tungen hin entstehen Knospen, welche sich zu normalen Zooecien gestalten; während dessen ist der Ernährungsapparat des Primärzooeciums zu Grunde gegangen, und es scheint keine Regeneration für dieses stattzufinden, nie habe ich wenigstens bei *Microporella Malusii* Colonien gefunden, wo dieses wohl der Fall war. Die Vorgänge und die Zeitdauer der Evolution waren bis auf wenige Stunden die nämlichen bei drei Colonien, welche sich im Mai im Neapolitaner Aquarium vollkommen entwickelt haben. Bei einer einzigen Colonie in meiner Sammlung fand ich, daß das Primärzooecium kein *Membranipora*-Stadium bildete, und sieben Nachbarzooecien entwickelte; ihre Gestalt ist wie ein kleineres, gewöhnliches Zooecium, jedoch mit einem schnabelförmigen Ende. In einer ausführlicheren Abhandlung werde ich dieses abbilden, sowie die hier mitgetheilten Angaben erläutern.

Was die Knospung anbelangt, so habe ich für *Microporella* wenige Beobachtungen, jedoch werde ich darauf bei *Flustra carbasea* zurückkommen; nur will ich hier bemerken, daß bei den Cheilostomen, ebenso wie dieses von Vogt und Harmer bei den Entoprocten nachgewiesen wurde, ein einziges Blastem, Ectoderm und Parenchym entwickelt.

3. Preliminary Notes on some Oligochaeta.

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eingeg. 7. September 1889.

1) The Sexual Organs of *Dero*.

The general organisation of *Dero* is well known through the researches of Perrier[1], Bousfield[2] and others; but up to the present time there has been no account of the generative organs. The genus *Dero* clearly belongs to the group Naidomorpha in which group it was placed by Vejdovský in his »System und Morphologie der Oligochaeten«. No recent opinion against this view of the affinities of *Dero* has been advanced by any naturalist who has studied the worm. The structure of the sexual organs entirely confirms the current opinion, although there are some differences in detail between *Dero* and other Naids.

The sexual form of *Dero* only differs from the asexual form in the absence of all traces of multiplication by fission, and in the development of the sexual organs. Externally the sexual individual is distinguished by the clitellum which occupies 3 segments (V—VII) and which bears the apertures of the reproductive ducts. The spermathecae

[1] Arch. Zool. Exp. T. I. (1872.)
[2] Journ. Linn. Soc. 1887.

open in front of the ventral setae of the fifth segment. In all the specimens which were examined there were invariably two setae only in each of the ventral bundles of the fifth segment; whereas in the segments anterior to the fifth the number was not constant, being either two or three; the setae of the fifth segment were in no particular different in shape from those of other segments.

The atria open on a line with the spermathecal apertures on to segment VI. *Dero* appears to differ from other Naidomorpha e. g. *Nais* in the fact that the ventral setae of this segment are entirely absent. In *Nais elinguis* according to Vejdovský[3] and Stolč[4] the atrial apertures are furnished with special genital setae, and the same structures are present in the few other species of Naidomorpha which have been investigated in the sexual condition.

There is a single unpaired sperm sac and egg sac.

2) A species of *Perichaeta* from Borneo.

Up to the present time the only earthworm which has been described from this island is *Megascolex armatus*. I now am able, through the kindness of Mr. H. O. Forbes, to refer to certain peculiarities in the structure of a large species of *Perichaeta* from the same island.

I reserve a full account of the anatomy of this *Perichaeta*, which exhibits one peculiarity of some interest, which I have not noticed or seen referred to in any other earthworm.

In both of the two individuals at my disposal the spermatheca showed a marked asymmetry. On one side of the body (the left in both specimens) there were two spermathecae placed close together in the VIIIth segment. On the right hand side of this segment there was only a single spermatheca, and a single pair, one on each side of the body, in the following segment. This peculiarity if it had been observed in only one specimen, would naturally be regarded as an abnormality; but its occurrence in two specimens selected at random, seems to be a strong proof that it is normal.

3) Note on *Moniligaster*.

Dr. D. Rosa in a valuable paper upon the Classification of Earthworms[5] has criticized some statements of my own[6] concerning the structure of the remarkable genus *Moniligaster*. Rosa points out that two much stress was laid upon the apertures of the vasa deferentia

[3] l. c.
[4] Zool. Anz. 9. Jahrg. p. 504.
[5] Boll. Mus. Zool. Anat. Comp. Torino. Vol. III. No. 41.
[6] Zool. Anz. No. 268.

being placed between two segments and upon the fact that the oviducts open behind the spermducts; I admit the justice of this criticism; he furthermore points out the discrepancies between my account of the reproductive organs of *M. Barwelli* and Horst's account[7] of the same organs in *M. Houteni*, which could be reconciled if it were proved that I had omitted to count two segments. I have since reexamined my specimens both in longitudinal sections and a preparation of the anterior end of the worm flattened out and mounted in Canada balsam; the latter preparation shows me that I have made an error of one segment. After the peristomial segment there is an extremely narrow setigerous segment with setae so minute that they require a microscope for their demonstration. The apertures of the atria are thus between segment X/XI; there is therefore some reason to regard the original description by Perrier of *M. Deshayesi* as being right in this particular.

From this it appears that the difference in position between the apertures of the spermducts of *Moniligaster* and the earthworm *Tetragonurus*[8] is reduced to one segment; this is perhaps hardly a sufficient reason for refusing to accept Rosa's placing of *Moniligaster*. But the correction of this error does not invalidate the position that I have taken up as to the affinities of the genus *Moniligaster*.

I am unable to state what is the position of the testes but I should imagine that they will be found to occupy the IXth segment — possibly attached to the posterior dissepiment of this segment. It is also difficult to make out the relations of the single pair of spermsacs to dissepiment IX—X and consequently the position of the vas deferens funnel is obscure; it seems most probable that the spermsacs are really — as they appear to be — contained partly in segment X and partly in segment IX: and that they correspond to the anterior and posterior outgrowth of the septum IX—X in the young *Lumbricus* (see Horn's »Atlas of Practical Elementary Biology«, pl. XII fig. IX). In this case the funnel of the vas deferens will be really in the IXth segment. The only alternative to this is that the vas deferens opens into the Xth segment, i. e. the same segment as that which bears its external orifice. This condition, as I have already pointed out is paralleled in *Stylaria*, but the first alternative commends itself to me as the most probable. In either case there is a great difference from the conditions met with in other earthworms. Furthermore the atrium as than already insisted ressembles the atrium of the Lumbriculidae and differs from the corre-

[7] Notes from the Leyden Mus. Vol. IX.

[8] It must be remembered however that we have no anatomical date with regard to this genus.

sponding structure in any known earthworm; but Dr. Rosa does not make use of the characters of the atrium in defining the family Terricolae and so I pass by this point of difference, which appears to me nevertheless to be a very important one.

In the XIth segment of *Moniligaster Barwelli* is a funnel-like structure composed of columnar ciliated cells which I have identified as an oviduct; as I was unable to find its external pore I cannot be certain that it is not one of a second pair of vas deferens funnels; but it seems much more likely that the structure in question is an oviduct assuming for the moment that the funnels in segment XI are vasa deferentia funnels — one of two things must follow: either they open by means of well developed atria on both boundary lines of segments XI, XII — in which case the conspicuous orifices of them have escaped the attention of Perrier, Horst, Bourne[9] and myself: or, the tubes run forward and open into the atrium of the Xth segment! In the latter case there will be a ressemblance to the Lumbriculida so strong, that any further criticism of Dr. Rosa's views is rendered unnecessary. I think it must be admitted that the ciliated funnels are those of the oviducts and that they open on to the exterior not further back than the XIIth segment; it is a fair assumption that the ovaries are in the XIth though I confess to having found no traces of them.

I cannot therefore agree with Dr. Rosa's contention that the reproductive organs of *Moniligaster Barwelli* conform to the type which he formulates as characteristics of earthworms.

There is another structural feature in *Moniligaster* to which I would direct attention as bearing upon the question at hand.

Dr. Rosa rightly remarks upon the presence in all earthworms (that have been investigated from that point of view) of a pair of receptacula ovorum in the XIVth segment attached to the anterior mesentery. I have called attention to the fact that in *Moniligaster Houteni* these bodies are of remarkably large size as compared with those of other earthworms.

Dr. A. G. Bourne has made the interesting observation that in *Moniligaster minutus* »sacs containing ripe ova occupy segments XII —XV at least«. I cannot avoid the conclusion that these sacs are as Dr. Bourne suggests eggsacs which therefore in the large number of segments which they occupy offer a striking ressemblance to the eggsacs of the Tubificidae and other aquatic Oligochaeta.

London, Sept. 5 1889.

[9] Proc. Zool. Soc. 1886.

Druck von Breitkopf & Härtel in Leipzig.