2. Note on Oka's biannulate Leech.

By J. Percy Moore, Philadelphia.

(With 1 fig.)

eingeg. 13. Juli 1900.

Any consideration of the Ichthyobdellid somite was intentionally omitted from my recent paper (1900) on *Microbdella* as it was desired to reserve the material relating to this family for a later occasion, but the failure to mention Oka's earlier discovery of a biannulate leech was a pure oversight for which I wish to make amends.

The leech described by Oka (1895) is a species of *Ozobranchus* which is doubtfully referred to *O. Mendiesi* (Blainville) Quatrefages. Several species of this genus have been described but they are not yet clearly defined. Usually the complete somite is 3-annulate or 4-annulate, but Oka's species is remarkable in having 22[1] somites each composed of two rings only, the rest being, when differentiated at all, uniannulate. In the anterior region of the body the annuli are of approximately equal width, but posteriorly they are alternately wide and narrow. As interpreted by Oka each somite in the posterior region embraces a larger annulus followed by a smaller one. Indeed, no other interpretation seems reasonable, for on the ventral side the intrametameric furrows disappear and thus each narrow annulus is associated structurally with the immediately preceding wide one.

The discovery of such a type among the Ichthyobdellids is of great interest as furnishing another factor in the series of somite parallelisms between the two principal phyletic lines of the Hirudinea.

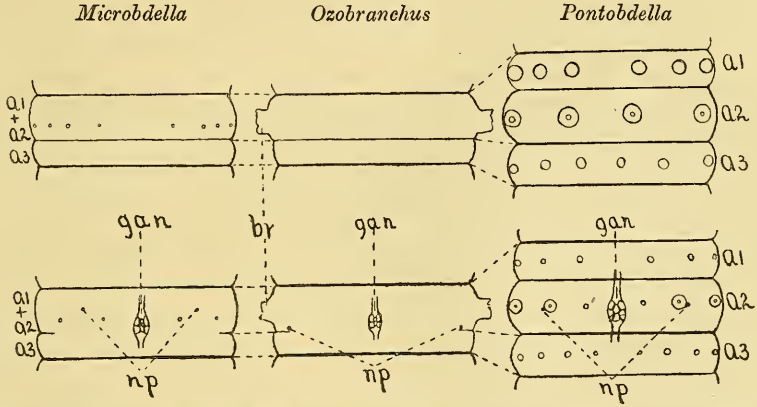
The remarkable similarity between the somites of this species and the Glossiphonid *Microbdella* is indicated in the accompanying figures, a somite of *Pontobdella* being added for comparison as an example of a usually 3-annulate Ichthyobdellid. In each case the somite is subdivided into a broad anterior and a narrow posterior annulus by a furrow which disappears on the ventral surface. Oka does not state the exact position of the ganglion but it probably lies, as in other species of *Ozobranchus*, in the middle of the somite, that is, chiefly in the posterior half of the large annulus, as in *Microbdella*. The nephropores, as frequently happens in the Ichthyobdellidae, are

---

[1] Oka says 23 (II to XXIV inclusive), but it is probable that each of the two broad annuli which are regarded by him as belonging to somite II in reality constitutes an entire somite. The one thus added would bring the full number of somites exclusive of the sucker, up to 27, the number usually recognized in the corresponding regions of other leeches.

placed far back on the large annulus, according to Oka at the line of the furrow separating the large and small annuli, while in *Microbdella* they are further forward, as in the Glossiphonidae generally, anterior to the metameric sensillae. In *Microbdella* the metameric sensillae are on the posterior half of the large ring. None have been described for this *Ozobranchus*, but the branchia spring from the sides of the corresponding region. The large and small annuli are clearly respectively equivalent in the two forms.

Just as *Microbdella* has been compared with *Glossiphonia* so may the somite of Oka's *Ozobranchus* be compared with any triannulate Ichthyobdellid, as, for example, *Branchellion* or *Pontobdella*. The large ring of *Pontobdella* contains the nerve ganglion from which



Diagrams of typical somites of *Microbdella*, *Ozobranchus* and *Pontobdella*. Upper series dorsal, lower ventral aspects. *br* stumps of branchia, *gan* ganglia, *np* nephropores.

peripheral nerves, after passing through a small accessory ganglion, diverge to the preceding and succeeding rings. Sometimes a fourth, fifth or sixth narrow annulus is present as a result of the subdivision of one, two or all of the primary annuli, but for the present purposes of comparison these conditions may be ignored. The large annulus of *Pontobdella* also contains the principal papillae, the pulsating vascular vesicles and the nephropores; the latter vary in position but are most frequently situated as shown in the figure, that is, well back on the annulus. It seems extremely probable from these topographical considerations that the large annulus of *Ozobranchus* corresponds to the neural annulus plus its predecessor in *Pontobdella* and that its structure fully confirms the results arrived at through a study of *Microbdella*: namely, that the neural annulus is morphologically the

middle and not the anterior ring of the 3-annulate leech somite and its derivatives.

Oka, however, has come to a different conclusion. He compares the complete somite of *Ozobranchus* and *Glossiphonia* and, while recognizing that the large annulus of the former is morphologically equal to two annuli of the latter, believes that these two are the first (neural) and second (post-neural) instead of as Castle (1900) and I believe the neural and its predecessor.

The case becomes still clearer in favour of the latter view when comparison is made on either hand with a form of intermediate structure. This is found, in a, as yet undetermined, species of fresh-water Ichthyobdellid in which the complete somites are divided into three annuli, but the furrow separating *a* 1 from *a* 2 is much more shallow than that between *a* 2 and *a* 3. The nerve ganglion, metameric sensillae, pulsating blood vesicles and more posteriorly the nephridial openings are situated within *a* 2 which evidently corresponds to the posterior half of, and with the associated *a* 1, to the entire large annulus of *Ozobranchus Mendiesi.*

Much the same condition as that last indicated is found in a species of *Ozobranchus* which Apáthy (1890) has described under the name of *Pseudobranchellion Margoi.* This species is described as tri-annulate and Blanchard ('94) states that the preneural ring is double in large individuals, making four in all if these are counted as two. Apáthy, however, after stating that the furrow between ring 3 and the succeeding ring 1 of his enumeration is more shallow than the furrows which separate ring 2 from 1 and 3, says (p. 125). »Dieses Verhältnis ist besonders auf den kiementragenden Somiten auffallend, wo die Furche zwischen dem 3. und 1. Ring beinahe ganz ausgeglättet ist. Das Hauptseptum des Somits liegt zwischen dem 2. und 3. Ring und bedingt hier die tieferen Furchen (Einschnürungen) des Körpers.«

If the »Hauptseptum« is the true coelomic dissepiment, which some will dispute, its position as described by Apáthy corresponds exactly with the neuromeric limits of the somite, and the relative prominence of the inter-annular furrows is just what the neuromeric standard of Castle would lead one to expect. In the application of such a standard the rings enumerated as a 1, a 2 and a 3 would correspond respectively to Apáthy's 3rd, 1st and 2nd rings.

Papers cited.

Apáthy, S., 1890. *Pseudobranchellion Margoi* (Nova familia Hirudinearum). Ertesitö az Erdélyi Museum Egylet. Orvos-Természettudományi Syakosztályából. Vol. XV. p. 122—127.

Blanchard, R., 1894. Hirudinées de l'Italie continentale et insulaire. Boll. Mus. Zool. Anat. comp. Univ. di Torino, Vol. IX. No. 192. p. 84.

Castle, W. E., 1900. The Metamerism of the Hirudinea. Proc. Amer. Acad. Arts and Sciences. Vol. XXXV. p. 285—303.

Moore, J. Percy, 1900. A Description of *Microbdella biannulata* with especial regard to the Constitution of the Leech Somite. Proc. Acad. Nat. Sc. Philad., 1900. pl. VI. p. 50—73.

Oka, Asajiro, 1895. Description d'une espèce d'*Ozobranchus*. Zoological Magazine. Vol. VII. pl. III. p. 1—7.

3. Beitrag zur Pigmentfrage.

Von S. Prowazek, Prag.

eingeg. 13. Juli 1900.

Während eines Aufenthaltes auf der zoologischen Station in Triest bot sich mir auch die Gelegenheit dar, mehrere Beobachtungen über das Pigment und die Pigmentzellen einiger Knochenfische anzustellen.

Bei einer bloß oberflächlichen Betrachtung ist zunächst die Abfolge der Farben des Pigmentes im verticalen Sinne bemerkenswerth, indem zumeist zu oberst die schwarzen, dann die rothen, orangerothen und gelben Pigmentzellen anzutreffen sind (so bei *Trigla hirundo* zuerst schwarz, dann roth oder orangeroth und gelb, bei *Blennius tentaculatus* zuerst braunschwarz, dann orangeroth und gelb, beim *Labrus* braunschwarz, orangeroth, gelb etc.). Man wäre vor Allem geneigt, dieses Phänomen irgendwie mit der Absorption des Lichtes oder der reichlicheren Sauerstoffzufuhr etc. in Zusammenhang zu bringen; doch fand ich bei einigen bis 13 mm langen durchsichtigen Jungfischen, die längst der Rückenlinie und gegen die Schwanzflosse zu zuerst schwarzes, dann gelbliches Pigment führten, dieselbe abermalige Pigmentabfolge in der Tiefe zu beiden Seiten der Wirbelsäule.

Auch in horizontaler Richtung ist die Pigmentanordnung verschieden, so findet man bei der *Trigla* die schwarzen Pigmentzellen zu beiden Seiten der Flossenstrahlen, dann aber wieder an der Faltungslinie der dazwischen sich ausspannenden Membran; bei dem erwähnten Jungfische waren die Pigmentzellen einseitig an der Basis der dorsalen Flossenstrahlen angeordnet und folgten ihnen nur auf der distalen Seite, wogegen sie in der Schwanzflosse zu beiden Seiten dieser anzutreffen waren. Im Allgemeinen kann man behaupten, daß sie den Linien des geringeren gleichartigen histologischen Widerstandes folgen und auch in diesem Sinne ihre Fortsätze besonders aussenden; diese Verhältnisse kann man an den Rückenflossen des *Blennius*, *Gobius* u. a. gut beobachten. Bei den Jungfischen