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Mus. Comp. Zool. of Harvard College, pp. 113-119,

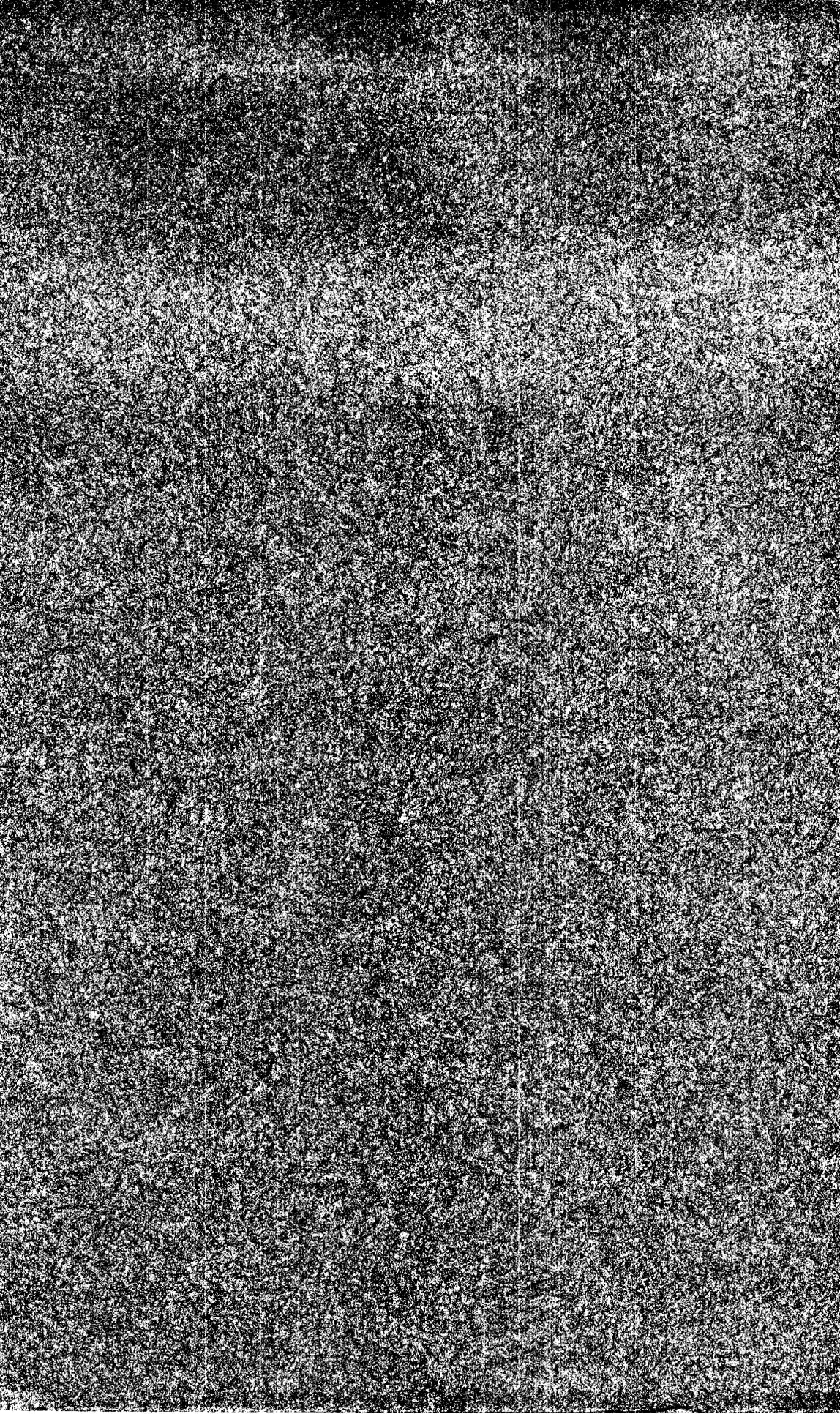
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Description of Lucifer Typus. M. Edw.?

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DURING the early part of August a few specimens of the genus *Lucifer* were taken at night with the hand net, at the surface of the water, in the vicinity of Fort Wool, by Mr. August Schmidt.

As far as I know, this is the first record of the occurrence of this interesting genus on our shores. Messrs. Smith and Harger took a few specimens (species undescribed and undetermined) east of George's Bank, Lat. 41° 25' N., Long. 65° 5' to 30' W., (Note 1.) The described species have come from various points in the Mediterranean, Atlantic, Pacific and Indian Oceans.

DESCRIPTION.

Antennary segment twice as long as the carapace. A small spine (Figure 1, *s*,) projects from its anterior margin at the base of the eye-stalks.

There is no clear line of demarcation between the antennary segment and the carapace.

Carapace about as long as the first abdominal segment. Its inferior borders crenate. A minute spine on each side. (Figure 1, ζ.)

The first five segments of the abdomen are about equal in size, their latero-inferior margins produced into an obtuse angle at the middle. The sixth segment of the abdomen is almost twice as long as the preceding ones, and is furnished with two teeth on the lower border on either side; the anterior tooth is pointed; the posterior, blunt.

The eye-stalks are clavate, and less than one-half as long as the antennary segment.

The peduncle of the first antennae is composed of a basal segment nearly equal in length to the ocular peduncle, and two short segments. The proximal end of the basal segment is slightly enlarged for the accommodation of the auditory sac with its enclosed otolith. (Figure 1, ε.) (Note 2.) The peduncle bears a long multiarticulate flagellum, the proximal annuli of which are furnished with short setae.

The peduncle of the second antennae is composed of two segments. Of these, the first is very short, and bears a short "olfactory denticle." The second segment is much longer, but not equal to the proximal segment of the first

antennae. The flagellum is apparently about as long as the flagellum of the first pair. The second antennae bear at their base, externally, an "antennal scale," (Figure 1, *d*,) which is fringed with numerous setae, and equals the eye-stalks in length.

The mouth is bounded in front by a large labrum, (Figure 1, *e*; Figure 2, *a*,) then follow a pair of mandibles, (Figure 2, *b*,) and a bilobed metastoma. (Figure 2, *c*,) The first maxillae consist of a small setiferous inner lobe, (Figure 2, *d''*,) a larger outer lobe (Figure 2, *d'*,) also armed with setae, and a palpus. (Figure 2, *d'''*,) The second maxillae (Figure 2, *e'*,) possess a "scaphognathite," (Figure 2, *e''*,) but their structure was not made out in detail. The first maxillipeds (Figure 2, *f*,) are two-jointed, the terminal segment beset with setae on its inner border.

The second maxillipeds (Figure 1, *f*, Figure 2, *g*,) are made up of six segments, the three distal bent back upon the preceding ones. All the segments of this appendage and the four following pairs bear scattered setae.

The four following pairs of appendages (third maxillipeds and first, second and third "deca-podal" legs,) are bent forward. The second pair is the shortest, next in length comes the first pair, next the third, the last being the longest, and furnished with a minute claw at the extremity.

There is no trace of the fourth and fifth pair of "decapodal" legs, nor of outer branches on any of the thoracic pairs.

The first pair of abdominal appendages in this (male) specimen are armed with the peculiar prehensile organ (Figure 1, *m'*) which is commonly found in the males of this genus. It consists of a movable piece (Figure 3, *a*) which closes upon a blunt process, (Figure 3, *b*) tipped with minute teeth. There is but one terminal branch.

The second pair of abdominal appendages have three terminal branches, (Figure 1, *n'*, *n''*, *n'''*), the remaining four pairs possess two terminal branches. The outer branch of the last pair (Figure 1, *r'*) is longer than the inner branch, (about one-third longer than the telson,) and is produced at postero-lateral angle into a sharp tooth. The terminal branches of all the abdominal limbs are furnished with setae, excepting the short plate-like third branch of the second pair, (Figure 1, *n'''*.)

Length, 9 millimetres.

The single specimen obtained agrees in most respects with the description of the earliest known species by J. R. Thompson, (Note 3.) It differs noticeably, however, in the shorter eye-stalks. In this it agrees better with *Lucifer Regnaudii*, M. Edw., (Note 4.) In view of the unsatisfactory description of the known species, I have thought best not to impose a new specific name upon this

specimen until sufficient material is at hand for a critical revision of the species.

CAMBRIDGE, *January 9th, 1879.*

NOTES.

1. Report on the Dredgings in the region of St. George's Banks, in 1872. By S. J. Smith and O. Harger. Trans. Conn. Acad. Arts and Sci., III, 26, 1874.

2. The auditory apparatus of *Lucifer* was first observed by SOULEYET, (Comptes Rendus, XVII, 665, *note*, 1843; Froriep's Neue Notizen, XXVIII, 84, *note*, 1843.) Later it was described and figured by HUXLEY. (Notes and Observations made on board H. M. S. Rattlesnake during the years 1846-50. Ann. Mag. Nat. Hist., 1851, p. 305, Pl. XIV, Fig. 1.) *Cf.* also, KRÖYER, Forsøg til en mongraphisk Fremstilling af Kræbsdyrslægten Sergestes. Med Bemærkninger om Dekapodernes Horeredskaber. Kong. Dansk. Vidensk. Selsk. Skrifter. V, Naturvidensk og Math., Afd. IV, 293, Tav. V, Fig. 20, 1859. HEUSEN, Studien über das Gehörorgan der Decapoden. Zeits. Wiss. Zool., XIII, 383, 1863.

3. Zoölogical Researches and Illustrations, p. 58, Pl. VII, Fig. 2, 1829. Thompson's specimen was taken in the Atlantic, Lat. 11° 56' N., Long. 32°

55' W. He described it under the generic name simply. The trivial name *typus* was given later by Milne Edwards, (Hist. Nat. des Crustacés, II, 469, 1837.)

4. *Loc. cit.*, Pl. 26, Fig. 10. From the Indian Ocean.

Besides the above cited works, *cf.*, with reference to *Lucifer*, DANA, Crust. U. S. Explor. Exped., pp. 668-675, Pl. 44, Fig. 9; 45, Figs. 1-3, 1852.

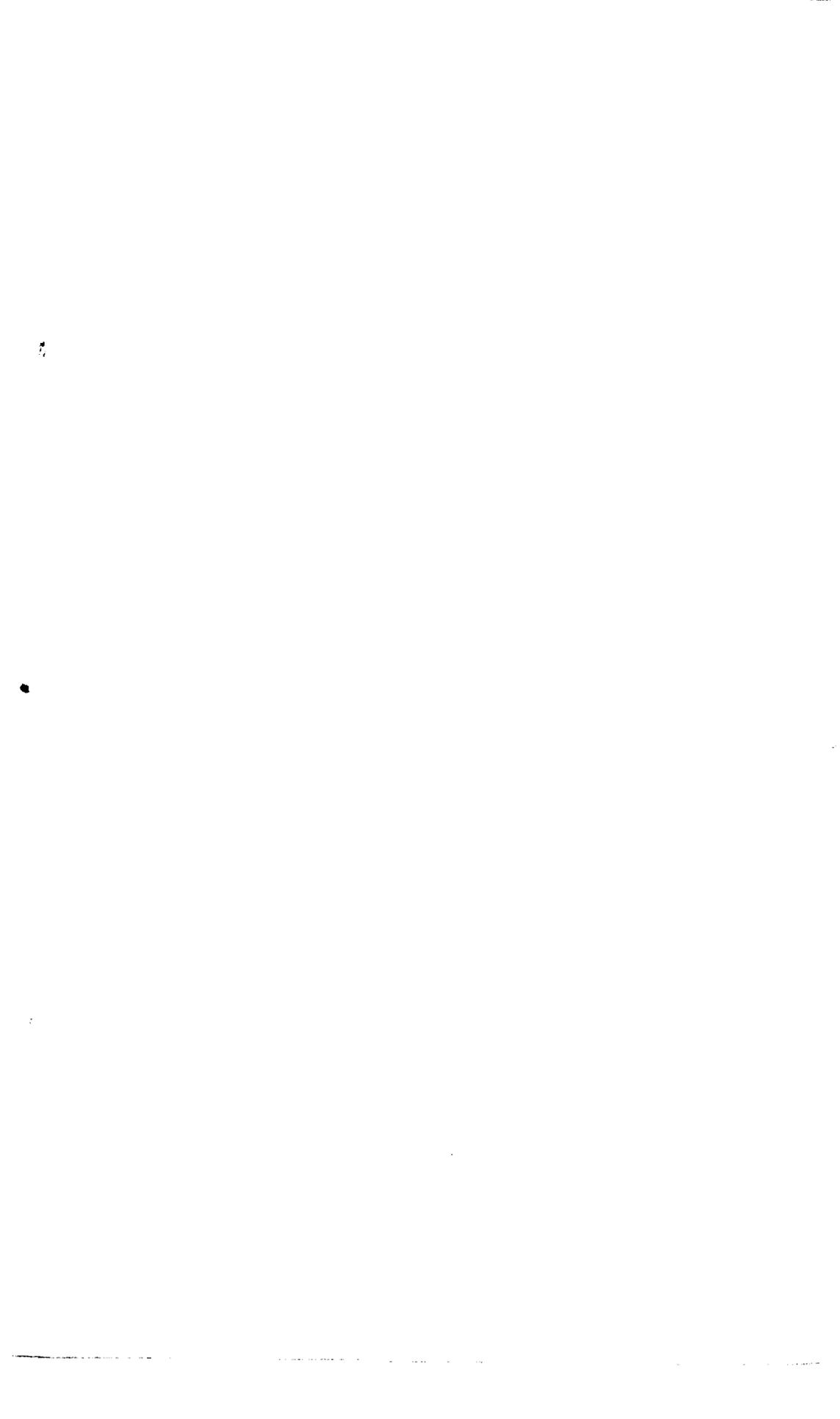
SEMPER, Zeits. Wiss. Zool., XI, 106-107, 1862.

CLAUS, Ueber einige Schizopoden und niedere Malacostruken Messina's. Zeits. Wiss. Zool. XIII, 433-437, Taf. XXVIII, Fig. 21-26, 1863.

A. DOHRN, Untersuchungen über Bau und Entwicklung der Arthropoden. Zeits. Wiss. Zool., XXI, 356-359, Taf. XXVII, Fig. 1-10, 1871.

WILLEMÖES-SUHM, "Preliminary Remarks on the Development of some Pelagic Decapods." Ann. Mag. Nat. Hist., XVII, 163, 1876. (An interesting note on the development of *Lucifer*, showing that Dana's genus *Erichthina* is a young stage of *Lucifer*. See also, CLAUS, Untersuchungen zur Erforschung der genealogischen Grundlage des Crustacien-Systems, p. 40, 112, 113, 1876.)

STREETS, Contr. to the Nat. Hist. of the Hawaiian and Fanning Islands and Lower California Bull. U. S. National Museum, No. 7, p. 122, 1877.



EXPLANATION OF FIGURES.

FIGURE 1.—*Lucifer typus* M. Edw.? 9 mm. in length. *a*, eye-stalk; *b*, antenna of first pair; *c*, antenna of second pair; *d*, "scale" of second antenna; *e*, labrum; *f*, second maxilliped; *g*, third maxilliped; *h, i, k*, appendages corresponding to the first, second and third pairs of legs of the higher Decapods; *l*, sac at the end of the *vas deferens*? *m*, first abdominal appendage; *m'*, copulatory organ on the first abdominal appendage; *m''*, terminal branch of the first abdominal appendage; *n, n', n'', n'''*, second abdominal appendage with its three terminal branches; *o, p, q*, third, fourth and fifth abdominal appendages with their two terminal branches; *r, r', r''*, basal segment, outer and inner branches of the sixth abdominal appendage; *s*, antennary segment; *s'*, spine on antennary segment; *t*, carapace; *v, x, y, z, a, β*, first to sixth abdominal segments; *γ*, telson; *δ*, nervous cord in the thorax; *ε*, auditory organ in basal segment of first antenna; *ζ*, spine on the carapace.

FIGURE 2.—Do. Mouth-parts of left side. *a*, labrum; *b*, mandible; *c*, metastoma; *d'*, outer lobe of first maxilla; *d''*, inner lobe of first maxilla; *d'''*, palpus of first maxilla; *e'*, second maxilla; *e''*, scaphognathite; *f*, first maxilliped; *g*, second maxilliped.

FIGURE 3.—Do. Prehensile male organ on the anterior border of the first pair of abdominal appendages, $\frac{1}{6}$ inch objection. *a*, movable piece which closes upon the process *b*; *c*, muscles which move *a*.

