented in the littoral fauna of the Indian and Pacific Oceans.

Among the species already known and that were found by the “Investigator,” some are very interesting to note because they have still been collected only in a single locality and the “Investigator” encountered them in a region more or less distant from this first locality. Their area of geographical distribution is considerably increased. These are notably the following species:

Ophioglypha stellata Studer,
Ophioglypha Forbesi Duncan,
Ophiocnida Picteti Lorient,
Amphiura Duncani Lorient,
Ophiostigma formosa Lutken,
Ophiocampsis pellucida Duncan,
Ophiopteron elegans Ludwig,
Ophiothrix vitrea Döderlein,
Ophiothrix lepidus Lorient.

In addition to the new species collected by the “Investigator”, I have believed it necessary to figure some species already known, but very insufficiently described that have not yet been represented, following the example of P. de Loriol and of Döderlein, whose so conscientious works greatly facilitate the task of their followers. Most of the old authors, Müller and Troschel, Grube, Peters, etc., have given some ophiuroids descriptions so summary and incomplete that it is difficult and sometimes impossible to recognize the species they have named, all the more that they have not published figures. This example has unfortunately been followed by Brock and sometimes by Lyman. It is especially in the study of numerous Indo-Pacific species of the genus *Ophiothrix* that we encounter these difficulties. I do not believe that the identification of *Ophiothrix* would be much more difficult than that of other ophiuroids if we had sufficient descriptions and especially of good figures. But presently, several species of this genus are impossible to identify for those who do not have the original specimens before their eyes. It is thus desirable that zoologists who have these specimens make a revision and publish descriptions with drawings making it possible to recognize the species they were used to establish.

I am happy to state here my thanks to MM. Döderlein, de Loriol and Marktanner for their extreme kindness in examining some doubtful specimens or comparing them to the types that they possessed and communicating to me very valuable information.

LIST OF SPECIES COLLECTED BY THE “INVESTIGATOR” IN THE INDIAN OCEAN.

1 <i>Pectinura gorgonia</i> (Müller and Troschel). (Pl. XV, fig. 1 and 2). 2 <i>Pectinura arenosa</i> Lyman. 3 <i>Ophioglypha sinensis</i> Lyman. (Pl. XV, fig. 6 and 7). 4 <i>Ophioglypha stellata</i> Studer. (Pl. XV, fig. 3, 4 and 5). 5 <i>Ophioglypha Forbesi</i> Duncan. 6 <i>Ophiolepis rugosa</i> nov. sp. (Pl. XV, fig. 8 and 9). 7 <i>Ophiolepis cincta</i> Müller and Troschel. 8 <i>Ophiocnida Picteti</i> Lorient. 9 <i>Ophiocnida echinata</i> (Ljungmann). (Pl. XVII, fig. 25). 10 <i>Amphiiira Duncan</i> Lyman. 11 <i>Amphiura relict</i>a nov. sp. (Pl. XVI, fig. 15 and 16). 12 <i>Ophiactis affinis</i> Duncan. 13 <i>Ophiactis sexradia</i> (Grube). 14 <i>Ophiopsila pantherina</i> nov. sp. (Pl. XVI, fig. 13 and 14). 15 <i>Ophionereis porrecta</i> Lyman. 16 <i>Ophiostigma formosa</i> Lutken. 17 <i>Ophiocoma lubrica</i> nov. sp. (Pl. XX, fig. 44 and 45). 18 <i>Ophiocoma scolopendrina</i> Agassiz. 19 <i>Ophiocoma brevipes</i> Peters. 20 <i>Ophiacantha decora</i> nov. sp. (Pl. XVI, fig. 10, 11 and 12). 21 <i>Ophiacantha vagans</i> nov. sp. (Pl. XVIII, fig. 29 and 30). 22 <i>Ophiomastix annulosa</i> (Lamarck). 23 <i>Ophiocnemis marmorata</i> (Lamarck). 24 <i>Ophiomaza cacaotica</i> Lyman. 25 <i>Ophiomaza mærens</i> nov. sp. (Pl. XXI, fig. 50 and 51).	26 <i>Ophiocampsis pellucida</i> Duncan. 27 <i>Ophiopteron elegans</i> Ludwig. 28 <i>Ophiothela Danæ</i> Verrill, 29 <i>Ophiothela Danæ</i> var. nov. <i>involuta</i>. 30 <i>Ophiothrix trilineata</i> Lütken. 31 <i>Ophiothrix striolata</i> Grube. 32 <i>Ophiothrix insidiosa</i> nov. sp. (Pl. XVII, fig. 22, 23 and 24). 33 <i>Ophiothrix speciosa</i> nov. sp. (Pl. XVII, fig. 17, 18, 19, 20 and 21). 34 <i>Ophiothrix hirsuta</i> Müller and Troschel. 35 <i>Ophiothrix longipeda</i> Müller and Troschel. 36 <i>Ophiothrix triloba</i> Martens. 37 <i>Ophiothrix nereidina</i> (Lamarck). 38 <i>Ophiothrix propinqua</i> Lyman. (Pl. XVIII, fig. 31 and 32; Pl. XIX, fig. 38). 39 <i>Ophiothrix stelligera</i> Lyman. 40 <i>Ophiothrix otiosa</i> nov. sp. (Pl. XIX, fig. 33, 34 and 35). 41 <i>Ophiothrix vitrea</i> Döderlein. 42 <i>Ophiothrix lepidus</i> Lorient. 43 <i>Ophiothrix diligens</i> nov. sp. (Pl. XXI, fig. 46, 47, 48 and 49). 44 <i>Ophiothrix innocens</i> nov. sp. (Pl. XVIII, fig. 26, 27 and 28; Pl. XIX, fig. 39). 45 <i>Ophiothrix comata</i> Müller and Troschel. (Pl. XX, fig. 40, 41, 42 and 43). 46 <i>Ophiarthrum elegans</i> Peters. (Pl. XIX, fig. 36 and 37). 47 <i>Ophiomyxa brevispina</i> Martins var. nov. <i>irregularis</i>. 48 <i>Sthenocephalus indicus</i> nov. gen., nov. sp. (Pl. XXI, fig. 52 and Pl. XXII, fig. 53). 49 <i>Euryale aspera</i> Lamarck. 50 <i>Astrophyton claratum</i> Lyman.

ECHINODERMA OF THE INDIAN MUSEUM.
OPHIUROIDEA.

ILLUSTRATIONS
OF THE
SHALLOW-WATER OPHIUROIDEA

COLLECTED BY THE
ROYAL INDIAN MARINE SURVEY SHIP
INVESTIGATOR

BY
R. KOEHLER,
PROFESSOR OF ZOOLOGY IN THE UNIVERSITY OF LYON.

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Translator's note.

The “Illustrations of the shallow-water Ophiuroidea collected by the Royal Indian Marine Survey ship Investigator” are those cited in the “List of species collected by the Investigator” in a separate publication, “Ophiuroids collected by the Investigator in the Indian Ocean. II. The littoral ophiuroids”.

The figures are not in this publication. They were published separately as “

Køehler's name is spelled Koehler on the cover and in the plate captions, Køehler in the text. I have not changed these.

EDITORIAL NOTE.

The Prefaces to the “*Investigator*” Reports issued last year explain how the “*Investigator*” collections came to be made and to find their way to the Indian Museum.

The present Fasciculus contains the figures of the Shallow-water Ophiuroidea described by Dr. Kœhler in the *Bulletin Scientifique de la France et de la Belgique* and in the *Bulletin de la Société Zoologique de France*, for 1898. The figures form eight plates, which are numbered XV–XXII in continuation of the plates of Deep-sea Ophiuroidea published last year.

I have, in behalf of the Trustees of the Museum and of the Naturalists of the “*Investigator*,” to record my best thanks to Dr. Kœhler for having carried an onerous voluntary undertaking to a happy issue.

A. Alcock, Major, I.M.S.,

Superintendent of the Indian Museum.

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XV.

- Fig. 1. — *Pectinura gorgonia* Müller and Troschel. Dorsal surface, Mag. 8.
Fig. 2. — *Pectinura gorgonia*. Ventral surface. Mag. 8.
(Echinodermes recueillis par "l'Investigator " dans l' Océan Indien. — Les Ophiures littorales. *Bulletin Scientifique de la France et de la Belgique*. Vol. XXXI, p. 58)
Fig. 3. — *Ophioglypha stellata* Studer, Dorsal surface. Mag. 15.
Fig. 4. — *Ophioglypha stellata*. Ventral surface. Mag. 15.
Fig. 5 — *Ophioglypha stellata*. Lateral view of an arm. Mag. 20.
(*Bulletin Scientifique*, p. 59)
Fig. 6. — *Ophioglypha sinensis* Lyman. Dorsal surface. Mag. 12.
Fig. 7. — *Ophioglypha sinensis*. Lateral view of an arm. Mag. 25.
{*Bulletin Scientifique*, p. 59)
Fig. 8. — *Ophiolepis rugosa* Koehler. Dorsal surface. Mag. 15.
Fig. 9. — *Ophiolepis rugosa*. Ventral surface. Mag. 15.
{*Bulletin Scientifique*, p. 64) Belgique. Vol. XXXI, p. 58)

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XVI.

Fig. 10. — *Ophiacantha decora* Koehler. Dorsal surface. Mag. 15.

Fig. 11. — *Ophiacantha decora*. Ventral surface. Mag. 15.

Fig. 12. — *Ophiacantha decora*. Cylinders of the dorsal surface of the disc. Mag. 100.
(*Bulletin Scientifique de la France et de la Belgique*, p. 80)

Fig. 13. — *Ophiopsila pantherina* Koehler. Dorsal surface. Mag. 17.

Fig. 14. — *Ophiopsila, pantherina*. Ventral surface of the disc. Mag. 17.
(*Bulletin Scientifique*, p. 72)

Fig. 15. — *Amphiura relictæ* Koehler. Dorsal surface. Mag. 20.

Fig. 16. — *Amphiura relictæ*. Ventral surface. Mag. 20.
(*Bulletin Scientifique*, p. 68)

R. Koenig del.

10-12. *Ophioscolex degeeri*.

15-16. *Amphura relicta*.

13-14. *Ophiopella parthurnia*.

A. C. Chubb, sculp.

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XVII.

- Fig. 17. — *Ophiothrix speciosa* Koehler. Dorsal surface of the disc. Mag. 9.
Fig. 18. — *Ophiothrix speciosa*. Ventral surface. Mag. 9.
Fig. 19. — *Ophiothrix speciosa*. Brachial spines. Mag. 20.
Fig. 20. — *Ophiothrix speciosa*. Two cylinders of the dorsal surface of the disc from the interradius. Mag. 40.
Fig. 21. — *Ophiothrix speciosa*. Two cylinders of the dorsal surface of the disk from the radius. Mag. 40.
(*Bulletin Scientifique de la France et de la Belgique*, p. 93)
Fig. 22. — *Ophiothrix insidiosa* Koehler. Dorsal surface of the disc. Mag. 15.
Fig. 23. — *Ophiathrix insidiosa*. Ventral surface of the disc. Mag. 15.
Fig. 24. — *Ophiathrix insidiosa*. Brachial spines. Mag. 30.
(*Bulletin Scientifique*, p. 91)
Fig. 25. — *Ophiocnida echinata* (Ljungmann). Ventral surface of the disc. Mag. 8.
(*Bulletin Scientifique*, p. 67)

H. Koehler, del.

14-21 *Ophiotrix* *sp. nov.* 22-24 *Ophiotrix* *umbrosa* 25 *Phacelia* *eximius*

A. J. Chavigny, del.

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XVIII.

- Fig. 26. — *Ophiothrix innocens* Koehler. Dorsal surface. Mag. 15.
Fig. 27. — *Ophiothrix innocens*. Cylinders of the dorsal surface of the disc. Mag. 50.
Fig. 28. — *Ophiothrix innocens*. Brachial spines. Mag. 40.
(Description d' une nouvelle espèce d' Ophiure de l' Océan Indien.
Bulletin de la Société Zoologique de France. 1898)
Fig. 29. — *Ophiacantha vagans* Koehler. Dorsal surface. Mag. 20.
Fig. 30. — *Ophiacantha vagans*. Ventral surface. Mag. 20.
(*Bulletin Scientifique de la France et de la Belgique*, p. 82)
Fig. 31. — *Ophiothrix propinqua* Lyman. Dorsal surface. Mag. 15.
Fig. 32. — *Ophiothrix propinqua*. Ventral surface. Mag. 15.
(*Bulletin Scientifique*, p. 97)

II. Keel-like form.

28-32 *Crepidula murex*. 33-37 *Crepidula verna*. 38-42 *Crepidula pectoris*.

Pl. 1. 1865.

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XIX.

- Fig. 33. — *Ophiothrix otiosa* Koehler. Dorsal surface, Mag. 20.
Fig. 34. — *Ophiothrix otiosa*. Ventral surface. Mag. 20.
Fig. 35. — *Ophiothrix otiosa*. Brachial spines. Mag. 40.
(*Bulletin Scientifique de la France et de la Belgique*, p. 99)
Fig. 36. — *Ophiarthrum elegans* Peters. Dorsal surface. Mag. 5.
Fig. 37. — *Ophiarthrum elegans*. Ventral surface. Mag. 5.
(*Bulletin Scientifique*, p. 108)
Fig. 38. — *Ophiothrix propinqua* Lyman. Brachial spines. Mag. 40.
(*Bulletin Scientifique*, p. 97)
Fig. 39. — *Ophiothrix innocens* Koehler. Ventral surface. Mag. 15.
(*Bulletin de la Société Zoologique de France*, 1898)

H. Koehler del.

33-35. *Ophiotrix atona*.

36-37. *Ophiotrix elegans*.

38. *Ophiotrix imbecilis*.

39. *Ophiotrix propinqua*.

A. C. Duerksen, lith.

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XX.

- Fig. 40. — *Ophiothrix comata* Müller and Troschel. Dorsal surface. Mag. 12.
Fig. 41. — *Ophiothrix comata*. Ventral surface. Mag. 12.
Fig. 42. — *Ophiothrix comata*. Brachial spines. Mag. 16.
Fig. 43. — *Ophiothrix comata*. Cylinders of the dorsal surface of the disc. Mag. 100.
(*Bulletin Scientifique de la France et de la Belgique*, p. 105)
Fig. 44. — *Ophiocoma luhrica* Koehler. Dorsal surface. Mag. 20.
Fig. 45. — *Ophiocoma luhrica*. Ventral surface. Mag. 20.
(*Bulletin Scientifique*, p. 76)

Fig. 42. Ophuridea.

Fig. 43. Ophuridea. crinoid. 44-46. Ophuridea. crinoid.

Fig. 44. Ophuridea.

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XXI.

- Fig. 46. — *Ophiothrix diligens* Koehler. Dorsal surface. Mag. 25.
Fig. 47. — *Ophiothrix diligens*. Ventral surface. Mag. 25.
Fig. 48. — *Ophiothrix diligens*. Brachial spines. Mag. 30.
Fig. 49. — *Ophiothrix diligens*. Cylinders of the dorsal surface of the disc. Mag. 60.
(*Bulletin Scientifique de la France et de la Belgique*.p. 103)
Fig. 50. — *Ophiomaza moereus* Koehler. Dorsal surface. Mag. 5.
Fig. 51. — *Ophiomaza moerens*. Ventral surface. Mag. 5.
(*Bulletin Scientifique*, p, 85)
Fig. 52. — *Sthenocephalus indiens* Koehler. Ventral surface. Mag. 2.
(*Bulletin Scientifique*, p. 112)

EXPLANATION OF THE PLATES.

OPHIUROIDS.

(by **R. Koehler** at Lyon)

PLATE XXII.

Fig. 53. — *Sthenocephalus indiens* Koehler. Dorsal surface. Natural size.
(*Bulletin Scientifique de la France et de la Belgique*, p. 112)

H. Kessler, del.

83 Sphaerocephalus indiensis

G. C. Morduk, lith.