Zoologischer Anzeiger

herausgegeben

von Prof. **Eugen Korschelt** in Marburg.

Zugleich

Organ der Deutschen Zoologischen Gesellschaft.

Bibliographia zoologica

bearbeitet von Dr. **H. H. Field** (Concilium bibliographicum) in Zürich.

Verlag von Wilhelm Engelmann in Leipzig.

XXXIV. Band. 27. Juli 1909. Nr. 18/19.

Inhalt:

I. Wissenschaftliche Mitteilungen.

1. **Andrews**, The Use of *Thelycum* and *Petasma*. S. 545.
2. **Wandolleck**, Die Mundöffnung von *Ogcodes*. (Mit 4 Figuren.) S. 549.
3. **Börner**, Über Chermesiden. (Mit 1 Fig.) S. 554.
4. **Verhoeff**, Über einige Mastigophorophylliden und Craspedosomiden. S. 561.
5. **Cockerell**, New Names for two genera of Protozoa. S. 565.
6. **Verhoeff**, Neues System der Diplopoda-*Ascospermophora*. S. 566.
7. **Ärnbäck-Christie-Linde**, On intermediate forms among Chiroptera. (With 4 figs.) S. 572.
8. **Cavazza**, Studien über die in Italien vorkommenden Wieselarten der Untergattung *Arctogale*. (Mit 10 Figuren.) S. 582.
9. **Richters**, Tardigraden unter 77° S. Br. (Mit 3 Figuren.) S. 604.
10. **Toldt**, Über den vermeintlichen Bärenembryo mit Stachelanlagen. S. 606.

II. Mitteilungen aus Museen, Instituten usw. Deutsche Zoologische Gesellschaft. S. 608.

III. Personal-Notizen. S. 608.

Literatur. S. 401—432.

I. Wissenschaftliche Mitteilungen.

1. The Use of Thelycum and Petasma.

By E. A. Andrews, Baltimore.

eingeg. 27. März 1909.

Students of the Crustacea will recall that in the Prawns, the Penaeidea, the sexes differ markedly in the form of the limbs of the abdomen and in the fact that the female has a structure upon the thorax that is not found in the male. The peculiarity of the first pair of limbs of the abdomen of the male is, that each bears a remarkable membrane-like structure that is firmly hooked to its fellow of the opposite side, so that the two together form a sort of crumpled curtain stretched across from limb to limb. From this resemblance to a curtain, Spence Bate, in 1881, named this structure the *Petasma*. Later, in the Challenger Reports, he called the peculiar structure that is found only upon the female, the *Thelycum*, as being peculiar to the female. This *Thelycum* is a plate, or a depression, or a more complex organ between the fourth and fifth legs of the thorax, on the middle of the body.

The fact that both the *Petasma* and the *Thelycum* differ in different species has made them a useful part of the description of species, but what they mean in the economy of the animals has not hitherto been found out.

In the Schizopoda, which are more primitive than the group of Decapods, the Penaeidea; the male has likewise a remarkable complex extension of the first abdominal leg, while the female has no peculiar organ. Sars in the Challenger Reports, Vol XIII, p. 69, says: „As to the function of these remarkable appendages in the male, there can, I think, be little doubt of their serving to seize the spermatophores and place them on the sexual openings of the female. The first pair are unquestionably the most effective for this purpose, while the second pair perhaps perform merely a coadjutory function." This conclusion is based upon the fact that elongated pear shaped spermatophores were found not only in the male defferent duct but also inserted into the oviduct of the female. This interpretation of the use of the specialized first abdominal legs in the Schizopoda was extended to the *Petasma* of the Penaeidea, by Spence Bate, in the Challenger Reports Vol. XXIV, p. XLVI, because the exceptionally pelagic member of the Penaeidea, *Lucifer*, also shows spermatophores attached to the openings of the female oviducts. That the plate like outgrowth of the first abdominal leg of the male *Lucifer* is used to transfer the spermatophore to the female is, however, still inferential. Professor W. K. Brooks who had the best opportunity to study the living *Lucifer*, states in the Philosophical Transactions of the Royal Society, 1882, p. 59, „I was unable to discover how the spermatophore is transported to the body of the female, or what part the clasping organ upon the first pleopod of the male performs during the act of copulation."

Spence Bate has nothing to say as to any possible use of the peculiar female organ, the *Thelycum.*

In his monograph on the Crustacea in Bronns Klassen und Ordnungen, A. E. Ortmann discusses the peculiar organs of the Penaeidea, and concludes that the *Petasma* and the *Thelycum* may be used together in copulation. On page 1070 he says: »Die Bedeutung, die diesem ‚*Thelycum*' zuzuschreiben ist, ist noch sehr unklar, doch dürfte es sich vielleicht nachweisen lassen, daß die Bildung des *Thelycum* bei den einzelnen Arten in direkter Beziehung zu der ebenfalls mannigfaltigen Ausbildung des männlichen Organs (*Petasma*) steht, und daß beide bei der Copulation benutzt werden. Nimmt man nämlich an, das beide Organe, das männliche und das weibliche, sich bei der Copulation vereinigen oder aufeinander legen, so kommt dadurch die männliche Geschlechtsöffnung ziemlich genau der weiblichen gegenüber zu liegen,

eine gegenseitige Stellung, die für die Übertragung der Spermas auf die weiblichen Teile nur von Vorteil sein kann.«

Ortmann also states that female organs analogous to the *Thelycum* are entirely unknown in all other groups of the Decapoda.

Since that date, however, it has been shown that in the crayfish of the genus *Cambarus*[1] there is a female organ used in conjugation which has the same location upon the thorax as the *Thelycum.*

This fact, together with the striking parallelism between the *Petasma* on the one hand and the first male abdominal limbs of the crayfish on the other, in that both are of characteristic form in each species, led me to infer that since the male limbs of these crayfish were found to transfer sperm into the sperm receptacle of the female that the exceptionally modified limbs of the males in the Penaeidea might be used to transfer sperm into some receptacle to be sought for in the *Thelycum.*

An examination of the *Petasma* in some specimens of *Parapenaeus constrictus* shows that it is well fitted to transfer sperm from the openings of the defferent ducts through the length of the organ to its anchor shaped tip and thence out through a groove in each arm of the anchor to the special termination right and left. The *Thelycum* in this species prooves to be a well protected pocket, right and left, with complex anterior and posterior horns and by applying the male to the female it seems probable that the tips of the *Petasma* might be made to discharge sperm right and left into the two lateral pockets that lie concealed within the *Thelycum.*

A subsequent anatomical study of the *Petasma* in *Penaeus brasiliensis* shows that it also might function as an organ to transfer sperm from the openings of the defferent ducts to the *Thelycum.* The *Thelycum* in this species, though outwardly very much like that in the above species of *Parapenaeus* contains a remarkable chitinous bag, with exceedingly narrow external opening and this bag contains large quantities of sperm in several females.

It is thus proven that the *Thelycum* may contain sperm and as the *Petasma* seems well fitted to put the sperm into the *Thelycum* we seem to have an explanation of the use of these two organs.

In confirmation of this view we note that Spence Bate in the above Challenger paper, in describing specimens, all females, of *Hemipenaeus tomentosus* figures and describes the *Thelycum* as a deep depression, but in one case this is figured as filled up by a mass that projects all round about the depression and is referred to in the explanation of plates as a gelatinous mass, though in the text the author says ,,the deep

[1] Andrews, The annulus ventralis. Proc. Boston Acad. Nat. Hist. 32. 1906.

depression between the posterior two pairs of periopoda is sometimes filled with a grey mass of firm and leathery texture" Again on p. 70 of his article on the Penaeidea in the Ann. Mag. Nat. Hist. Vol. VIII, 1881, he says of the female „a ventral plate varying in form and appearance, according to species, lies between the last two pairs of legs: connected with this, varying also in form according to species a large mass of brown membranous material is attached, in some species large and fan-like in shape, in others it is an irregular oval disk; but what relation it has to the true history of the animal, observation has yet to determine." In the lack of observation we may suppose that both the leathery, or gelatinous, or membranous mass is in all cases a spermatophore, or at least a secreted mass that has been poured out in connection with the sperm, to protect it, and to aid in its safe disposal within the cavity of the *Thelycum.* The specific shape of these attached masses must be connected with the specific form of the abdominal legs, which probably shape the mass as well as transfer it to the *Thelycum.*

That so little is said of these membranous masses in the Challenger report is probably due to their loose, temporary nature, to their having fallen of in the manipulation of specimens.

We then conclude that in the Penaeidea the *Thelycum* is generally used to hold the spermatophor mass, or to store up the sperm, and that the *Petasma* is used to transfer the sperm, or the spermatophores, to the *Thelycum.*

In the exceptional cases such as *Lucifer* where there is no *Thelycum* the *Petasma* probably transfers the spermatophores directly to the mouths of the oviducts. This difference seems correlated with the mode of carrying the eggs, since in both *Lucifer* and the Schizopoda where there is no *Thelycum* and the spermatophores are inserted into the oviducts the eggs are carried upon the legs of the thorax, which is not known to be the case in other decapods.

An illustrated description of the anatomy of the *Thelycum* will be published later. At present its resemblance to the sperm receptacles of the lobster and of *Cambarus* leads to the inference that the ancestors of the crayfish must have had something like a *Thelycum* in the female and something like the *Petasma* in the male. In *Cambarus* the structures have been greatly changed in both sexes but still have the same uses, in general.

In *Astacus* the male abdominal leg is still modified but is used to transfer spermatophores to the exterior of the shell of the female, the female lacking any sperm receptacle. In crayfishes of the Southern Hemisphere the semale organs also are lacking. Rather than assume that the resemblances between the organs of the higher crayfish and the

Penaeidea are due to independent origins, we will assume that the highest crayfish, *Cambarus*, has retained these characters, though they have disappeared more or less in other crayfish. That is to say, that while *Cambarus* has lost gills and so departed from ancestral anatomy it has on the other hand retained sexual habits and organs that were once of wider occurrence, in fact universal amongst the crayfish ancestors.

We may modify Ortmann's argument for the distribution of American crayfishes by assuming two migrations from Asia into America. One set of migrants gave rise to *Cambarus*, but left behind in Asia forms that have since become Cambaroides by loosing the sperm receptacle while retaining the more numerous gills of the migrants. The other set of migrants were the little changing *Astacus* forms.

Johns Hopkins University, March 12, 1909.

2. Die Mundöffnung von Ogcodes.

Von Dr. Benno Wandolleck, Dresden.

(Mit 4 Figuren.)

eingeg. 28. März. 1909.

In den Sitzungsberichten der Ges. naturf. Fr. zu Berlin veröffentlichte ich 1894 Nr. 3 eine Übersicht über den Bau des Kopfskelettes der Henopier, jener eigentümlichen Dipterenfamilie, die auch unter den Namen Acroceridae oder Inflatae bekannt ist. Zu dieser Familie gehört die Gattung *Ogcodes*, deren Angehörige sich neben andern Merkmalen noch dadurch auszeichnen sollten, daß ihre Mundteile vollkommen reduziert wären, ja daß gar keine Mundöffnung vorhanden sei.

Erichson[1] hatte darüber geschrieben: »Die Stelle wo sonst Rüssel und Mundöffnung Platz haben, ist mit einer ausgespannten Membran völlig verschlossen. In der Mitte dieser Membran bemerkt man einen feinen hornigen Ring, der sich hinten an der Stelle der Unterlippe etwas erweitert und gegenüber an der Stelle der Oberlippe noch etwas mehr nach innen vortritt und hier einen kleinen Vorsprung zu jeder Seite neben sich hat, der an die verkümmerten Mandibeln der Schmetterlinge erinnert. Es wäre dies ein Beispiel mehr, wo bei Insekten im vollkommenen Zustande die Funktion der Nahrungswege vollständig aufgehört hat.«

Im Arch. f. Naturg. 1846. I. S. 288 sagt er: »ich überzeugte mich nun, daß wirklich ein Rüssel vorhanden ist, er ist aber nur sehr kurz, tritt erst hinter jener Hautfläche an der hinteren Seite des Kopfes vor und ist gerade gegen die Vorderhüften gerichtet. Nachdem das Insekt

[1] Entomographien I. 1840. S. 137, 138.