38. Contributions to the Anatomy and Systematic Arrangement of the Cestoidea. By Frank E. Beddard, M.A., D.Sc., F.R.S., F.Z.S., Prosector to the Society.

[Received April 2, 1912 : Read May 7, 1912.]

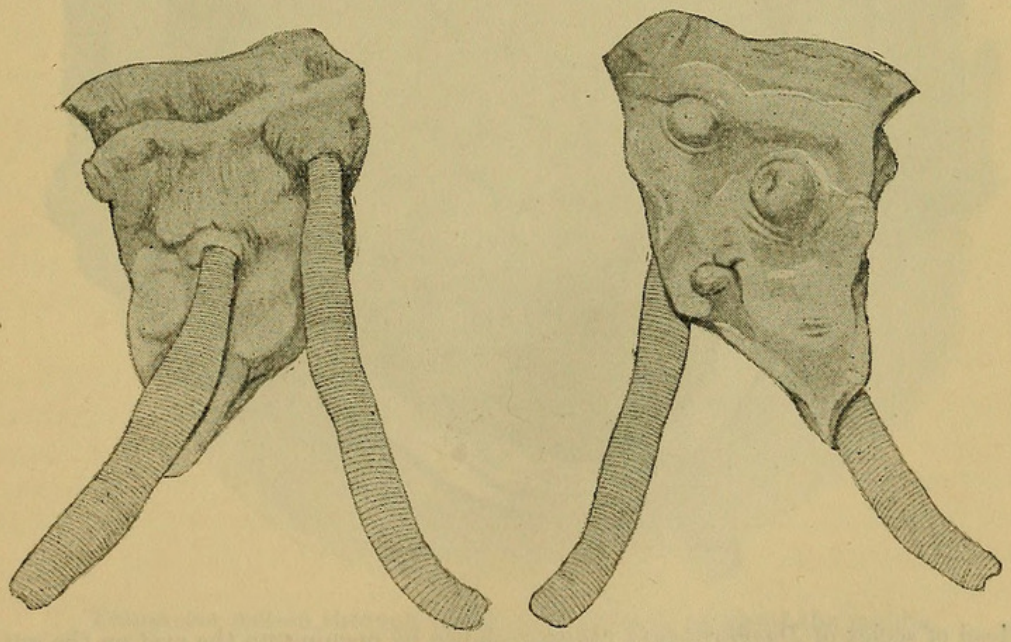
(Text-figures 92–101.)

V. On a new Genus (*Dasyurotænia*) from the Tasmanian Devil (*Dasyurus ursinus*), the type of a new Family.

Index.

The Cestoidea hitherto recorded from Marsupials appear to belong to the following genera only, viz. *Triplotænia*, *Moniezia*, *Bertiella*, *Linstowia*, *Anoplotænia*, *Oochoristica*, and *Cittotænia*. To these must now be added an eighth genus, of which I have recently examined examples from the Tasmanian Devil, in whose small intestine they occurred.

Text-fig. 92.



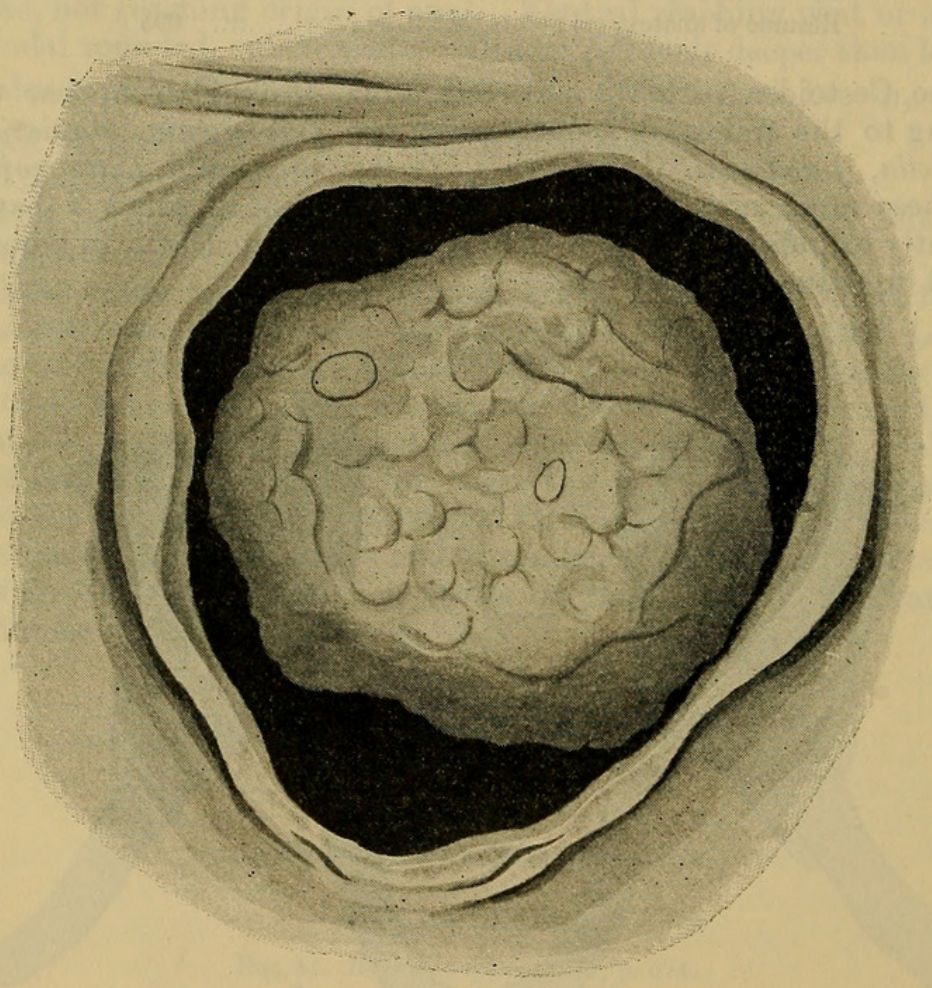
Dasyurotænia robusta, nat. size.

Two views of the same two specimens, to show their attachment to the gut. The left-hand figure represents the interior of the gut, the right-hand figure the outside.

The accompanying drawings (text-fig. 92) show two of the three specimens which I obtained *in situ*. Each worm is firmly imbedded at the head end in the wall of the gut. The two

drawings show the inner surface and the outer surface of the intestine. The body of the worm is rather flat though at the same time fairly thick, and is curved in a sickle-like fashion. The length of the larger of the two individuals is about $1\frac{1}{4}$ inches, and the greatest breadth does not exceed 5 mm. There is not a very marked difference in diameter at the neck end of the body, and the worm thus presents a very solid and strong appearance, which is correlated with the very firm way in which it is imbedded in the gut. The narrowness of the segments and the lack of overlap of successive segments contributes further to the stout appearance of the worm.

Text-fig. 93.

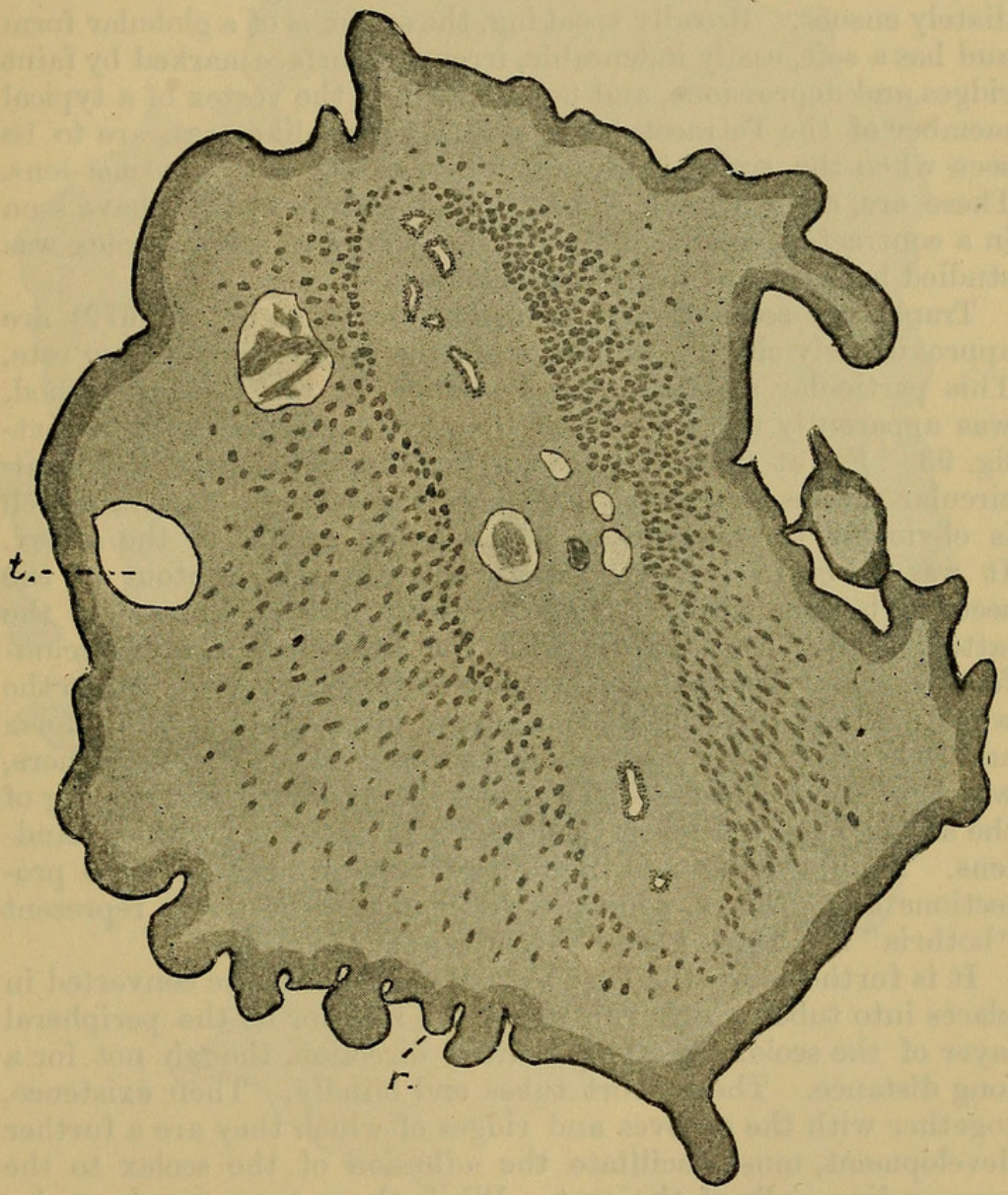


Head of scolex of *Dasyurotænia robusta*, shown by opening up the cyst on the gut.

The last two or three segments of the body are rather narrower from side to side and are curved, thus tending to encircle each other successively. This state of affairs is shown in the drawings referred to. Anteriorly the strobila is seen to perforate the wall of the intestine, which forms a fold round it, like a collar not fitting very closely. The strobila at this point disappears from view when the intestine is examined from its internal surface.

When the piece of gut to which the worms are attached is turned over they reappear on the outer surface (as is shown in text-fig. 92) in the form of a cyst. This cyst forms a simple hemispherical bulging upon the wall of the gut consisting apparently of the peritoneum. When this peritoneal wall is cut through a

Text-fig. 94.



Transverse section through scolex of *D. robusta* at about the middle.

The central medulla shows the problematical vesicles referred to in the text in the middle of its extent and the coils of the water-tubes at the ends.

r. Irregular furrows upon scolex. *t.* Tube formed by these.

A second tube of the same nature lies above and to the right of that lettered.

cavity is opened up in which lies the large scolex. This is illustrated in text-fig. 93. The scolex, it will be observed, does not completely fill the cavity in which it lies.

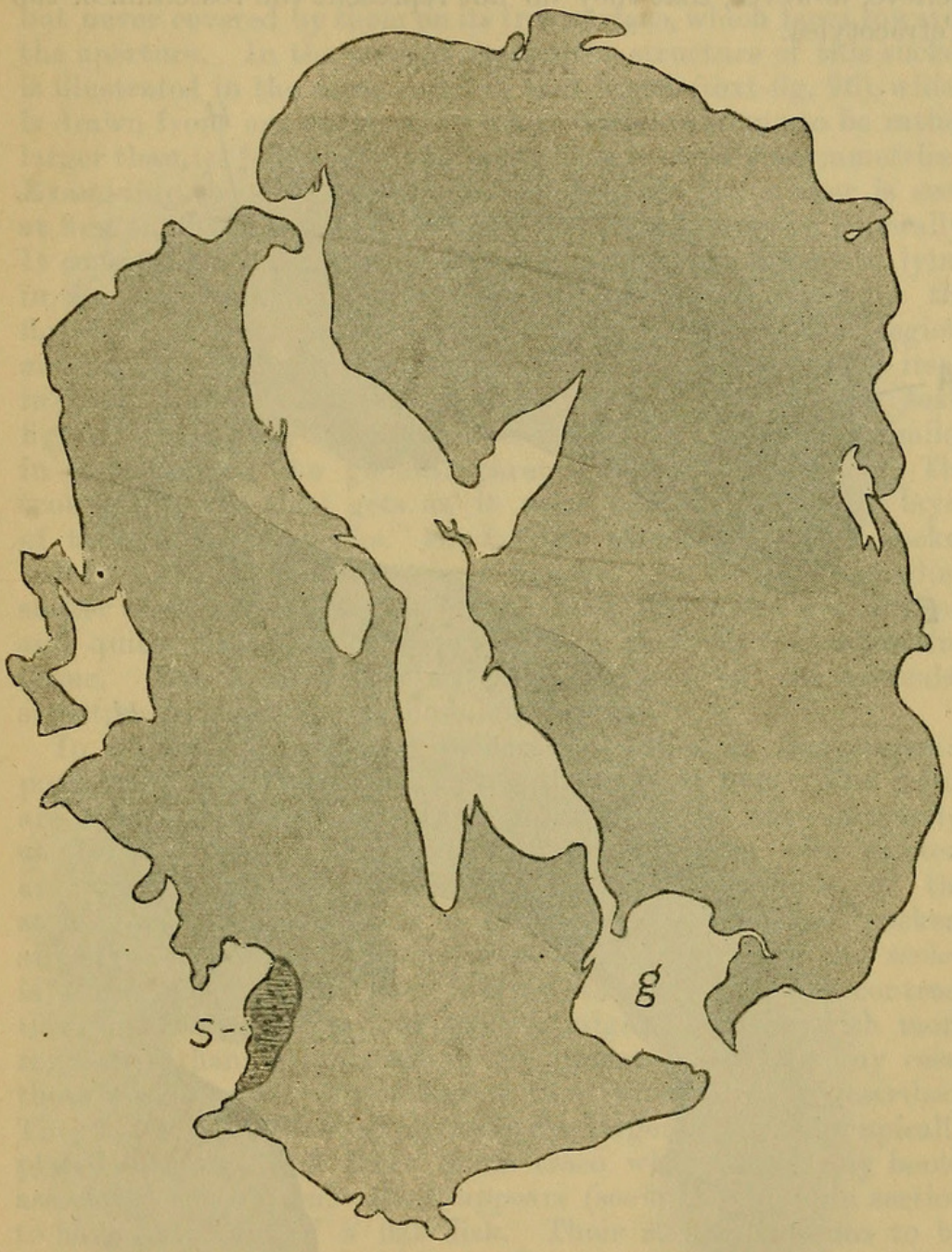
The large size of the scolex of *Dasyurotænia* contrasts with the relatively small or even minute scolex of other Tetracotylea, and thus recalls that of the Tetraphyllidea and others of the "lower" groups of Tapeworms. So also do certain other characters of the scolex in this worm. The greatest diameter of the scolex is 3·5 mm., and it is of much the same length, so that its dimensions are but little less than the diameter and thickness of the body, and are greater than those of the neck-region which immediately ensues. Broadly speaking, the scolex is of a globular form and has a soft, easily indentable, irregular surface marked by faint ridges and depressions, and not at all like the vertex of a typical member of the Tetracotylea. Two flat plate-like areas are to be seen when the scolex is examined in this way with a pocket-lens. These are, as I believe, the expanded suckers which I have seen in a contracted condition in another specimen whose scolex was studied by means of transverse sections.

Transverse sections of the scolex (text-fig. 94, p. 679) are approximately circular in outline, in the middle part at any rate. This particular scolex, which I studied by the section method, was apparently more retracted than the one represented in text-fig. 93. For at first the sections (text-fig. 95) showed two semicircular masses closely applied along the straight margin which is obviously the expression of an apical groove in the scolex. It was lower in the series than this that the contour of the sections became circular. At the body end of the scolex the latter slightly overlaps the neck for the whole of its circumference. But although the sections through the scolex are on the whole circular in form, the peripheral layer is not at all uniform and shows numerous processes and grooves occurring everywhere, which is an expression of the irregular grooving and ridging of the scolex apparent when that region is examined with a hand-lens. I could detect no symmetrical arrangement in these projections and grooves, which, however, may collectively represent "bothria" meandering over the surface of the scolex.

It is furthermore the fact that these grooves are converted in places into tubes which run along the interior of the peripheral layer of the scolex in a longitudinal direction, though not for a long distance. These short tubes end blindly. Their existence, together with the grooves and ridges of which they are a further development, must facilitate the adhesion of the scolex to the surrounding walls of the cyst. While the more or less irregular grooves and furrows upon the surface of the scolex might be put down to irregular contraction of its outer layer, this can hardly be the case—one would suppose—with these invaginated tubes. In any case the arrangement of the suckers does not conform to the arrangement usually met with among the Tetracotylea (to which group this worm would be *expected* to belong). The scolex, however, possesses four suckers which are of very small size when compared with the diameter and circumference of the scolex.

The greatest diameter of one of the suckers is not more than one-tenth the diameter of the scolex at its widest part.

Text-fig. 95.



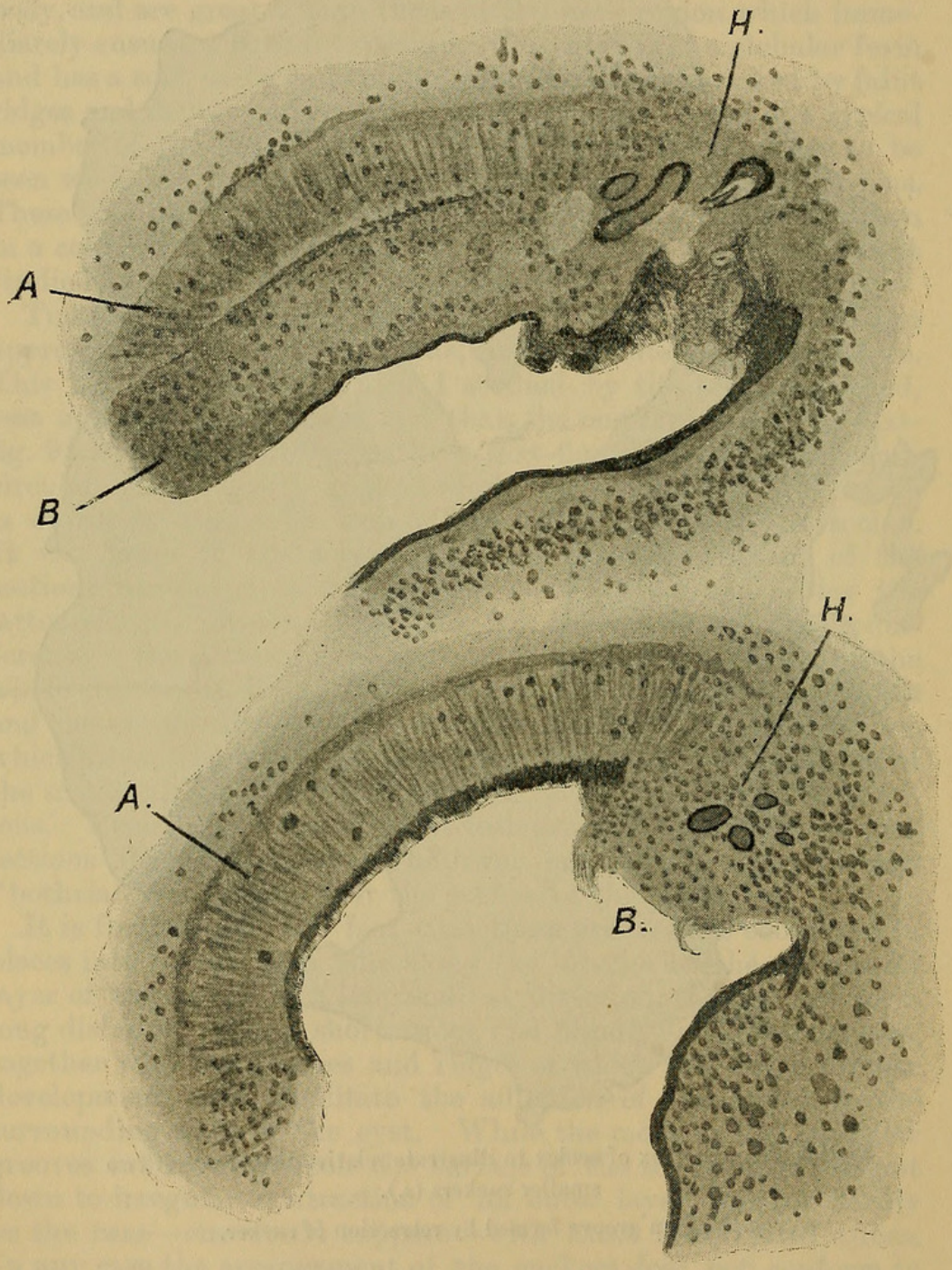
Section through apex of scolex to illustrate relative size of one of two smaller suckers (*s.*).

g. Median groove formed by retraction of sucker.

On either side of the apical groove already mentioned was a single cup-shaped sucker bearing hooks. I assume, therefore, that these two suckers are really anterior in the fully expanded condition of the scolex, and that they are the two disk-like bodies

described above in the scolex, which was examined entire and by the aid of a lens only. These two suckers were not exactly opposite on the opposite sides of the groove. They represent all that I can find in the scolex comparable to a rostellum. I believe, however, that they do not represent the rostellum of the Tetracotylea.

Text-fig. 96.



Two consecutive sections through one of two larger suckers bearing hooks.

A. Muscular layer of sucker. *B*. Cellular layer in which lie hooks (*H*.).

In these sections (text-fig. 96) the sucker appears cup-shaped, the orifice naturally opening into the median transverse groove

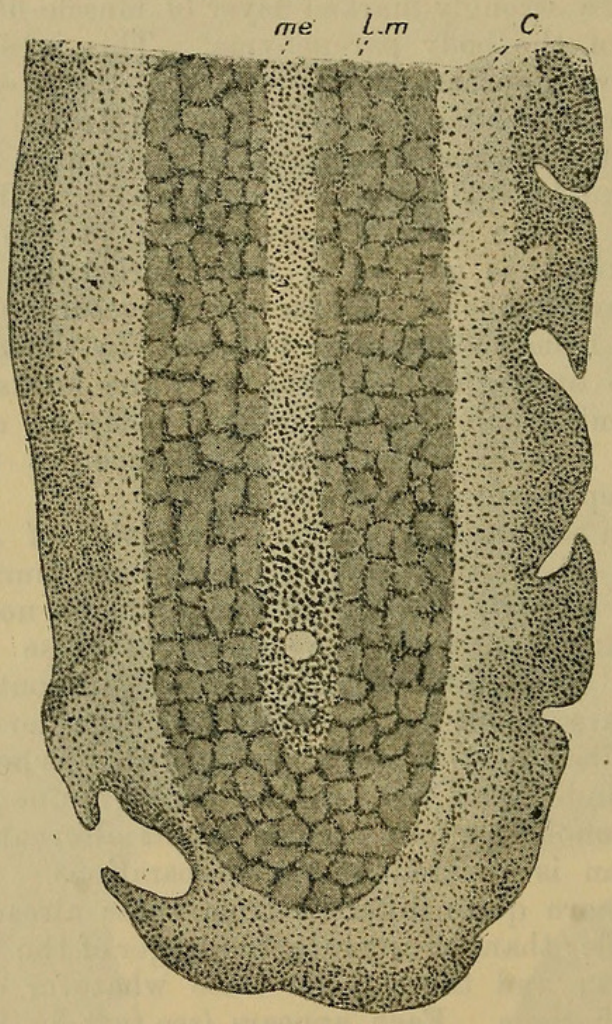
upon the scolex. The structure of the sucker is not like that of the typical Tetracotylean sucker. In the latter there is one thick layer of typically arranged muscle-fibres (into the nature of which arrangement it is not my purpose to enter—it is well known) which is quite distinct from the surrounding tissues of the scolex, but never covered by them on its free surface, which faces towards the aperture. In the present species the structure of this sucker is illustrated in the accompanying text-figure (text-fig. 96), which is drawn from one sucker only which appears to me to be rather larger than its fellow, the two being thus mutually asymmetrical. Examining the sections from below upwards, the sucker is seen at first to be apparently like that of the Tetracotylea generally. It consists of a strongly marked layer of muscle-fibres etc. lying in a cavity of the body parenchyma. This is shown in the figure. As we approach more nearly to the rostellar region, another layer in which the hooks are implanted pushes itself in front of the sucker proper, as is also shown in the text-figure referred to. This layer is continuous with and similar in structure to the general parenchyma of the head. The true (?) sucker thus gets as it were buried beneath a layer of tissue bearing hooks. So far the structure of this sucker will be plain from the sections figured. In the corresponding sucker of the opposite side of the body the hooks are obvious and quite similar, and imbedded in a perfectly corresponding tissue. But I could find no trace whatever of the muscular structure independent of these hooks.

In addition to these two suckers the scolex of *Dasyurotænia* possesses two others, thus making the normal four. The latter are roughly opposite to each other, but do not—obviously, at least — alternate with the others. These two suckers are opposite to each other and lie on the outside of the scolex, and are about on a level with the hooked suckers already described. It is quite possible that when the scolex is fully expanded and not warped through unequal contraction with alcohol, the four suckers might alternate with more regularity than is apparent in my preparations. In any case, these suckers are quite different from those already described. They are smaller than, at any rate, the larger of the more apically placed suckers; and there is no trace whatever of any hooks associated with them. Each appears (see text-fig. 95) in section to have the form of a flat disk. Their structure seems to be quite like that of suckers generally among Tapeworms. What is very apparent about these suckers is their very small size compared with the wide periphery of the scolex. I could not detect them at all on an examination of the scolex with a lens (see text-fig. 93, p. 678).

We have next to consider the histological structure of the scolex, which presents certain peculiarities. The anterior region of the scolex has no distinction into medullary and cortical layers. The commencement of such a differentiation is marked by the

depth of the invagination of the anterior end of the scolex referred to above. This part of the scolex presents a very lax appearance in sections, which is doubtless to be correlated with the irregular outline of the scolex. Through this lax tissue stray in every direction muscle-fibres which no doubt effect the retraction of this anterior part of the scolex. The main mass of tissue in which the muscular fibres run has the usual amorphous ground-substance of the Cestoid body with many nuclei; but I have not made a particular histological study of these tissues.

Text-fig. 97.



Part of transverse section through neck-region of *Dasyurotænia robusta*.

C. Cortical layer outside of longitudinal muscles (*l.m.*).
me. The thin medullary layer.

Further back in the scolex the medullary region appears as quite distinct from the cortical. In the latter the muscular fibres gradually collect into a massive bundle of longitudinally running fibres which immediately surround the medulla and occupy a great deal of the cortex. Within the scolex there is no subdivision of this muscular mass into bundles such as I shall

describe in the strobila and even in the neck-region of the same. In the medullary region at either end is to be seen the water vascular tube, which is here rather coiled, a tube appearing five or six times in a single cross section. In the middle of the medullary area are certain remarkable structures, which are represented in text-fig. 94 (p. 679). These are apparently hollow spheres excavated in the parenchyma but with very definite walls. These vesicles contain lumps of an amorphous matter into the nature of which I have not enquired. There is no connection that I could find between these vesicles and the water vascular system. I am quite uncertain as to their nature.

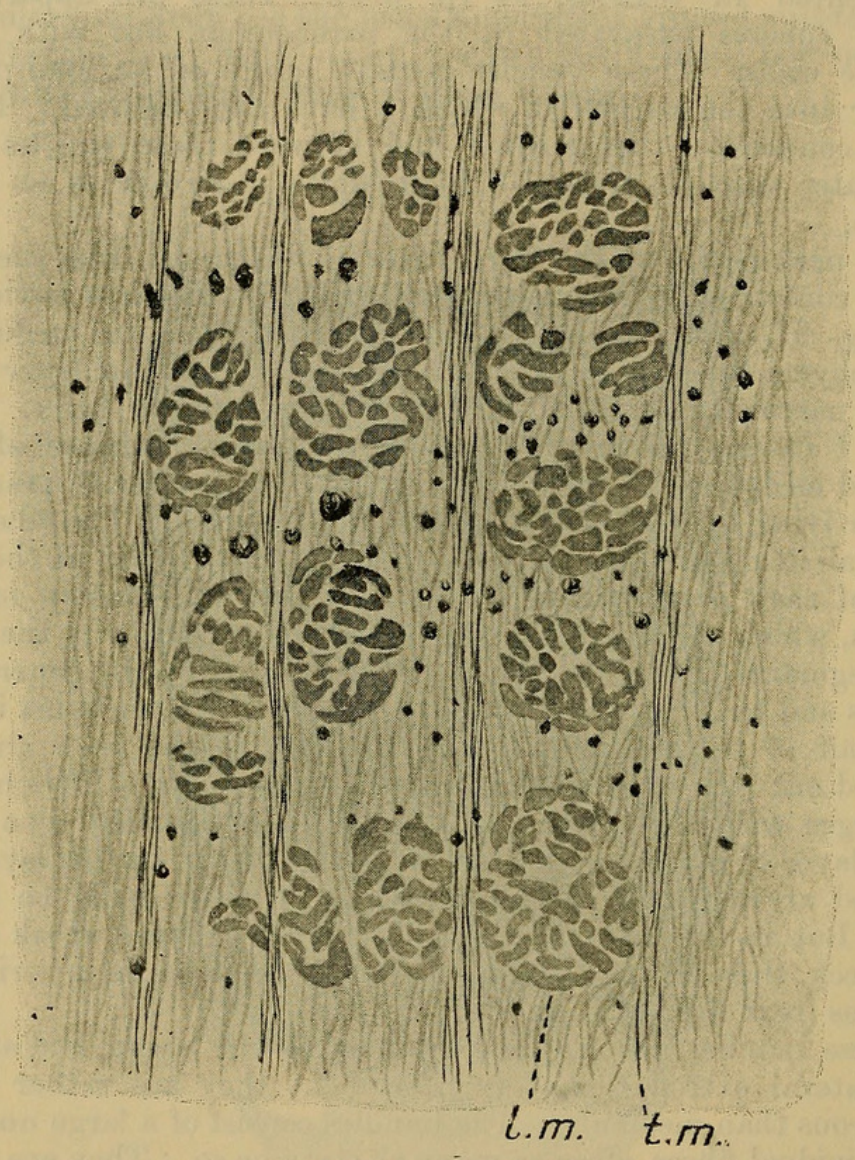
The neck-region of the worm after it has issued from the cyst which contains the scolex is represented in transverse section in text-fig. 97. It will be observed at once that the medullary parenchyma is very greatly reduced. It forms a thin layer very much narrower than the extremely thick cortical layer. Nor could I discern in it the typical retiform appearance of the Cestoid medullary parenchyma with spherical masses of granular matter lying between the meshes of the network. The whole of the available space, save between the individual testes at the two sides of each proglottid, is occupied by the rudimentary female organs, which together with the testes seem to occur in the very first segments. The whole space thus occupied by the generative masses and by what remains of the medullary parenchyma is not one half of the diameter of the cortex. It has been already pointed out that at the posterior end of the scolex, a little before it merges with the neck, the medulla is surrounded by a very thick layer of muscles composed of large fibres. In this layer no marked arrangement of the fibres into bundles could be made out. But in the next few sections, which we here speak of as the neck, these fibres are very definitely disposed in a series of bundles (text-fig. 98).

These bundles are disposed in four to six layers, and at the two lateral extremities of each segment they are rather more numerous than medianly. The bundles consist of a large number of individual fibres, often as many as sixty or so. They are separated from each other by a dense nucleated tissue. Later in the body we have the same four to six rows of bundles of fibres; but in these latter segments each row is separated from those which lie above and below it by a delicate layer of transverse fibres. These fibres are not apparent in the neck-region. I imagine that this enormously powerful muscular system is correlated with the distance to which the scolex is enabled to force itself into the wall of the intestine of its host. These rows of bundles of longitudinal fibres are reminiscent of what is characteristic of the family Acoleidæ, as is to be seen, for example, in the genus *Proterogynotœnia*,* where they have been figured by

* Abh. Senck. Ges. 1911, p. 260, fig. 14.

Fuhrmann. Outside of these layers of fibres the cortex presents no features which differentiate it in any marked way from other allied forms.

Text-fig. 98.



Section through the muscular layer of the cortex, taken at a point further back than that represented in text-fig. 97.

l.m. Bundles of longitudinal fibres. *t.m.* Transverse fibres.

The water vascular system of this tapeworm is in more than one respect remarkable. In transverse sections through the ripe proglottids only two vessels are as a rule visible, one on each side of the body. The most careful examination often failed to reveal the presence of another, even minute, tube. Nor did longitudinal sections show any trace of this second vessel. It is not, however, really absent in this worm, as I found it to be in *Thysanotænia lemuris*, for it is present as a very minute tube in some segments. The vessels which are obviously present

are of very large size, and it appeared to me that that on the pore side of the segment was a little the larger of the two. This, then, is the first important point about these vessels, *i. e.* that there is a very large ventral tube on each side of the body and a very minute dorsal tube. In following out a series of transverse sections, it is seen that the lumen of the large ventral water-vessels is occasionally occluded by a delicate diaphragm-like sheet of membrane which is abundantly nucleated. There is no question of a narrowing of the calibre of the tube, but of an actual membrane which extends partly across it here and there.

In sagittal sections the existence of these membranes stretching partly across the lumen of the water vascular tube is quite obvious. They occur, moreover, on both sides of the body, that is to say in the case of both ventral tubes. The reason for emphasizing this fact will be apparent later. In the longitudinal sagittal sections referred to it will be seen that there are several of these membranes which stretch a good way across the water-vessel, and though two membranes arising from different sides of the vessel do not actually meet, the edge of each stretches beyond the edge of the other, so that the tube would appear, when viewed in the direction of its length, to be entirely occluded. It is noteworthy that these diaphragms, so to speak, arise indifferently from both sides. The exact arrangement will be plain from the annexed drawing (text-fig. 99, p. 688). I have noticed that in some of the posterior proglottids the lumen is actually occluded once in each proglottid. The two ends of two oppositely projecting membranes are connected by a continuous though very thin membrane which connects the thicker extremities of the lateral projections. This median part appears to be nowhere deficient, and the water vascular system is thus divided up in these regions of the body into a series of chambers.

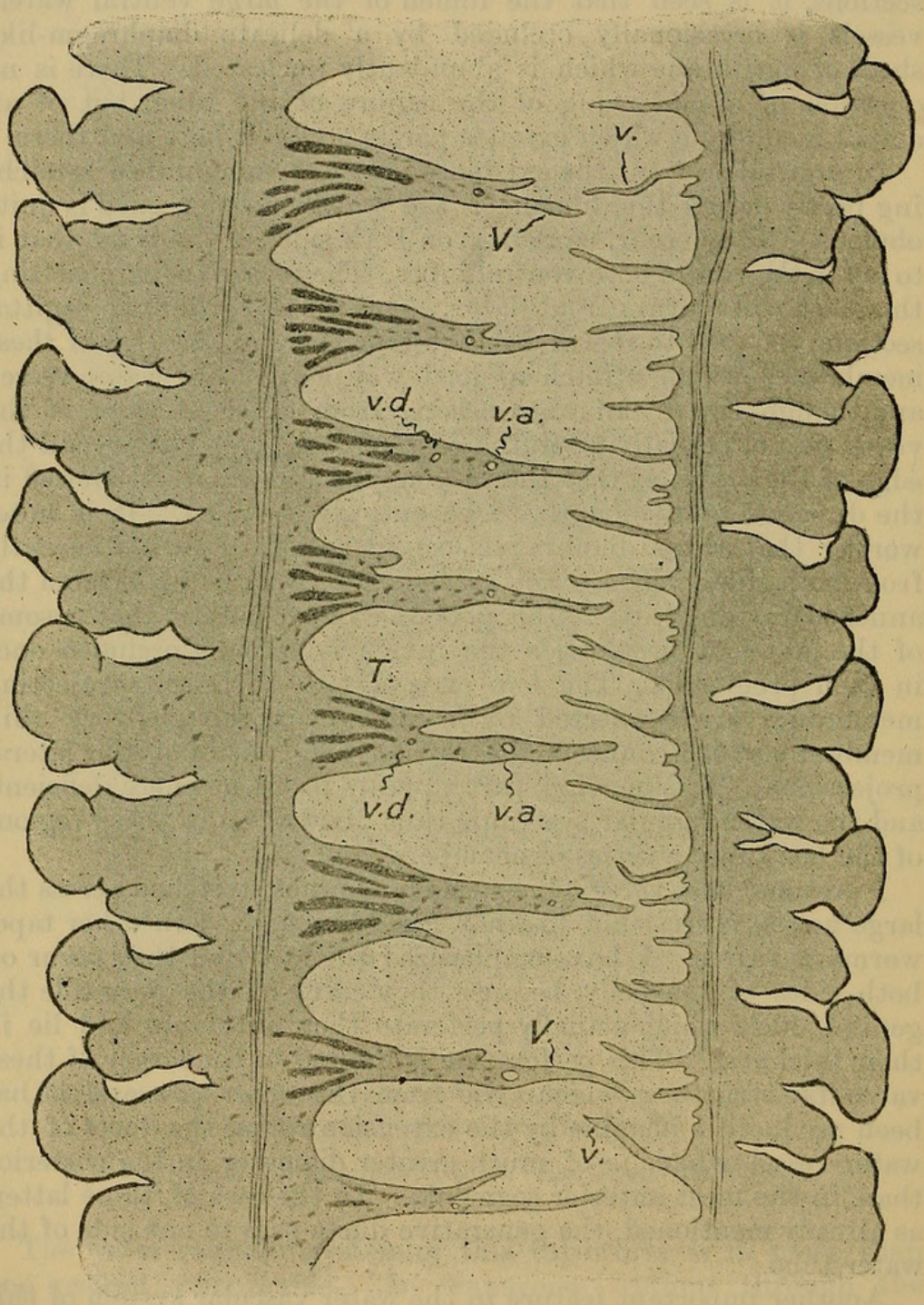
I presume that these numerous membranes stretched across the large vessels correspond to what has been figured in other tapeworms as valves. I have emphasized the fact that they occur on both sides of the body, because they carry on the pore side the genital ducts which actually perforate their substance and lie in their thickness. This perforation is limited to the larger of these valve-like structures which arise from the outer side, and it has been produced I imagine by the extension round the ducts of the water-vessel, which is of much greater diameter in the posterior than in the most anterior segments. In the case of these latter, as already mentioned, the generative ducts pass to one side of the water-tube.

Another important feature in the water vascular system of this tapeworm is the total absence of transverse vessels uniting the longitudinal trunks in such segments. This state of affairs is not unknown among other Cestoidea—it occurs, for example, in *Hymenolepis acuta* *—but it is not common. Nor is this lack of

* v. Janicki, Zool. Anz. Bd. xxvii. 1904, p. 776.

transverse vessels compensated by any network of excretory tubes pervading the medulla, such as is met with in the genera *Inermicapsifer* and *Zschokkeella* *.

Text-fig. 99.



Sagittal section to illustrate ventral water vascular tube.

V. Projecting valves. *v.d.* Vas deferens. *v.a.* Vagina. *T.* Testes.

* Beddard, P. Z. S. 1912, p. 596, and literature quoted there.

The *Generative organs* of this tapeworm begin to be recognisable very early in the body, only a segment or two behind the head. But it is a long way back before the ovaries are ripe. As in the vast majority of Cestoidea, the testes ripen earlier than the ovaries. This being the case, the testes are recognisable earlier as distinct bodies, and only cease to be so clear in the more posterior segments, where the uterus is gorged with eggs. A remarkable point of interest in the generative organs is the fact that the duct leading to the exterior, or to be more exact the formative mass of cells which will be both vagina and cirrus sac, is seen to alternate in position in relation to the single water vascular tube and the nerve-cord. In all segments the actual opening is on the same side of the body, but the generative duct passes towards it either between the water-tube and the nerve-cord or outside of both; in the latter case only to one side—there is no alternation between a dorsal and a ventral position. We shall see, when the cirrus sac and vagina come to be described later, that there is also variation in the exact relationship in position between these two.

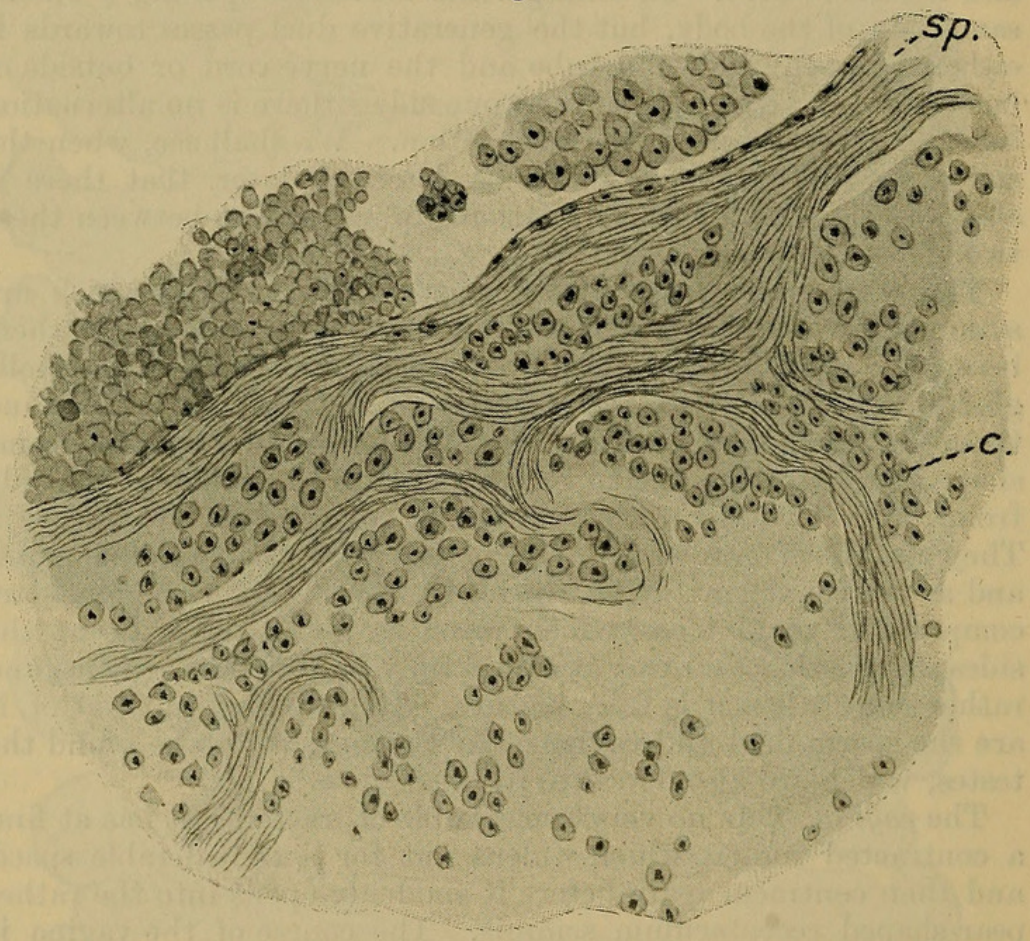
The *ovaries* are large and consist of two wings, which are symmetrical or very nearly so, the middle point between them being the middle line of the body, where are situated the shell-gland etc. The ovaries are posterior in the segment, and behind them lie the *vitelline glands*. These latter are of much the same shape as the ovaries, and in rather immature segments differ only from them by their rather darker staining with hæmatoxylin. They also form two wings symmetrical with their middle point, and are in contact with the ovaries in front. The two glands are composed of many lobes, which reach as far as the testes at the sides; altogether an ovary occupies fully half of the segment, and rather more when it is fully mature. Immediately in front of it are the sperm-duct and vagina. At the sides are to be found the testes, which are also dorsal to it.

The *vagina* offers no very remarkable character. It has at first a contracted lumen, which widens out for a considerable space, and then contracts again before it suddenly opens into the rather pear-shaped receptaculum seminis. The course of the vagina is quite straight between its two ends and oblique in direction. The narrow part of the vagina which opens into the receptaculum is of some length, but shorter than the wider part. The vagina shows quite the same characters in the most mature proglottids. The receptaculum seminis is full of spermatozoa, and very frequently contained ova at its wider end, close to where the oviduct opens into it. The receptaculum and the vagina lie anteriorly in the segment in front of the ovary, but behind the uterus.

The *uterus* of this worm is persistent and found as a large cavity extending right across the segment in the most mature proglottids that I have examined. It begins as a small rounded cavity lying in the front part of each segment.

The *testes* of this worm are chiefly massed at the two sides of the proglottid, but these two masses are connected by a string of testes which pass dorsally along the proglottid. They therefore nearly surround the ovary and the female organs generally, so far partly resembling *Cyclorchis*. In transverse sections the testes appear circular in section; but sagittal sections such as that represented in text-fig. 99 (p. 688) show that the form of the testes is that of a flat plate, for in those sections they appear more linear in shape. These sections also show quite plainly that each testis

Text-fig. 100.



A portion of the coil of the sperm-duct (*sp.*) gorged with sperm.

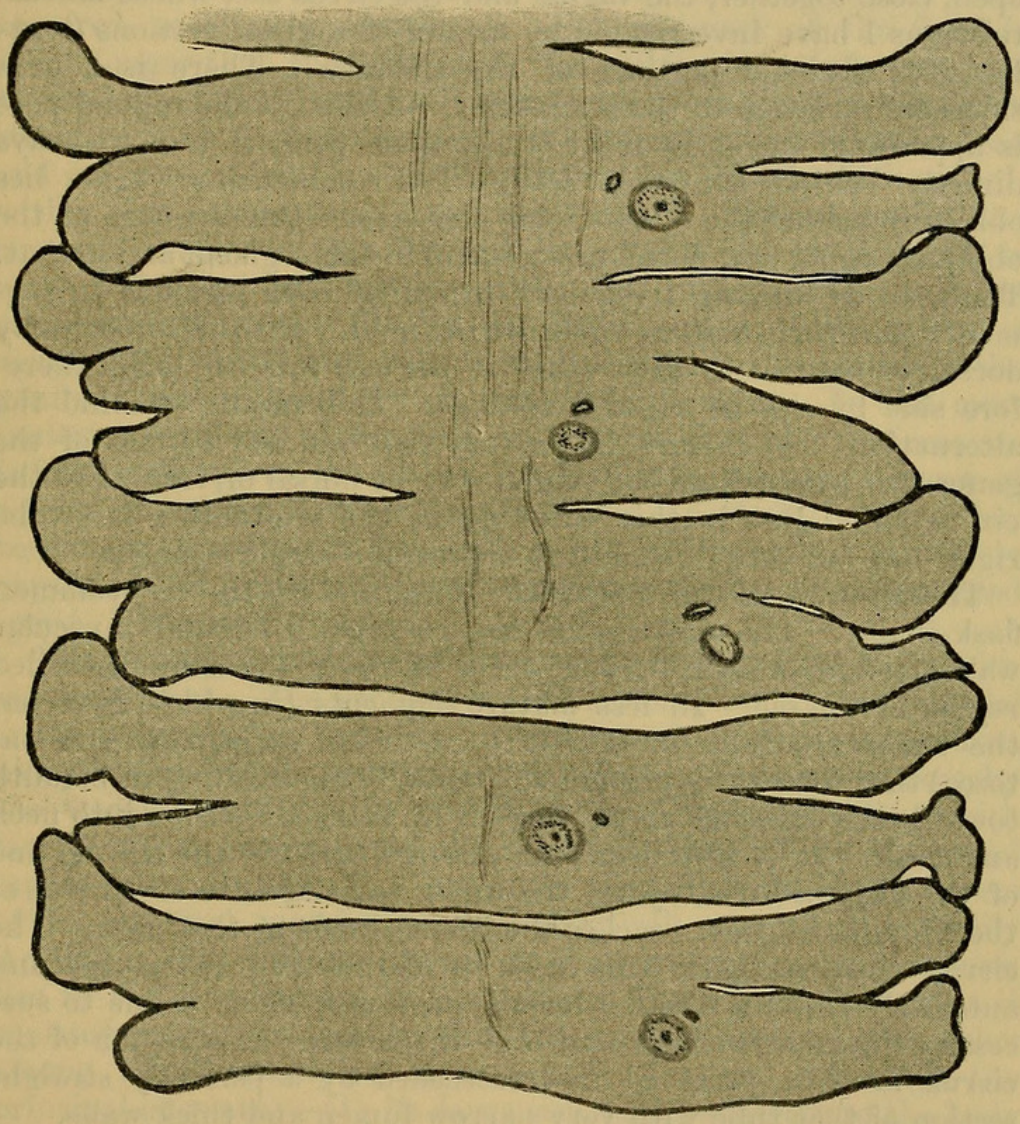
c. Interstitial prostatic cells.

lies in a space, unless, indeed, the appearances produced are due to shrinkage through reagents. In any case, however, the testes of these worms frequently present the appearance of being surrounded by the spermatozoa which they produce, thus showing that a chink exists or can be formed for their reception when pressed out of the testis. The testes are very numerous and quite crowded together,—so much so that the delimitations between successive segments so far as concerns these organs

are not at all visible in sagittal sections ; they appear as a continuous mass.

The *sperm-duct* runs straight for a short way after it has left the cirrus sac. It forms a copious coil (text-fig. 100) occupying the middle of the body and lying partly dorsally to the receptaculum seminis and rather nearer to the pore side of each proglottid. The rest of the coil—that part which is nearest to the cirrus sac—is

Text-fig. 101.



Sagittal section showing in consecutive segments the varying relations of cirrus sac (the larger tube) and vagina.

to the pore side of the receptaculum, and therefore ventral in position. In fact, regarded as one coil, this region appears oblique in direction in transverse sections of the proglottids. Between the individual loops of the sperm-duct are cells which quite fill up the interstices, and are thus numerous in proportion to the width

of those interstices. The cells are rather clear, with well-stained nuclei. They correspond exactly, as it seems to me, with the prostatic cells of *Inermicapsifer* and *Zschokkeella*, dealt with in these genera by v. Janicki* and myself †, and which appear to occur also elsewhere. In immature segments the cells bulk more largely than the coils of the sperm-duct. But the reverse is the case in the mature proglottid.

The *genital ducts* open into a common *cloaca genitalis*, which in its turn opens on to the exterior. The cloaca genitalis is of some depth, but it is not borne upon any process of the body. Into it open, close together, the vagina and the cirrus sac, whose mutual relations I have investigated by means of sagittal sections (text-fig. 101) through portions of the strobila. There is a considerable variation in these relations. Although the vaginal pore is apparently never in front of the male pore, it is not always directly behind the male pore. The commencing vagina lies obliquely behind the commencing cirrus sac—the direction of the obliquity being now dorsal now ventral in this segment and in that. There is, in fact, an irregular alternation from segment to segment; sometimes the two tubes are not merely oblique, but actually dorsal or ventral to each other as the case may be, lying therefore side by side in sagittal sections. This recalls to mind the alternation that occurs in certain (but not all) species of the genus *Moniezia*, where the vagina may be dorsal or ventral to the cirrus sac. But in this latter genus the alternation is of the right and left set of generative organs of a single segment.

The *cirrus sac* of this tapeworm is large and has the very common flask-shape. The neck-region has very thick circular muscular walls, forming a sheath which thins out over the more distended region of the sac. In less mature segments (in which, however, the testes are fully developed, though with no mature spermatozoa) the cirrus sac is elongated, gradually diminishing in breadth towards the external pore; there is no marked division into neck and flask. It is very long and extends towards the middle line of the body, a little beyond the water vascular tube of its side of the body, or at least reaches the internal side of that tube. The cirrus runs straight from end to end of the cirrus sac and anteriorly presents a moniliform appearance, which is due to successive dilatations of the lumen of the cirrus. This region of the cirrus is both preceded and succeeded by a perfectly straight section of that tube with very narrow lumen and thick walls.

In later segments the cirrus sac acquires the flask-shape already referred to. Coincidently with this is an actual shortening of the length of the entire sac and a coiling of the cirrus within it. The cirrus sac in these and in subsequent segments hardly reaches beyond the outer edge of the water vascular tube. It seems clear therefore that the shortening is due to an actual contraction of

* Denkschr. Ges. Jena, xvi. 1910.
† P. Z. S. 1912, p. 602.

the length caused by a bulging of the walls of the cirrus sac due in its turn to the rapid growth and consequent coiling of the cirrus. When the cirrus sac is in this fully formed condition, the cirrus itself is differentiated more thoroughly into those regions less markedly indicated in earlier stages. The sperm-duct enters the cirrus sac at the apex and its lumen contracts to a fine line for a short space near to its entry. This is particularly obvious in the last few segments of the body, where the sperm-duct has become much dilated before its entry into the cirrus sac, and thus offers a greater contrast to this exceedingly narrow region.

In these more mature cirrus sacs the flask-shape has been acquired, as already mentioned. But the neck of the flask is much longer than the body part. The latter is so fully occupied by the coils of the cirrus itself that there is but little of the interstitial packing tissue to be seen. At its entry into the cirrus sac and for a considerable time thereafter the duct is thick-walled, with a very narrow lumen, and much coiled. This region of the cirrus is succeeded by a not very long but coiled tract, which is much wider and has thinner walls. The lining membrane bears numerous spinelets. Finally, the distal region of the cirrus is again thick-walled and with a narrow lumen: it opens into the genital cloaca without any alteration of character. In the most posterior segments of the body the greater part of the cirrus sac is filled with sperm, the posterior region alone showing a group of coils of the cirrus. Whether the anterior part of the cirrus has become ruptured, as it appeared, or has been simply enormously expanded and its walls reduced to extreme tenuity by the enclosed sperm, I am unable to say.

The systematic position of this tapeworm is difficult to fix with any confidence. The generative system, and, indeed, the internal anatomy generally, presents no differences of importance from many Tetracotylea; and there are, indeed, no reasons so far why the worm should not be placed in the Anoplocephalidæ, which family, as has been pointed out, contains nearly all the Marsupial tapeworms. On the other hand, the very much developed layers of longitudinal muscles in the body-wall suggest the family Acoleidæ. The difficulty, however, of accurately placing the worm lies in the peculiarities of the scolex. There is no doubt that it contrasts very considerably with the general form of the scolex among the Tetracotylea in a number of points, of which the principal ones are:—(1) its large size, both relatively to the body and actually; (2) the presence of numerous grooves which cannot be, at any rate, entirely artefact, as they are converted here and there into tubes running within the thickness of the head; (3) the relatively minute size of the four suckers and the fact that two of them and two only are furnished with hooks*.

* Furthermore, these hooks are distinctly hollow at their broader end, "like a Ruminant's horn," as Shipley (Willey's Zool. Res., Entozoa, 1900) notes of *Calliobothrium*, one of the Tetraphyllidea.

These characteristics are collectively different from anything met with among the Tetracotylea that is known to me. They are not, however, inconsistent with the conditions known to occur among the Tetraphyllidea, if we may admit the grooves upon the scolex to represent the bothria of such tapeworms. The suckers would then correspond with the small accessory suckers so frequently possessed by these latter worms, and their small size relatively to the scolex would be thus intelligible. The apparently numerous bothria not reducible (by me) to symmetry is suggestive of a type like *Phyllobothrium* * slightly modified, or perhaps *Peltidocotyle* †. We cannot, however, place *Dasyurotænia* among these Tetraphyllidea on account of the Tetracotylean character of its yolk-gland. But with reference to this gland it may be borne in mind that it is in structure much more diffuse than is usual with the generally solid vitelline gland of the Tetracotylea.

The genus may be thus defined :—

Dasyurotænia, *gen. nov.*

Stoutly built worms with large scolex bearing four small suckers, of which the inner two bear hooks. No rostellum, but anterior end of scolex, including hooked suckers, retractile. Segments very short. Inner layer of (longitudinal) muscles very thick, consisting of four to six rows of bundles of fibres. Ventral excretory tubes large, with numerous valves not communicating with each other in the strobila. Dorsal vessels minute, not always visible. Genital pores unilateral. Testes numerous, chiefly lateral, anterior, and dorsal. Vas deferens with a large coil in middle of segment surrounded by prostatic cells ; cirrus sac large, cirrus with spinelets. Ovaries with two wings, median ‡ *and posterior and ventral in position, in front of vitelline gland, which is also symmetrical. Shell-gland median, dorsal. Receptaculum seminis present, nearly median, ventral. Uterus sac-like, persistent, fills nearly whole of ripe proglottid. Eggs thin-shelled.*

Hab. *Marsupials.*

The species I term "*robusta*" on account of its very stout build. It is, however, quite impossible for me to venture upon an enumeration of the peculiar specific characteristics for the present.

This genus and species cannot, as I think, be identified with any other form that has been described from an Australian Marsupial. From the present genus we only know a species described by myself § a little time since as *Anoplotænia dasyuri*. Nor can I identify it with any of the genera enumerated at the beginning of this paper in other Marsupials. In fact, *Bertiella* is

* Bronn's 'Thierreich,' Bd. iv. Cestoiden, pl. xli. fig. 10.
† *Ibid.* pl. xliii. fig. 1.
‡ Middle line of female apparatus only slightly displaced towards pore side.
§ P. Z. S. 1911, p. 1003.

the only one of these genera to which it bears any likeness in the reproductive system, and from this genus the characters of the scolex at once distinguish *Dasyurotænia*. Indeed, its inclusion among the Tetracotylea (=Tænioidea) is not, to my mind, an obvious certainty. In any case the hooked suckers exclude it from the family Anoplocephalidæ, to which nearly all the Marsupial tapeworms belong up to the present.

The most salient points of anatomical interest in this worm appear to me to be the following :—

(1) The immense size, relatively speaking, of the scolex and the small size in comparison with it of the suckers. The fact that two suckers are armed with hooks while the other two suckers are not so armed.

(2) The great thickness of the longitudinal muscles, which consist of at least four layers of bundles each containing very many individual fibres of considerable stoutness.

(3) The existence for the most part of only a single water vascular tube on each side of the body, which is, moreover, in the posterior segments completely divided up into a series of compartments, one to each segment, and whose lumen is also here and more anteriorly divided by delicate septa jutting into its cavity. Furthermore, by the fact that these tubes are not connected in successive segments by transverse vessels, as is so nearly universally the case.

(4) As a remarkable structural feature, which is at present mysterious in nature, may be mentioned the isolated cavities in the medullary region of the head which have no connection with the water vascular tubes.

(5) An anatomical feature of some importance is the very variable relation to each other in position of the extremities of the male and female ducts, which is correlated with an orifice upon one side of the body only. An alternation in the position of the external pore may, we know, be accompanied with difference in the relative position of the ducts as, for example, in the double series of genital tubes of *Moniezia*.

(6) In view of the very considerable peculiarities of structure briefly indicated in the foregoing résumé, it may be worth mentioning, as a remarkable fact, that the generative organs do not show any marked features of interest as compared with those of other tapeworms.