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XLVII.—*On a new Species of the Genus Atya (A. Wyckii) from Celebes.* By SYDNEY J. HICKSON, M.A. (Cantab.), D.Sc. (Lond.), Hon. M.A. (Oxon.), Fellow of Downing College, Cambridge, Deputy Linacre Professor at Oxford.

[Plates XIII. & XIV.]

IN the mountain districts of Minahassa, in North Celebes, a favourite dish at the midday meal or "rijst tafel" is made by boiling a large number of the small "garneelen" which are caught in Lake Tondano. I first saw these small prawns when I was staying some 6 or 7 miles from the lake at a small mountain settlement called Kelelonde; but as they were at the time prepared rather for use than for observation, I trusted to a future visit to the lake to obtain some specimens for examination. Unfortunately I was unable to revisit the lake; but since my return home I have received a large consignment of these interesting forms from the Resident of Menado, the Jonkheer van der Wyck. As I at all times received much kindness and assistance from the Resident of Menado during my stay in Celebes, and am deeply indebted to him for the trouble he took to obtain specimens and information whenever I required them, I propose as a

slight acknowledgement of my indebtedness to name this prawn (which turns out to be a new species of the genus *Atya*) *Atya Wyckii*.

Many species of this remarkable freshwater genus are now known. Species are found in Mexico, the West Indies, the Cape-Verde Islands, Java, Batjan, Bali, Celebes, the Philippines, Tahiti, Samoa, and New Caledonia.

In most cases they are found in rivers and brooks running into the sea, frequently accompanied by freshwater species of the genus *Palæmon*. In only one case do we find it mentioned that its habitat lies much above the sea-level, namely *A. sulcatipes*, 300 feet above the level of the sea at San Nicolao, Cape-Verde Islands (6, p. 49). The species I am about to describe lives in Lake Tondano, at a height of 2000 feet above the sea-level.

In many respects it is a much more slender and delicate form than any of its nearly allied species, and the three posterior pairs of walking-legs are equal in length and covered with a very sparse covering of fine hairs and a very few thick thorn-like hairs.

In most of the species of *Atya* the most remarkable feature is the mode of attachment of the chelæ of the first two walking-legs. The propodos is not attached at its proximal extremity to the carpos, but is prolonged nearly as far behind the articulation as it is in front. Moreover, the carpos has usually a most extraordinary shape, being either irregularly triangular or crescent-shaped, with the propodos articulating with the lower angle or horn. This is not the case with *A. Wyckii*. In the posterior chelate limb the carpos is long and cylindrical, as it is in the nearly allied genus *Caridina* and in *Palæmon* and other typical genera of the family. In the anterior chelate limb, however, the carpos is shorter and much wider at the distal than at the proximal extremity. In both the propodos is not prolonged behind the articulation with the carpos.

The tuft of hairs which is found at the ends of the chelæ in all species of *Atya* is also present in this one, and hidden among the dense hairs of each tuft is a hook. This hook is not seen at first, as it is completely hidden by the hairs; but it may readily be seen by soaking the claw in oil of cloves and examining it as a transparent object with the microscope. It may be that these hooks are present in other or all species of *Atya*; but they have never yet been figured.

We have, unfortunately, no precise information as to the size of many of the species; but this one seems to be, if not the smallest, at any rate one of the smallest known. Thus,

of the species brought back by the 'Challenger,' *A. sulcatipes* is 68 millim. long, *A. serrata* 37 millim., *A. bisulcata*, ♂ 23 millim., ♀ 35 millim. The species from Lake Tondano is never more than 25 millim. in length. The largest females were 25 millim., but the average size of the females bearing ova was only 20 millim. The males are a little smaller and average 18 millim. in length. With these preliminary remarks, which justify the step I have taken in making a new species for it, I will proceed to describe its characters in detail.

The carapace is smooth and is not carinated dorsally until near the rostrum. The rostrum is sharp, laterally compressed, and bears on the dorsal side from twelve to seventeen serrations and on the ventral side very constantly nine. Occasionally there are a few hairs between the serrations, but more generally they are absent. The rostrum does not extend so far forward as the anterior end of the antennary plate. Just above the antennary termination of the branchio-cardiac furrow the carapace bears a small tooth.

The pleon is smooth dorsally, compressed laterally, and the sixth somite is always considerably longer than the fifth (from once and a half to twice as long). The telson is long and pointed, reaching very nearly as far as the ends of the swimmerets; it bears four little hairy patches on each side and is terminated by a row of seven or eight short coarse hairs.

The eye-stalks are short and the eyes are but little larger in diameter than the stalk.

The three basal joints of the first pair of antennæ are fringed with long stiff hairs standing out at right angles to the joints; the first joint is provided with a long stylocerite almost as long as the second joint, and the second joint is also provided with a stylocerite, but a short one. The two long slender flagella are approximately equal in length and about as long as the carapace, *i. e.* 7 millim. The second antenna bears a broad ovate scapocerite, which is fringed internally with stiff-jointed hairs and extends forwards just beyond the anterior termination of the rostrum. The flagellum is about the same length as the body, *i. e.* 20 millim.

The mandibles (fig. 3) bear no palps. The free edge consists of a molar process (*a*), a short portion bearing coarse feathered hairs (*b*), a longer portion bearing much finer hairs (*c*), and a grinding-process (*d*) marked with very fine parallel ridges.

The first pair of maxillæ (fig. 4) are small, foliaceous, and divided into three branches. The outer branch or endopodite (*end.*) is tipped with one or two stiff feathered hairs.

The middle branch is more oval in shape and bears on its inner margin a dense row of short thorn-like hairs. The inner branch is semicircular in outline and bears a number of stiff, finely feathered hairs, one row arranged directly on the margin and one or two smaller rows on the under surface.

The second maxillæ (fig. 5) are also thin, delicate, foliaceous appendages. The protopodite is trilobed and bears a large number of long, delicate, but at the same time stiff hairs. The ovoid anterior end of the scaphognathite bears at its margin a few thick feathered hairs. The posterior end of the scaphognathite bears a tuft of remarkably long setæ terminated by a small hook. These long setæ are found in this position in all the species of the genus *Atya*. It is usually supposed that they are for the purpose of keeping the gill-chamber clean.

The first maxillipedes (fig. 6) are almost identical with those of *Atya bisulcata*. The inner margin is fringed with very long delicate hairs.

The second maxillipedes (fig. 7) also do not offer any very remarkable peculiarities. The outer border of the terminal joint being bent through an angle of 180° comes to face inwards, and is covered with a dense brush of very fine delicate hairs. The other joints are sparsely covered with stiff hairs. There is a broad mastigobranchial plume supporting a gill and a well-marked podobranch as well.

The third maxillipedes (fig. 8) are long and pediform. The basal and first joints of the endopodite are sparsely covered with long delicate hairs, the second joint bears a few short stiff bristles, the last joint bears a brush at the proximal end of fine close-set hairs, but more distally they become shorter and stiffer, until they become almost tooth-like at the extremity. The exopodite has a number of long delicate hairs towards its distal extremity.

On the basal joint there is a rudimentary mastigobranch and a well-developed arthrobranch.

Of the ambulatory limbs (pereiopods) the first two are chelate, the second pair being somewhat longer than the first pair. The carpos of the first pair is short and shaped like an elongated heart. The articulation with the propodos lies on the inner side of the lower angle of the distal extremity of the carpos. The propodos does not extend behind as well as in front of the articulations. The tuft of hairs at the extremity of the dactylos and propodos is very dense, and protects a sharp curved hook. Each of the hairs of these tufts bears a number of fine recurved hairlets, so that each tuft is

capable of retaining a very considerable quantity of foreign material (fig. 14).

The carpos of the second pereopod (fig. 10) is much longer than that of the first; it is almost uniformly cylindrical in shape, but swollen into a joint at its distal extremity. The chelæ are similar to those of the first pair.

The posterior three pairs of pereopods are approximately equal in size and terminated by sharp pointed claws armed with short thorn-like hairs; they are covered only with a very sparse covering of hairs. The basal joint of each pereopod except the last bears one or two very fine hairs, the somewhat reduced mastigobranchs.

The branchial formula appears to be

Pleurobranchiæ	0 . 0 . 1 . 1 . 1 . 1 . 1
Arthrobranchiæ	0 . 1 . 0 . 0 . 0 . 0 . 0
Podobranchiæ	1 . 0 . 0 . 0 . 0 . 0 . 0
Mastigobranchiæ	1 . 1 . 1 . 1 . 1 . 1 . 0

but as the specimens are very small and the gills not very well preserved in all cases, too much reliance should not be placed upon it. I examined a great many specimens very carefully, and the above represents the conclusions I came to. After a large number of careful measurements I drew up the following as the average measurements of the adults:—

	♂. millim.	♀. millim.
Entire length	19	22
Length of carapace.....	7	8.5
Length of first antennæ.....	7.5	9
" second " 	18	20
" first pereopod	5	5.5
" second " 	6.5	7
" third " 	6.25	6.5
" fourth " 	6	6.25
" fifth " 	5.5	6

For other species of the genus *Atya* see:—

- (1) LEACH.—Trans. Linn. Soc. Lond. vol. xi. 1815, p. 345.
- (2) RANDALL.—“Crustacea of the Sandwich Islands,” Journ. Acad. Nat. Sci. Philadelphia, viii. pt. i. p. 140 (1839).
- (3) NEWPORT.—“Species of *Atya* from New Zealand &c.,” Ann. & Mag. Nat. Hist. vol. xix. 1847, p. 158.
- (4) DE HAAN.—Fauna Japonica, Crustacea, 1850, p. 186, pl. O.
- (5) DANA.—Crustacea, 1852, vol. i. p. 540.

- (6) v. MARTENS.—“Ueber einige ostasiatische Süßwasserthiere,” Archiv f. Naturgeschichte, vol. xxxiv. 1868, p. 47.
- (7) MIERS.—“Malaysian Crustacea,” Ann. & Mag. Nat. Hist. ser. 5, vol. v. 1880, p. 382, pl. xv. figs. 3 and 4.
- (8) SPENCE BATE.—“Crustacea Macrura,” ‘Challenger’ Reports, vol. xxiv. pp. 691–702, pls. cxviii.–cxx.

EXPLANATION OF PLATES XIII. & XIV.

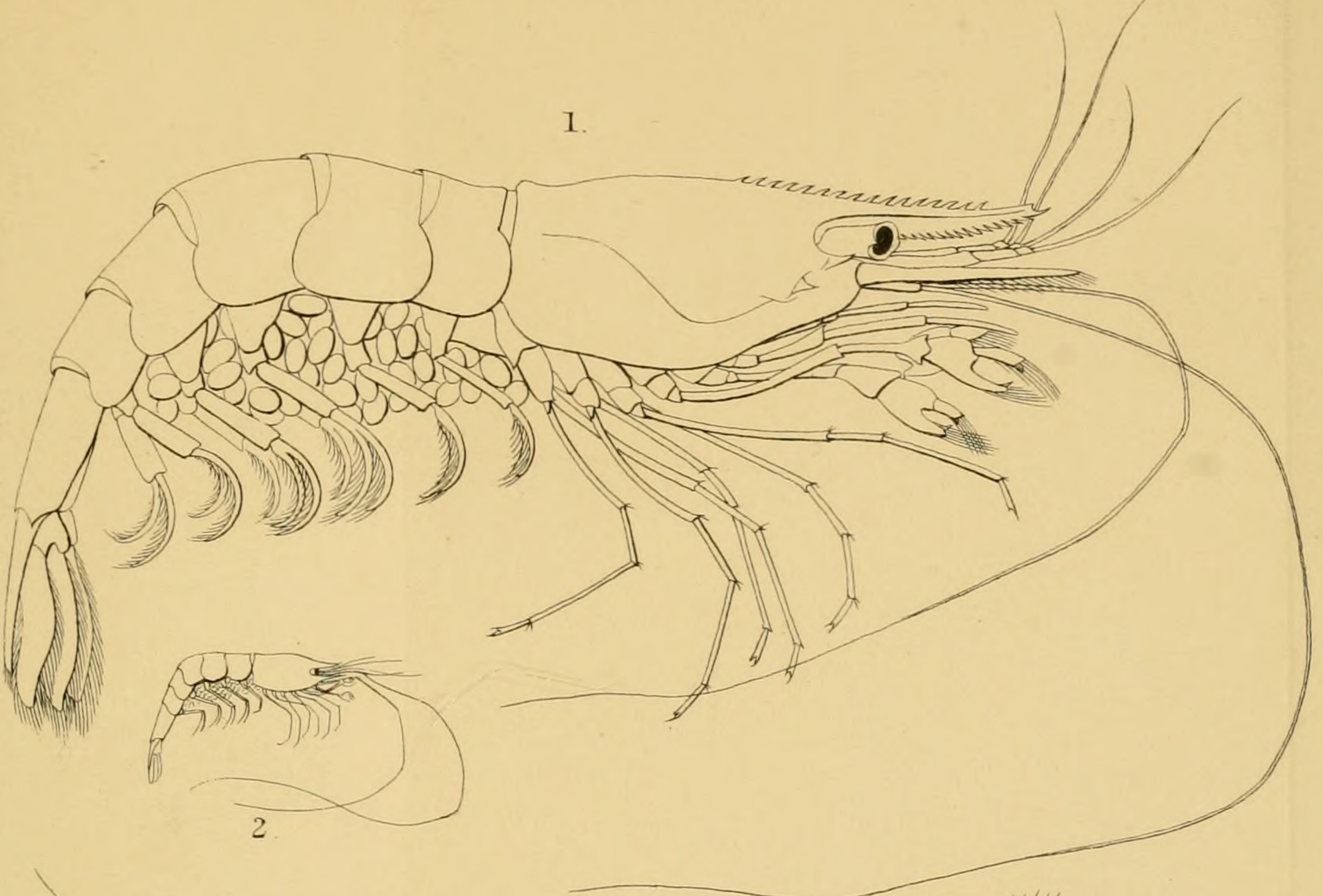
- Fig. 1.* *Atya Wyckii*, × 5 diameters.
- Fig. 2.* The same, natural size.
- Fig. 3.* Mandible. *a*, molar process; *b*, edge, bearing a few coarse feathered hairs; *c*, edge, bearing numerous fine hairs; *d*, triturating surface.
- Fig. 4.* First maxilla. *end.*, endopodite.
- Fig. 5.* Second maxilla. *a*, protopodite; *b*, anterior end of scaphognathite; *c*, posterior end of scaphognathite bearing long hooked hairs.
- Fig. 6.* First maxillipede.
- Fig. 7.* Second maxillipede. *a*, endopodite; *b*, exopodite; *c*, podobranch; *d*, mastigobranch.
- Fig. 8.* Third maxillipede. *a*, endopodite; *b*, exopodite; *c*, rudimentary mastigobranch; *d*, arthrobranch.
- Fig. 9.* First pereopod. *d*, mastigobranch.
- Fig. 10.* Second pereopod. *d*, mastigobranch.
- Fig. 11.* Third pereopod.
- Fig. 12.* Chela of first pereopod, showing the terminal hooks and brushes.
- Fig. 13.* Chela of second pereopod.
- Fig. 14.* One of the hairs of the terminal brushes of a chela, showing the recurved hooks with which it is provided.

(I am indebted for figs. 1 and 2 to the skill and accuracy of my sister, Miss A. W. Hickson.)

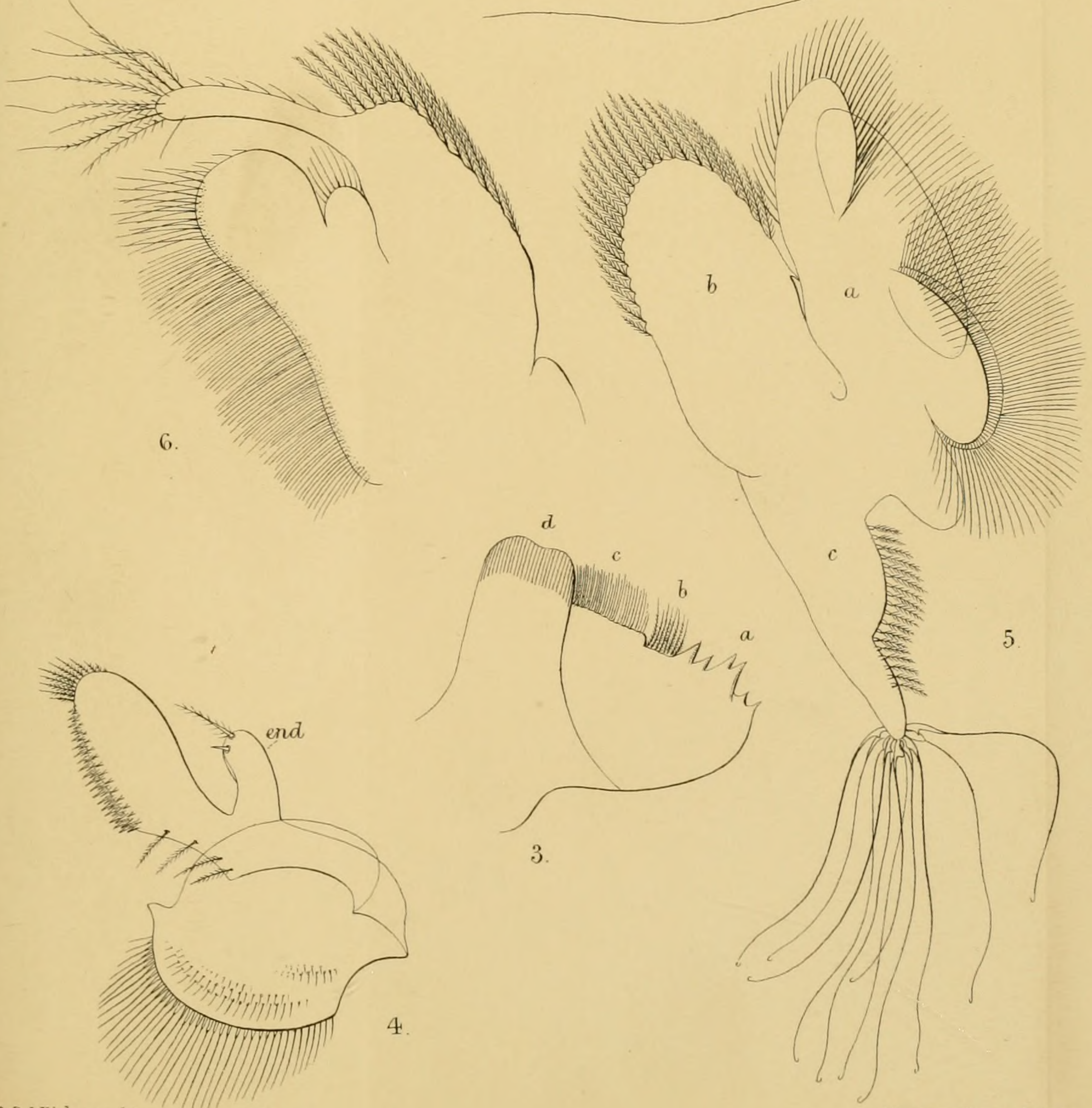
XLVIII.—*Notes on Reptiles and Frogs from Dominica, West Indies.* By Dr. A. GÜNTHER, F.R.S., Keeper of the Department of Zoology, British Museum.

Two small collections made in the island of Dominica by Mr. Ramage, a gentleman engaged by the West-Indies Exploration Committee, contain a very interesting series of the reptiles and frogs of that island. Mr. Ramage has been working in the island for a short period only, so that we may expect further additions to this present list, which consists of five species of lizards, three of snakes, and two of frogs. Of particular interest would be observations on the mode of propagation of the *Hylodes*.

1.



2.



6.

5.

3.

4.

