

XXI. *Description of a new Irish Crustaceous Animal.* By
ROBERT TEMPLETON, *Esq. R. A.*

[Read September 7, 1835.]

1838

ZOEA PATTERSONII, *Templ.* Plate XII.

THE body is irregularly cubical, the angles bevilled or rounded off. Superiorly the exterior is formed of a hyaline cartilaginous buckler, which sends outward a less dense, more membranous process, to envelope the eyes; another forwards and a little downwards, hollow and subulate, to form an acuminate rostrum, which, with a slight curvature, extends to a distance in front nearly equalling the length of the buckler. On each side, and about midway between the eyes and the posterior extremity of the dorsum, a smaller process is sent perpendicularly outwards, or rather inclining a little forwards. Behind the extended bases of these, and exactly in the middle line, arises the fourth and largest of these processes; it has its origin from a tolerably extensive base, which is distinctly observable by the thickening of the buckler, passes at first a little upwards as well as backwards, and then directs itself nearly horizontally backwards, the apex acuminate, curving slightly downwards, and ending beyond the fork of the tail, so as to make its entire length almost equal to that of the body and rostrum together. It is, like the others, hollow. Beneath the bases of these processes, the buckler extends nearly directly downwards, so as to envelope the sides and posterior part of the animal: the free edge being horizontal, slightly waved and curving up anteriorly to the bases of the ocular peduncles and rostrum, so as to leave the inferior and anterior part of the animal completely exposed.

The eyes are very large, and carried in an obconic tumid peduncle, curved somewhat backwards, and articulated to the buckler, through the medium of a membrane which admits of slight motion. When the eye is minutely examined, it seems composed of innumerable separate eyes, extending over the whole of the apical curved surface of the peduncle, and each so extremely small, that no separate facets are required, the smooth membrane enveloping the peduncle admitting of distinct vision: when traced inwards, each terminates in a deep brown pigmentum, which, being most obvious, gives the composed eye the appearance of being deeply immersed in the substance of the peduncle, and assuming,

of a new Irish Crustaceous Animal. 115

when looked at from above a crescent form, equidistant from the cornea; when examined from the side it presents an irregular lozenge.

Immediately interior to and beneath the eyes arise the superior pair of antennæ, from the outer sides of a rectangular mesial projection from the head of the animal forwards. They are elongate, robust, subconic, and as if jointed; and have their apices each with a little appendix carrying curved hairs, and another internal to it bearing a long waved spine and a shorter straight one. They are a little depressed, and stand nearly directly forwards, a short way removed from the rostrum.

Beneath and exterior to these, and curving somewhat outwards, will be found the next pair of antennæ, with an origin somewhat anomalous. They arise very far back, behind and exterior to some of the manducatory apparatus, and pass forwards numerously jointed nearly as far as the extremity of the rostrum. They are, like the last, depressed; and the last joint, which is very long, extending from the base of the superior antenna, is a short way from its base turned, and sends off an articulated offset, which is half as long as the remaining portion of the antenna, and ends with two spines; after this bifurcation the larger portion of the joint diminishes gradually in thickness, is slightly waved, arches outwards, and ultimately ends in two pinnate spines. A few minute hairs extend backwards a little way from the apex.

The mouth seems composed of an upper lip and three pairs of members placed in progressive order.

The material forming the lip extends forwards, then arches downwards anteriorly and laterally so as to form a hollow scoop, nearly fixed in position, having scarcely any motion, and seeming, in consequence, rather intended as a protection to the mouth, or throat, than an organ actually used in seizing food; its free edge is furnished with very minute spatulate toothed hairs. Beneath the base of this lip is articulated by one angle, the first pair of manducatory appendages, trapeziform, reddish; the anterior and superior edges nearly straight and of equal lengths; the posterior longest and waved; the anterior short, with three spines superiorly, and also waved so as to form a prominence at the angle opposite to the articulation. The gullet seems to have its position immediately above these appendages; but the specimen having unfortunately been dried on card, this part had so much collapsed as to render it impossible to be distinctly traced. The viscera for the same reason must be passed over unnoticed.

Behind and quite free from the play of the last-described bodies

on their articulation, is found the second pair in the series of appendages, placed vertically and transversely, each with its root exteriorly in immediate connection with that of the corresponding antenna; from its origin it passes inwards, gives off two processes, then has a direction somewhat downwards, curving forwards without losing its breadth, and ends abruptly by giving support to seven apical, short, acuminate, toothed spines. The superior of the two processes arises from the edge at nearly a right angle, curves inwards and forwards, and gives off from its apex two pair of curved spines. The inferior process is biarticulate, the first joint very short, with near its apex a long straight spine; the second, elongate, subdivides towards its apex, the smaller part ending in two thick short spines, the larger directed downwards, and having three long curved spines attached.

Proceeding backwards a very short way, we find the articulation of the last pair of appendages, which presents the form of a triangle nearly equilateral, placed longitudinally, supported by its apex, and with the base lobed and spiny. Still farther back, we reach the bases of the two pair of swimming legs; the "pattes très courtes et cachées sous le corps, à peine visible," I could find no trace of whatever, and believe they only existed in the imagination of Bosc, the first describer of the genus, or rather that their existence was inferred analogically when he had decided on the position of the animal in his systematic work. The legs arise from minute projections backwards of the fleshy part of the body, immediately external to the intestinal tube, the primary joint in both pairs being long, so as to project beyond the shell, robust, and in a slight degree arched forwards, laterally compressed, appearing more so perhaps than they ought to do, from the desiccation of the specimen, and ultimately offering two articulations at their apical extremity. The fore-leg is rather largest, and from the division it sends arching forwards a five-jointed member, terminated by a little pencil of hairs, and obviously designed to assist in the capture of the food of the little animal, as it is ever found in immediate connection with the parts of the mouth; the other part is two-jointed, of equal length, directed downwards and outwards, and has a minute apical articulated appendage carrying six very long waved diverging hairs. The posterior leg sends downwards or outwards likewise a subdivision in every way similar to the last, and backwards a very minute one composed of three joints; the mesial largest and furnished with a long spine, the apical with two small spines.

From the position it occupies adjoining the legs, the intestinal

of a new Irish Crustaceous Animal. 117

canal passes upwards and backwards towards the hollow base of the posterior dorsal spine ; it then curves downwards, accompanied by the aorta, within the descending dorsal lamina, till it arrives at the inferior embouchure, when it begins to pass backwards within the joints of the tail. This tail is composed of six or seven depressed joints, of which four present themselves externally, the first from behind two transverse spines or processes ; its breadth about equals its length, and furnished posteriorly at each side with a little tooth directed slightly outwards. The two succeeding joints are precisely similar, towards the tips however slightly diminished in breadth ; the terminal joint forms a crescent, or is widely forked, each bifurcation passing outwards, furnishing a tooth exteriorly, and three plumed spines internally, and then bending suddenly backwards, gradually diminishing in breadth, and terminating somewhat acuminate, the tips curving upwards.

In colour the animal is a brilliant brownish green, the green hue predominating about the eyes and front ; the brown inferiorly and posteriorly, and assuming a somewhat reddish tint about the mouth, intestinal canal, and processes from the caudal joints. The base of the last joint of the tail is dashed with red, and a concolorous macula is in each of the furcæ about the position of the spines. The legs, antennæ, and processes, are hyaline.

Taken by Mr. R. Patterson, V. P. Belfast Nat. Hist. Soc., in the same place as the *Anomalocera Pattersonii* (Larne Lough, county Antrim), on the 9th of May.

Plate XII. fig. 1. Represents the animal as seen from above, and very highly magnified.

2. Seen obliquely from beneath, to show the edge of the buckler, and relative positions of the interior parts.
3. The greater part of one side removed to show the positions of the parts of the mouth and of the legs.
4. Part of this further enlarged, to show more clearly the mouth and appendages.
5. Part of the head, the eye being removed to exhibit the origins of the antennæ, and the connection of the inferior to the second series of oral appendages.
- 6, 6'. The last joint of the inferior antenna seen in two positions.
7. Tip of the same antenna.
8. One of the second series of oral appendages. 8*. Tip of the superior process of the same.
9. The articulated appendage at the tip of the larger division of the legs showing the mode of attachment of the six hairs.
10. One of the spines of the last joint of the tail, to show the manner in which it is plumed.

K 2

My friend Mr. Patterson informs me that, when alive, the pulsations in the tail were extremely visible, and amounted to 122 in a minute. He refers the specimen to a figure published by Mr. Thompson, of Cork, in his *Zoological Researches*, and remarks that he has no doubt of their identity. With this opinion I cannot concur, if the representation given by Mr. Thompson be correct, which I have no doubt it is. In this latter (*Zoea Thompsoni*), the body is proportionally much longer, the processes in length much shorter, the eyes differently disposed, and the tail, or abdomen, shorter, narrower, and with processes, no trace of which appear in the above. I have therefore, as it does not appear to agree either with *Zoea pelagica*, or *Z. clavata*, no hesitation in considering it a new species, and confer on it, with much gratification, the name of the discoverer.*

The genus *Cyclops* of Müller at present includes a number of species with characters sufficiently decided to warrant their being formed into subgenera. Dr. Leach long since separated *Calanus*. In a paper I had lately the honour to present to this Society, I detailed the characters of another, being the genus, *Sapphirina*, Thompson: *Anomalocera Pattersonii* forms a third, and two yet remain clearly distinguished from the other numerous species associated with them in the genus. Attending only to the external forms, since our knowledge of their minute structure is still too limited to be used with effect in assigning their place with precision, we may arrange them in somewhat of the following manner:—

CYCLOPS, Auct.

Antennæ long; annuli of the body suddenly diminishing in breadth, forming a tail.

Eye single, pedunculate; inferior antenna with a radical branch.

Anomalocera. . . . Type, *A. Pattersonii*.

Eye deeply immersed in the head.

Superior antennæ moderately long. Inferior rather long.

* I have again to express my regret that the specimen I have had the good fortune to examine had not been preserved in spirits, as the degree to which desiccation had been carried leaves still some doubts in my mind as to the exact form of the joints in some parts; but this, I hope, will not long obscure the history of this genus, as I am aware my friend Mr. Westwood, the indefatigable Secretary of the Entomological Society, possesses some beautiful specimens preserved in a proper manner, and whose size is such as to admit of more minute and careful examination. [*Zoea Gigas*, Westw. in *Philosoph. Trans.* 1835, pl. 4, fig. A. with details.]

of a new Irish Crustaceous Animal. 119

Inferior antennæ bifurcate ; body elongate.

Omethia. { Type *Cyclops rubens*, Müll.
(*C. Castor*, Jurine.)

Inferior antennæ simple ; body ovate.

Cyclops, Müll. { Type, *C. Quadricornis*, Linn.
(*C. vulgaris*, Leach.)

Superior antennæ extremely long. Inferior very short.

Calanus, Leach. Type, *C. Fimmarchianus*, Müll.

Antennæ very short ; annuli gradually and moderately diminishing in breadth.

Annuli depressed ; body broad, flat. Eye distinctly double.

Sapphirina, Thomps. Type, *S. fulgens*, Tilesius.

Annuli subcylindric ; tail ending with two long setaceous styles.

Neostathes. { Type, *C. minutus*, Müll.
(*C. staphylinus*, Desm.)

N. B.—*Monoculus claviger* and *M. crassicornis* require to be further examined. I have never met with any thing like them.

That *Anomalocera* is a type of the genus *Cyclops* will appear at once evident by comparing it with the characters which Jurine, Latreille, and others, have assigned to that genus, as anciently constituted, if we except the singular position of the eye, the number of the segments of the body (in which latter particular it however associates itself with *C. rubens* and *C. minutus*); and one or two minor points. It has four antennæ; the superior long, setaceous, multiarticulate, in the male with a swelling, confined universally in this species to the right side. The inferior antenna filiform, and ending with a dense pencil of hairs; three sets of oral appendages and feet in pairs, attached to the successive posterior annuli of the body. The general form and the caudal appendages serve still more to confirm its affinity. From this species the genus *Pontia*, of M. Milne Edwards, leads to *Nebalia*, approaching the one by the cephalic development, and the other by its general habit. From the description of the parts of the mouth given by the same author of a species of *Nebalia*, I must imagine that considerable similarity can be traced between them and those I have described in *Anomalocera*. He however applies theoretic considerations, and assigns to them names in their successive order, on the propriety of which my knowledge of the subject will not admit of my expressing an opinion.

120 *Description of a new Irish Crustaceous Animal.*

Zoea appears to me to have its proper position near to this genus, though apparently much wanting in the development of particular parts. If we could imagine the obliteration of the posterior segments of the body, or that the tail and anterior ring were so brought together, as to drive the intermediate rings under the anterior, and prevent every thing more than mere rudimentary portions of these rings to be traced, and the swimming feet alone with the other parts removed, we should then find remaining parts or modified parts analogous to those of *Zoea*. Thus, in the mouth, infinitely the most essential object for consideration, we should find, in the first place, a labium common to both, then three successive pairs of appendages performing analogous offices. The first pair (internal mandibles of Jurine) occupy a similar position. The next in series marked in the delineations of *Zoea* (fig. 8) unquestionably perform functions similar to those marked (fig. 11, 12) in *Anomalocera*; and lastly, the lobate body, adjoining the legs of *Zoea*, has its analogous part in (fig. 13) *Anomalocera*, and lies horizontally appended by one corner, which is a singular confirmation of the views I am now taking. Fig. 14 of the *Anomalocera* may likewise be looked upon as replaced by the anterior division of the leg of *Zoea*, so that without any straining, an affinity between the animals may be traced. The antennæ and eyes present the greatest sources of discrepancy, but not greater than is to be found in adjoining tribes, and indeed it is observable that, as we descend from the more highly organised species, greater diversities always occur in analogous parts not essential to the absolute existence of the animal, the parts of manducation being almost the only parts which preserve a constancy of character.

From an attentive consideration of the habits and forms of these minute animals, I should be much inclined to remove the whole of them from their present connection with the bivalve *Lophyropoda*, and allot them a much higher station in the system, in fact, to a position which is hinted at by Latreille, close adjoining *Mysis* of Fabricius, and forming from it a diverging branch nearly on a rank with *Squilla*, but not in the same series, for this latter is too intimately connected with the adjoining tribes to admit of being separated by these. I have just detected among those I brought with me from Mauritius, a species* which forms the transition from *Squilla* to the *Amphipoda*, and whose description I propose to present to the Society as an appendix to the present paper.

* *Zoea Westwoodiana*, Templeton.