

JOURNAL
OF THE
ROYAL MICROSCOPICAL SOCIETY.

FEBRUARY 1887.

TRANSACTIONS OF THE SOCIETY.

I.—*Twenty-four New Species of Rotifera.*

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(Read 8th December, 1886.)

PLATES I. AND II.

THE following species of Rotifera were discovered either too late to be included in Dr. Hudson's work, or since that work was published. They are described with brevity; but, I hope, with precision sufficient for identification and differentiation.

1. *Taphrocampa selenura*. Body thick towards the head, tapering towards the foot; marked with strong articulations like *T. annulosa*; brain opaque, with a distinct red eye on its inner side; caudal fork a wide crescent; trophi as in *Notommata aurita*. Length 1/100 in. Lacustrine.

Since the note in H. and G. Rotif., i. 17, I have made repeated

EXPLANATION OF PLATES I. AND II.

- Fig. 1.—*Taphrocampa selenura*; dorsal.
" 2.—*Diplena* (?) *silpha*; lateral.
" 3.—*Notommata ovulum*; a, dorsal; b, lateral.
" 4.—*Furcularia melanducus*; dorsal; c, toes, enlarged.
" 5.—*Mastigocerca bicristata*; lateral; d, ideal section.
" 6.—*Diaschiza* (?) *cupha*; lateral; e, one toe, enlarged.
" 7.—*Mytilia Teresa*; dorsal; f, one toe, enlarged.
" 8.—*Pterodina reflexa*; posterior.
" 9.—*Notholca jugosa*; dorsal.
" 10.— " *rhomboidea*; dorsal.
" 11.— " *spinifera*; dorsal.
" 12.— " *polygona*; dorsal.
" 13.—*Furcularia lophyra*; lateral.
" 14.—*Callidina pigra*; dorsal; g, spurs, enlarged.
" 15.—*Synchæta longipes*; dorsal.
" 16.—*Euchlanis oropha*; lateral; h, transverse sections, the outer at *, the inner at †, of upper figure.
" 17.—*Distyla striata*; dorsal.
" 18.—*Asplanchna eupoda*; lateral.
" 19.—*Salpina marina* (lorica); lateral.
" 20.—*Diaschiza* (?) *rhamphigera*; lateral; i, trophi, dorsal; j, lateral.
" 21.—*Cohurus Dumnonius*; lateral; k, ventral.
" 22.— " *dicentrus*; lateral; l, termination of body.
" 23.— " *grallator*; lateral.
" 24.—*Monura micromela*; lateral; m, posterior.

examinations of this form, which, I am now convinced, has specific value. The crescent behind is glassy clear throughout, continuous with the body, not articulated; its form is that of the new moon when first visible. Cf. *Balatro clavus* Clap. (Plate I. fig. 1.)

2. *Diglena* (?) *silpha*. Body sub-cylindric, stouter at the head abruptly lessened behind; brain saccate, long, opaque at the end; toes minute, conical. Length 1/100 in. Lacustrine.

The whole animal is very soft and plump, not wrinkled, even in retraction. A well-marked, soft, decurved proboscis is on the front: no eye is visible. The sudden attenuation of the body to a slender cylinder, one-fourth of the whole length, is remarkable; this terminates in two or three soft lobes, below which are two very minute toes, with no appreciable foot intervening; for the rectum can be traced to a cloaca, just above the toes. Fuller examination is needed: I have seen but a single example, sent from the middle of Ireland; and the trophi were not satisfactorily defined. (Fig. 2.) Cf. *Notommata forcipata*, lat. aspect.

3. *Notommata ovulum*. Very small; body globose, plump; dorsum gibbous; venter flat: brain clear; eye wanting; foot short; toes rather long, acute, decurved. Length 1/370 in. Lacustrine.

This attractive little form has so much resemblance to *N. lacinulata* that I had doubted whether it is not a *var.* of that species. There are, however, divergences, important, if minute. It is very much rounder in all aspects; the toes are longer, uniformly diminishing to acute points and decidedly decurved: no trace of eye could be discerned. It swims rapidly, but evenly; does not *spring*, and does not *twitch*;—both which actions are so characteristic of *lacinulata*. Auricles (?) are occasionally pushed out. The front projects in a tubercle, halfway between which and the auricle on each side is a stiff seta. I have examined three specimens, two from Woolston, and one from Dundee. (Fig. 3.)

4. *Furcularia melandocus*. Body swollen, obtusely narrowed in front, tapering behind: brain saccate, opaque at the extremity: foot large; toes conical, each terminating in a soft, slender point, much produced. Length 1/130 in. Lacustrine.

Of excessively versatile outline, rapidly lengthening and shortening every instant. The front is apparently hard, with a sharp edge, below which is a broad, sub-prone, ciliate face. An ample brain-sac,—its terminal portion filled with chalky deposit, usually intensely black by transmitted light, but in some examples much diluted,—looks like a bottle of ink swaying to and fro in the animal's contortions. The prolonged finger-like tips of the toes (*c*) have a strong adhesive power, dependent on a pair of great mucus-glands. A minute frontal eye is not quite certain. Several examples have occurred in water from Woolston (Fig. 4.)

5. *Mastigocerca bicristata*. Two equal sub-parallel carinæ, running nearly the whole length of the dorsum. Length 1/50 in., of which the toe is nearly half. Lacustrine.

Discovered near Dundee, by Mr. Hood, who sent me from time to time many examples. It has a general likeness to *M. carinata*, but is much larger. The double carina confirms the conjecture that the asymmetry of that and other species is due to unequal development

The carinæ are thick at their base, and sharp at their edge, so that the furrow is sharp at the bottom, and has sloping sides. (Fig. 5: *d*, ideal section.)

6. *Diaschiza* (?) *cupha*. Much compressed; dorsum squarely gibbous; foot short, scarcely protruding; toes long, blade-shaped, slightly recurved, with claws abruptly shouldered. Length 1/124 in. Lacustrine.

This hunch-backed form needs fuller examination. I describe it from a single example, just dead, but not decomposed, in water sent from Birmingham. The depth, compared with the width, of the animal is remarkable. The trophi were very long, but ill-defined: in the occiput is a short brain, carrying a flat, lens-shaped red eye on its inner surface. The peculiar shape of the toes is shown at *e*. I affix a mark of doubt to the generic position, because I could not be quite sure of the dorsal cleft. (Fig. 6.)

7. *Mytilia Teresa*. Body truly oval: toes together wider than foot; each toe large, long, ovate, abruptly produced to a long, slender, acute point. Length 1/200 in. Marine.

This very pleasing species I have found in some abundance, in water dipped for me out of tide-pools in various parts of Torbay by my little granddaughter, with whose name I honour it. It has a very distinct red eye in the occiput. The large bulbous toes are peculiar, of which one is shown laterally at *f*. It is a sprightly creature, playing actively among confervoid algæ, often pivoting on its toes, like a *Cathypna*, jerking and bowing: it is less locomotive than *M. Tavina*. (Fig. 7.)

8. *Pterodina reflexa*. Lorica elliptical in outline, the two longitudinal halves bent upward and backward, at a considerable angle; the dorsal surface being evenly furrowed, the ventral rounded. Length of lorica 1/220 in. Lacustrine.

The angular character is not noticed on a dorsal view, but becomes conspicuous in the act of turning. *P. valvata* bends its leaves downward, on hinges, at will. *P. reflexa* bends its halves upward, on a medial line which is not hinged, but permanent. It is somewhat like a butterfly, sitting, with half-opened wings, on a flower in an autumn noon. The internal structure is normal. I have found it abundant in water from Smallheath, Birmingham. (Fig. 8.)

9. *Notholca jugosa*. Lorica ovato-rhomboid, highly elevated, broadly truncate before, narrowly behind: ridges and furrows strongly marked, ending before they reach the hind margin. Length 1/190 to 1/130 in. Marine.

This, of all the *Notholcæ*, seems to come the nearest to Ehrenberg's figure of *Anuræa striata*; of which he says, it is marine at Copenhagen, associating with *Pter. clypeata* and *Brach. Mülleri*, species with which *jugosa* is commonly found in the tide-pools of the Firth of Tay and of the Devon coast. (Fig. 9.)

10. *Notholca rhomboidea*. Lorica rhomboidal, with the lateral angles rounded, the front produced and truncate; dorsal and ventral plates separated behind by a short cleft. Length 1/160 to 1/145 in. Marine.

The ridges, in this species, can with difficulty be discerned, especially as the rotating head is habitually protruded, which the creature does not retract for the shock of any tap or shake of the instrument that I

can give. There is a long wrinkled cesophagus, a great saccate stomach, a distinct intestine, with the cloaca at the very extremity of the lorica; the branchial bands are distinct, but no contractile vesicle. It is not uncommon, with the preceding. (Fig. 10.)

11. *Notholca spinifera*. Lorica broadly sub-rhomboidal; the dorsal plate often less than the ventral, and separated by a wide and deep cleft: at each angle of junction is seated a short spine, so hinged as to be concealed within the cleft, or widely projected, at will. Length of lorica $1/220$ to $1/100$ in. Marine.

An interesting and attractive species. The whole interior is often richly coloured, especially the enormous stomach. An ample contractile vesicle is present. The hind outline in some examples is evenly rounded; in others an inangulation marks both plates. Ehrenberg's figure of *Anur. bivemis* may be compared with this; but it differs in important details; and his text gives no help. I receive this also from the Tay tide-pools. (Fig. 11.)

12. *Notholca polygona*. Lorica roundly pear-shaped, truncate in front; the central pair of the occipital spines stout, the other two pairs almost obsolete: ventral plate forming a square box, with sloping, many-angled sides. Length $1/160$ in. Lacustrine.

A remarkable form. The dorsal plate is a half-oval, the ventral nearly flat. The latter is very peculiar: a kind of sub-cubic box, open at the summit, runs down to about three-fourths' length, and then proceeds, in pyramidal form, to a point at bottom; and this appears to contain the viscera. Each side is covered-in by a plate of two planes, but appears to be empty. On those parts of the arched dorsal plate which answer to these empty lateral chambers, run down very delicate flutings, while the broad medial part is quite clear and smooth. All the angles are distinct. The only example seen was dead, but showed a crimson eye and a normal mastax. From Kingswood Pool, near Birmingham. (Fig. 12.)

13. *Furcularia lophyra*. Body fusiform: head separated by a constriction; back sharply ridged; toes broad at base, tapering at mid-length to long-drawn fine points. Length $1/290$ to $1/260$ in. Lacustrine.

Somewhat near to *F. gracilis*, but the above characters, which are constant in a great number of examples, sufficiently distinguish it. The body, sub-cylindric at first, swells more or less behind the middle, where the dorsum rises to a sharp edge, *not a carina*. The head is large, always distinct, with a brilliant eye at the very front, and a prone ciliate face. The trophi are those of *gracilis*, very large, often extruded. A thick short foot bears two great toes, often widely expanded, one-fourth of the whole length; each is a glassy rod, of thick base, which tapers somewhat abruptly near the middle to a long point of great tenuity. (Plate II. fig. 13.)

14. *Callidina pigra*. Body fusiform, fluted, not collared; column having a decurved acute hook; spurs minute; viscera rufous. Length (extended as in fig.) $1/90$ in. Lacustrine.

I have seen two examples, both of which had the extremities colourless, but the middle tinged of a delicate sherry-brown, the viscera

somewhat deeper in hue; while in one was an immense egg, of a coffee-brown, almost opaque, whose appearance suggested the probability that the species is strictly oviparous. The acute hooked proboscis is very conspicuous. The corona, scarcely divided, is not wider than the neck at the antenna, and this neck is not swollen into a collar. The penultimate spurs are very minute cones, whose bases are not separated by an interspace (fig. 14, *g*). The whole central body is indented with longitudinal furrows. The mallei are destitute of visible teeth. (Fig. 14.)

The animal is remarkably sluggish, rarely swimming, but turning its head slowly and aimlessly from side to side. It has occurred in Woolston Pond.

15. *Synchaeta longipes*. In front much like *S. pectinata*, but with the foot distinct, separated, long, furnished with two small toes. Length 1/173 in. Lacustrine.

The well-marked foot, having a rhomboid outline, common to all the eight or ten specimens that I examined, appeared to me sufficient, when combined with its small dimensions, to distinguish this species from *S. pectinata*, with which else it has much in common. The broad head bears four frontal warts and two setæ. It has occurred in some profusion in fresh water near Dundee. (Fig. 15.)

16. *Euchlanis oropha*. Lorica roof-shaped with sloping sides, but not rising to a ridge, yet cleft for a short distance behind, between two descending extremities. Ventral plate flat, thin, much smaller in its whole outline than the carapace: foot with a single seta or none; toes thin, blade-shaped. Length, total, 1/75 in. Lacustrine.

This is a noble species, and not uncommon. The posterior fourth of the ovate lorica seems as if pinched-in, and the dorsal edge of this portion becomes a low double carina. In fig. 16, *h*, the inner outline is that of this portion (posterior to † in the upper figure), the outer outline represents a transverse section at * in the upper figure. (Fig. 16.)

17. *Distyla striata*. Lorica as in *D. Gissensis*, but covered with longitudinal sulci; the front margin projecting in two lateral points (which, however, are lost in the protrusion of the head, by the evolution of flexible membrane): toes slender, straight, more than half as long as lorica, pointed, not shouldered. Length 1/130 in. Lacustrine.

The lateral infold is narrow and nearly closed. The dorsal sulci are about eight in number, slender and superficial: foot a long large bulb, not divisible into joints; toes long, nearly straight, rods. The dorsal surface is corrugated, besides the sulci; there is a minute eye, difficult of detection. Two examples occurred in water sent me by Dr. F. Collins from the pool at Sandhurst Military College. (Fig. 17.)

18. *Asplanchna eupoda*. Body globose, with a stout foot, retractile at will: rami of incus long, each armed on its inner edge with four widely-severed teeth. Length, moderately extended, 1/52 in., width 1/118 in. Lacustrine.

The most remarkable feature is the foot, which is, proportionally, much larger than in *A. myrmeleo*. The pincer-like rami are those of a normal *Asplanchna*, having a close resemblance to those of *A. priodonta*, save that their inner edges are not cut into saw-teeth, but beset with three distant spinous teeth, while each curved point is double. I have

examined eight or ten examples, all from the canal, Smallheath, Birmingham. (Fig. 18.)

19. *Salpina marina*. Occipital spines two, procurved; pectoral two, short; lumbar spine short, deep; alvines stout, separated from the lumbar by an angular sulcus. Length of lorica, from points to points, 1/136 in. Marine.

This large species was taken in a tide-pool in the Firth of Tay; the first *Salpina* found in the sea. Its anterior armature is that of *S. mucronata*, but the posterior is peculiar, in that the alvines are stout, nearly straight spines, and that the sinus which divides each from the lumbar point is not rounded, but makes two sides of a rhomboid, with definite angles. The specimen was dead when I found it. (Fig. 19.)

20. *Diaschiza* (?) *rhamphigera*. Lorica elliptical in outline, viewed dorsally; highly gibbous, viewed laterally; venter flat: toes stout, long, decurved: trophi projecting in form of a bird's beak. Length 1/173 in. Lacustrine.

The front terminates in an acute hooked beak, which is found to be the extremity of the trophi, and apparently of the incus protruded. The whole manducatory apparatus is of unusual dimensions, especially the fulcrum of the incus. (Fig. 20, *i*, represents the trophi seen dorsally; *j*, laterally.) I have not distinctly seen the dorsal cleft; but the line which passes along the back, at some distance from the edge, I presume to indicate the bottom of such a cleft; if it is not the base of a high carina. Two examples occurred together in water from one of my window tanks. (Fig. 20.)

21. *Colurus Dummonius*. Lorica in dorsal aspect a very broad oval, produced behind into two rather short points, separated by a wide but shallow sinus: the ventral line deepens in the middle; the ventral cleft extends around the front to the occiput: foot robust, with two moderately stout, separable toes. Length 1/260 in. Marine.

Three examples I have seen at different times among fine conferva, much studded with *Licmophoræ*, from tide-pools at Paignton, near Torquay. One of these had the sides much more parallel than the others. A large pale red eye is conspicuous. All had the habit of pivoting on the toe-tips, jerking and posturing. (Fig. 21.)

22. *Colurus dicentrus*. Lorica ovato-fusiform: body ending behind in a minute tail of two hooks adnate at their base: foot stout; toes long, very slender, more or less decurved throughout. Length 1/185 in. Marine.

I have examined nearly a score of individuals, and am satisfied that this is a true species, in which the peculiar termination of the body (shown enlarged in fig. 22, *l*) is constant, thus differing from *C. amblytelus* and *C. grallator*. The tail-points resemble rose-prickles. The appressed toes seem a single slender spine, but are often thrown apart. Two red eyes are distinct. It is not rare in the Tay tide-pools. (Fig. 22.)

23. *Colurus grallator*. Lorica much compressed; lateral outline ovate, sub-square behind, without points: toes half as long as lorica, very slender, straight, readily separated: ventral cleft slightly narrowed in the middle. Length 1/250 in. Marine.

Nearly related to the preceding; but the outline, viewed dorsally, is longer and narrower; there is no protrusion of the body behind the lorica; and the toes are quite straight. The frontal hook is unusually narrow. I have not been sure of an eye. A dozen examples have occurred from the Tay tide-pools. (Fig. 23.)

24. *Monura micromela*. Lorica in dorsal aspect broadly ovate, produced behind into slightly projecting points, separated by a shallow rounded sinus: in lateral aspect the quadrant of an oval: foot small; toe single, of uniform excessive tenuity. Length $1/230$ in. Lacustrine.

I have had, for thirty-six years, drawings of a species which I had marked (with "?"), as *Monura dulcis*. Very recently, in water from Slough, what seems the same form, now figured, has occurred, and that repeatedly. The excessive tenuity of the toe, which seems indivisible, is the most striking feature; and then the round sinus between the lorica-points (*m*). No eye is visible. The general figure is that of *Col. bicuspidatus*. (Fig. 24.)
