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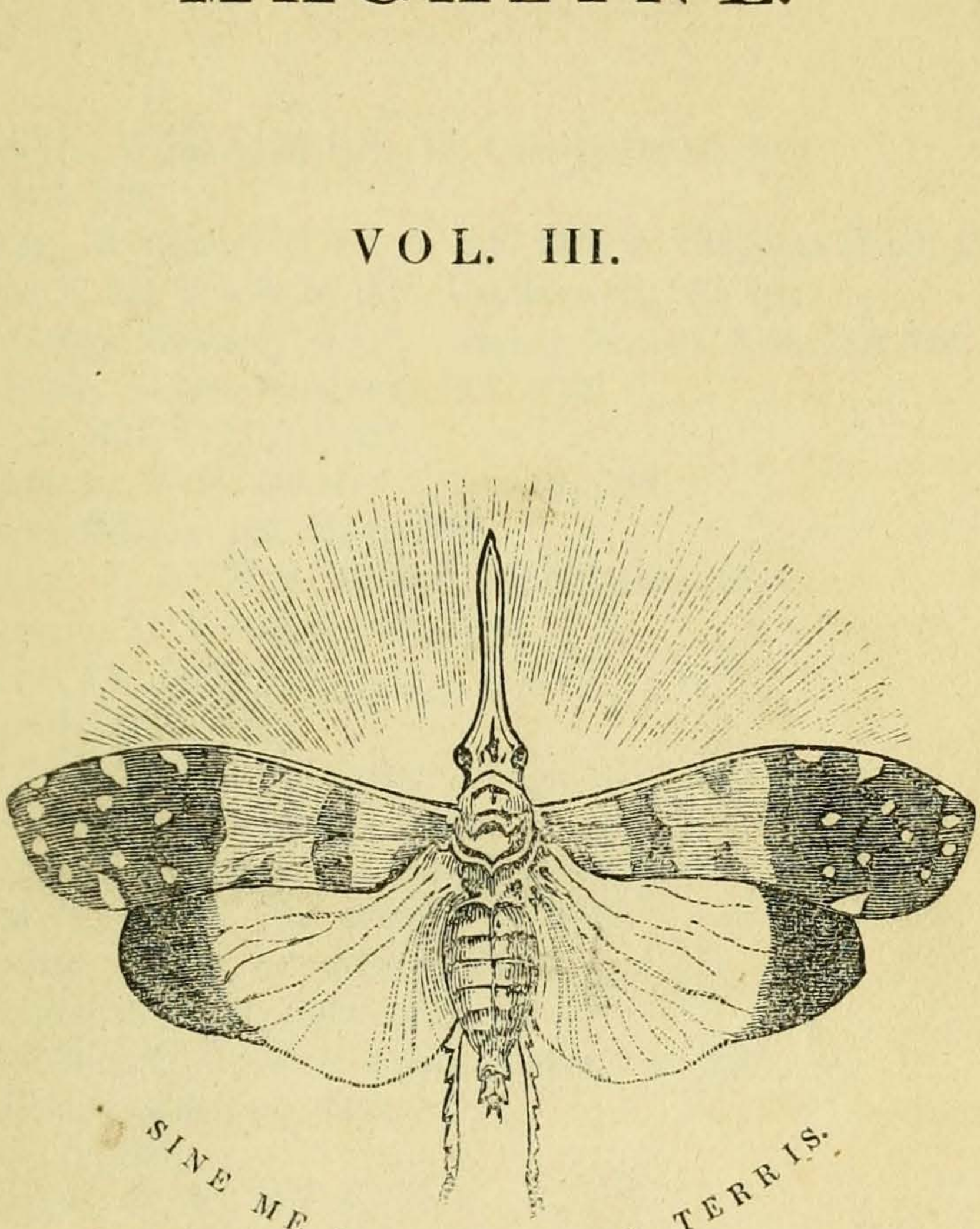

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ART. XLII.—*Natural History and Metamorphosis of an Anomalous Crustaceous Parasite of Carcinus Mænas, the Sacculina Carcini.* *By* J. V. THOMPSON, F.L.S. *Deputy-Inspector-General of Hospitals.*

A LONG time previous to the discovery of the metamorphosis in the *Crustacea*, I had occasionally met with the common shore-crab (*Carcinus Mænas*), having a purse-like appendage attached to the under-side of the tail, (figs. 1 and 2.) The

Fig. 1.

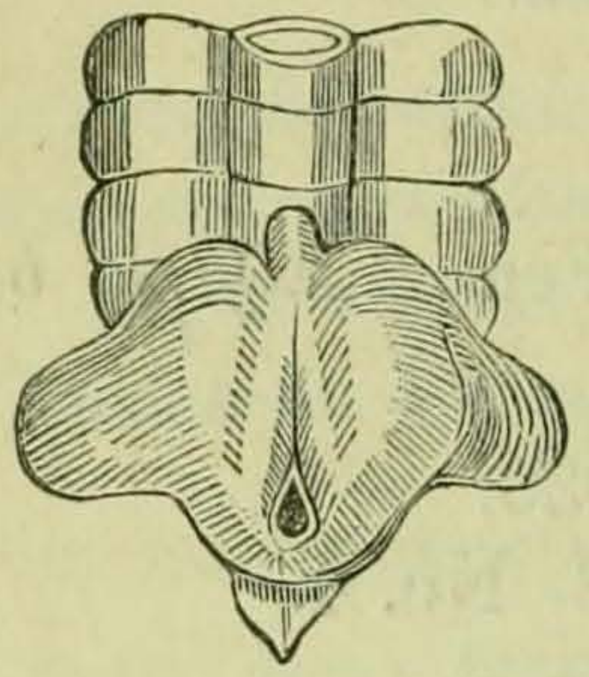
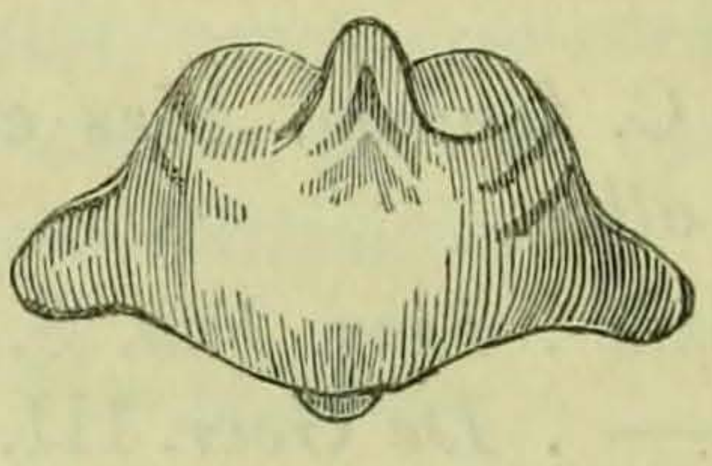


Fig. 2.



first of these being a female, it became a question whether this crab might not differ from others known to carry their ova after exclusion, attached in naked groups to the false feet under the tail. This was speedily decided, by finding males with the same appendage; and by individuals of both sexes being occasionally met with, having two or even three of them, but always attached to the median line of the tail, and to the interstices of some of its uppermost joints. These anomalies appeared to declare that they could be no part of the crab itself, but some anomalous excrescence or parasite.

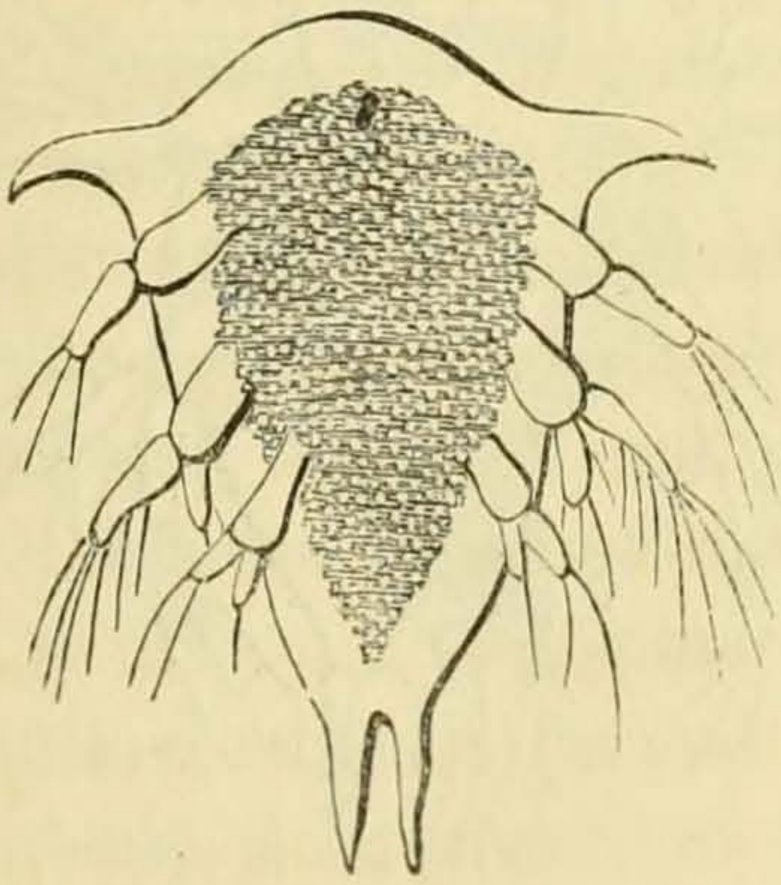
These parasites, which may be seen of various size, resemble a leathern pouch or satchel in figure and texture, are perfectly symmetrical, having an opening drawn together and closed at the lower end, and are so attached by a short thick neck to the membranous interstice between one of the upper joints of the tail of the crab, as to appear continuous with the body of the animal. On removing them by force, the neck presents the appearance of irregular branched joints, and a large opening is seen, which has every appearance of being continuous between the rectum of the crab and the cavity of the parasite, so as to conduct us to the conclusion, that it is through this

source it obtains the nutriment necessary to its support and growth. Externally the parasite does not present the slightest vestige of any kind of members.

On laying open the body of the parasite, the external coat appears to be composed of a double membrane, the outer rough, the inner smooth, within which we arrive at another whitish membranous sac, quite loose, except at the neck and lower opening, with both of which it is closely united. This membrane being slit open, a very large and flattened glandular body comes into view, of a white colour and smooth surface, filling the body from side to side, along one of which it is firmly attached to the enveloping loose membrane, as well as to the lower opening, where it terminates by a narrow neck, which is probably its secretory duct; beneath this gland the ample ovary is situated, composed of numerous elongated bunches of concatenated ova, enclosed within a very transparent membrane, attached only to the lower opening, where it terminates in two distinct apertures. Hitherto I have not been able to discover any other organs, unless a very small translucent sac, situated at the upper connected edge of the glandular body, and between it and the neck, with which it is also united. Query,—Can this be the stomach of the animal?

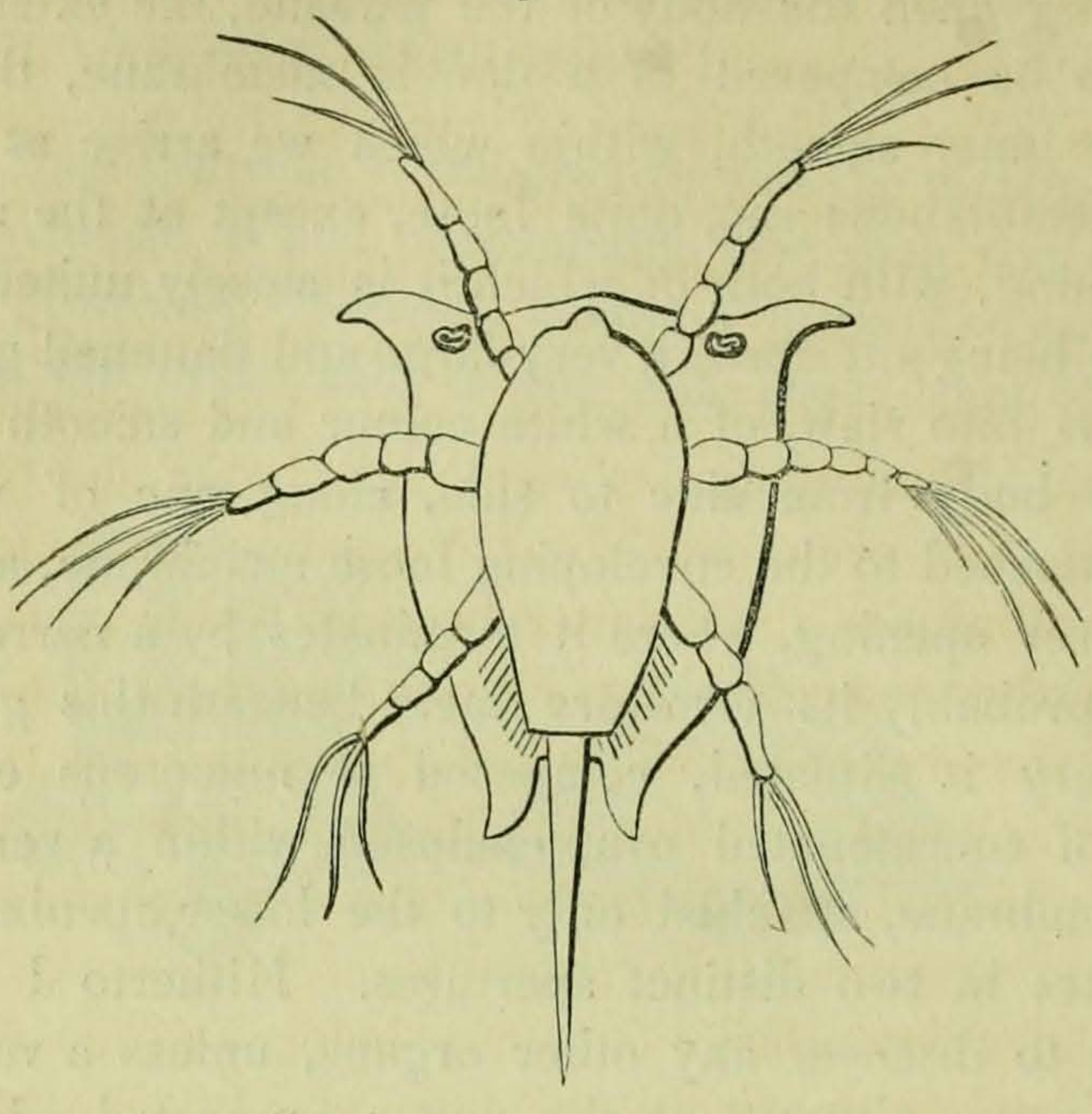
Such was the state of my knowledge in regard to this hitherto unobserved and very anomalous parasite, when I accidentally met with one of the above-named crabs in a trawl-boat, having a remarkably large and turgid parasite, from the lower aperture of which issued a purplish granular substance. Subjecting some of this substance to the microscope, it was found to consist of minute larvæ (fig. 4), in which it was easy

Fig. 4.



to recognise a resemblance to *Argulus armiger* (fig. 6), a microscopic crustaceous animal, never seen but by the Dutch

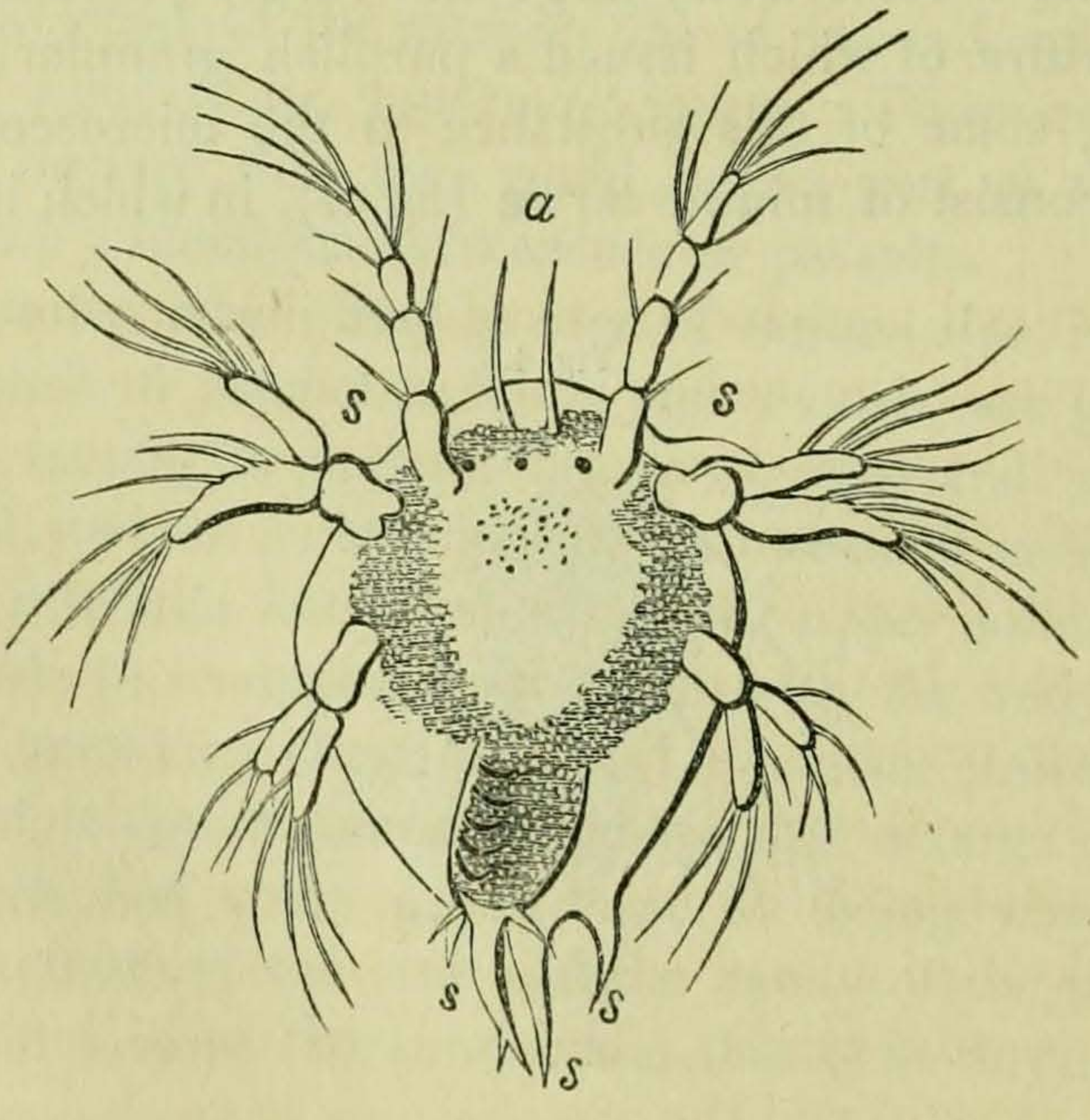
Fig. 6.



micographer Slabber. I could not, therefore, but felicitate myself upon the recovery of this long-lost type.

Several years elapsed before I discovered this same larva in its advanced state (fig. 5), which I have since found to abound

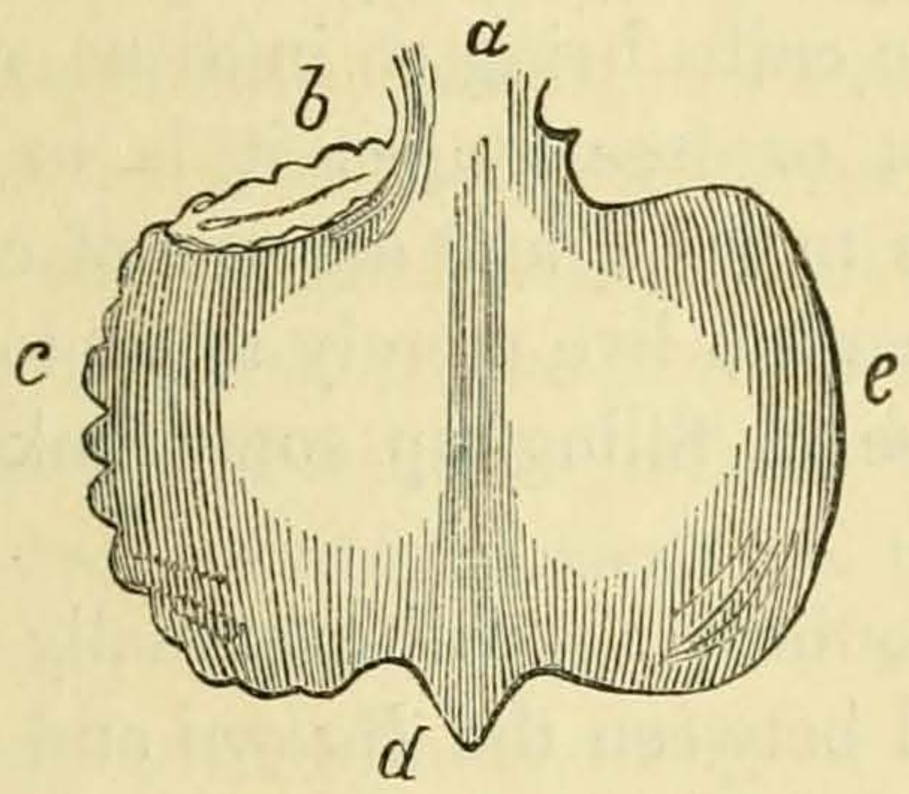
Fig. 5.



in the harbour of Cove during the Spring months; by this discovery its identity, through Slabber's rude figure, became sufficiently apparent.

Some important results and reflections naturally present themselves from a consideration of the foregoing detail, but they derive a ten-fold degree of interest by the subsequent discovery of the metamorphosis in the pedunculated *Cirripedes*, as developed in the Memoir read before the Royal Society. Without this we should still remain ignorant of the real affinities of this curious parasite, and of the mystery of its procreation. That it agrees with no tribe of the *Crustacea* is apparent, not even with the *Cirripedes;* nevertheless, its concealed affinity to these latter becomes evident, on a comparison of the respective larvæ; and yet how different and masked is the perfect animal, which presents us with another point of affinity in a union of the two sexes in the same individual; indeed, the *Sacculina* furnishes the only example in nature of an animal all generative organs, to the apparent exclusion of every other,—its body being entirely filled with the ovaria, and an enormous testicular gland. (Fig. 3.)

Fig. 3.



To an animal permanently fixed, and deriving its sustenance wholly through the medium of another, sight and members would have been useless, and are therefore cancelled by a Providence which never errs, and invariably adapts every animal to the peculiar station it is intended to fill in the scale of existence. In this respect it is however singular, as there are no other parasites of this class but retain some few members, if only for the purpose of adhesion.

If any naturalist is disposed to dispute the claim of *Sacculina* to the rank of an animal when in its last stage, and to consider it as a mere conceptacle, I have only to observe, that its long-continued growth, and the complication of an obvious testicular

gland, are in opposition to such an opinion. Indeed, we cannot but perceive in this curious animal a repetition of the singular metamorphosis of the *Cirripedes*, and of some others which I hope shortly to make known, in all of which the animal in its last stage, contrary to what we observe in insects, is less perfect and more simple in structure than its larva!

In the first stage of the *Sacculina*, it is free, provided with a remarkably powerful natatory apparatus, with sight, lives to acquire a comparatively large size, and having fastened upon the crab destined for its future support, insinuates itself, first under the tail flap, and then penetrates the rectum of its victim, and there undergoes its very singular metamorphosis; and from being little larger than a pin's head, acquires such a remarkable bulk as to exceed in width the flap or tail part even of the female crab, and to weigh as much as a quarter of an ounce, and probably contain a million of ova! This therefore, comparatively to the size of the animal from which it derives its support, is the largest parasite known, and must incommode the crab in proportion to its growth and number, independent of opening a way for the attachment of barnacles, *Serpuli* and *Zoophites*. From its prodigious fertility, and not even one-tenth of the crabs being so infested, numbers must be devoured in its first or free stage; it is in this way that it probably contributes to the grand scheme of creation, as in its second stage it appears to live merely to prolong its own race, and may have its use in filling up some link in the scale of natural affinities.

Thus I have no doubt but it will eventually tend to diminish the apparent interval between the *Balani* and *Lepades*, should the advanced larva of the latter be found to become *binocular*, which is more than probable, considering their perfect resemblance in their nascent state.

REFERENCES TO THE FIGURES.

Fig. 1. Parasite of *Carcinus Mænas*, as attached to the rectum of the crab, and showing its lower opening. Natural size.

Fig. 2. The other side of the same.

Fig. 4. The larva of *Sacculina Carcini*, when first hatched. Magnified.

Fig. 5. The supposed larva when fully grown, magnified; *a* horns, at the base of which its three eyes are seen, *s* the five spines of the dorsal clypeus.

Fig. 6. A copy of Slabber's figure, the *Argulus Armiger* of Latreille.

Fig. 3. The testicular gland; *a* broad upper attachment, *d* lower narrow attachment, *c* puckered edge, by which one side is attached to the enveloping tegument, *e* its opposite free edge, *b* the translucent organ, supposed to be the stomach (?) of the animal, firmly lodged in a cavity on one shoulder of the gland.