Onderstepoort Journal of Veterinary Science and Animal Industry, Volume 10, *Number* 2, *April*, 1938.

Printed in the Union of South Africa by the Government Printer, Pretoria.

South African Helminths—Part II.

Some Taenias from Large Wild Carnivores.

By R. J. ORTLEPP, Section of Parasitology, Onderstepoort.

NOTWITHSTANDING the fact that South African large wild carnivores have been collected for museums and zoological gardens for over a century, it is a remarkable fact that up to quite recently no Taenias have been described from these animals. A possible explanation is that collectors for museums have not concerned themselves about the internal parasites of these aniamls, and that those animals which have died in zoological gardens had either not been examined for helminths or their death may have occurred some considerable time after their capture by which time they had probably lost their original infection.

During the short period of the Zoological Survey's operation a few large carnivores have been shot and on examination all were found to harbour Taenias; in some cases the infection was particularly heavy. This was not surprising as our antelopes, from the region where these carnivores were obtained, were generally infected with "measles" and as these antelopes constitute the natural food of these carnivores one would naturally expect to find these hosts harbouring Taenias.

The Taenias from three lions, one leopard, one cheetah and one jackal, all obtained by the Zoological Survey are here described; in addition Taenias from a cheetah and a wild dog from South West Africa and Taenias from three jackals from the Orange Free State, Transvaal and Cape Province respectively are also incorporated.

Two species of Taenia have so far been described from our large carnivores, namely *T. regis* Baer, 1923, from a lion and *T. hyaenae* Baer, 1927 from an hyaena. An examination of the writer's material failed to reveal the presence of these two species, neither, except in in three cases, viz. *T. multiceps* and *T. serialis* from jackals and *T. pisiformis* from a wild dog, did the writer's specimens agree with any hitherto described species of Taenia. The absence of *T. hydatigena* was all the more striking because the larval stage of this parasite is a very common parasite in our sheep and goats and has also been found in our antelopes. In consequence the writer

has no other choice but to regard his specimens as representing hitherto unknown species. It may be mentioned that "measles" from antelopes and wild pigs, which the writer had previously examined, had proved not to be identical with the larval Taenias of our domestic pigs, cattle and sheep, namely *Cysticercus cellulosae*, *C. bovis*, *C. ovis* and *Caenurus cerebralis*.

From Lions.

*Taenia bubesei** sp. nov.

This species was represented by many specimens collected together with the following species from a single lion. The strobilae are somewhat contracted and are from 45 to 55 cms. long with a maximum breadth of 6 to 9 mm. according to the state of contraction; there are from 360 to 375 segments in entire specimens; mature segments are about 6 mm. broad and 3 mm. long and ripe segments reach a length of 8 mm. and 4 mm. broad.

The head is about 1·3 mm. broad and the suckers are somewhat rounded measuring 0·34 mm. in diameter. The rostellum is massive and about 0·79 mm. thick; in 15 heads examined it carried 42 to 46 hooks in two circles. The large hooks are from 0·235 to 0·273 mm. long and the smaller hooks 0·136 to 0·18 mm. long from the tip of the blade to the tip of the handle (Fig. 1); the blade is strongly arched and the lateral outline of the handle of the large hook is sinuous.

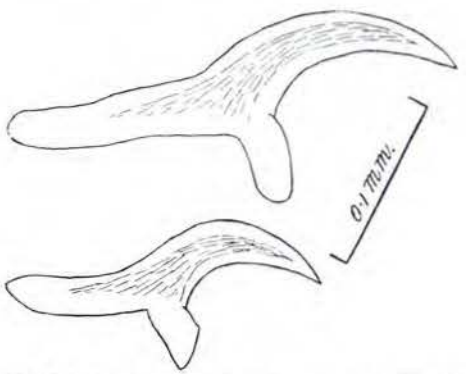

Fig. 1. *T.bubesei* sp. nov. Large and small hooks.

The cuticle is 0·008 to 0·009 mm. thick and is followed by a thin sheet of sub-cuticular transverse muscles 0·012 to 0·015 mm. thick; the longitudinal muscle layer fills practically the whole cortex and is about 0·2 to 0·23 mm. thick; it consists of numerous fibres 0·006 to 0·008 mm. thick irregularly scattered in its outer half and forming small bundles of 5 to 10 fibres each in its inner half (Plate 1, Fig. 1). The inner transverse muscle layer is 0·029 to 0·032 mm. thick. Dorso-ventral muscle fibres are well developed and are especially evident in the medullary parenchyma. Chalk bodies are relatively few in number and are mostly confined to the cortex: they are 0·015 by 0·012 mm. in size and smaller.

* "Bubesi" is Zulu word for "lion".

The ventral excretory canals are large, measuring 0·087 by 0·17 mm. to 0·1 by 0·17 mm. in diameter; they are situated 0·95 to 1·1 mm. from the lateral margins of the segment; the dorsal excretory vessels are situated dorso-laterally to the ventral excretory canals in the inner corner and have a diameter of about 0·009 mm.

The nerve cords are large, about 0·08 by 0·07 mm. in cross section and situated about 0·78 mm. from the edge; the two accessory nerve cords are distinct. The genital ducts pass between the excretory canals and dorsal of the nerve cord.

The genital atria alternate irregularly and in mature segments are situated just anterior to the middle of the segment; they are not very prominent. The atria are fairly large and the genital cones on their floor are inconspicuous. The club-shaped cirrus sac is 0·38 to 0·4 mm. long with a maximum thickness of 0·1 mm; the vas deferens makes a few loose coils in the cirrus sac but after emerging it becomes very intricately coiled (Fig. 2); the testes number between 500 and 600 and they extend backwards to the posterior level of the yolk gland and in some cases even further; none, however, were observed to pass behind this organ; they leave a fairly wide space free of testes round the female genital glands; the aporal and poral testicular groups are united to each by a narrow bridge of testes generally only 2 to 4 testes broad.

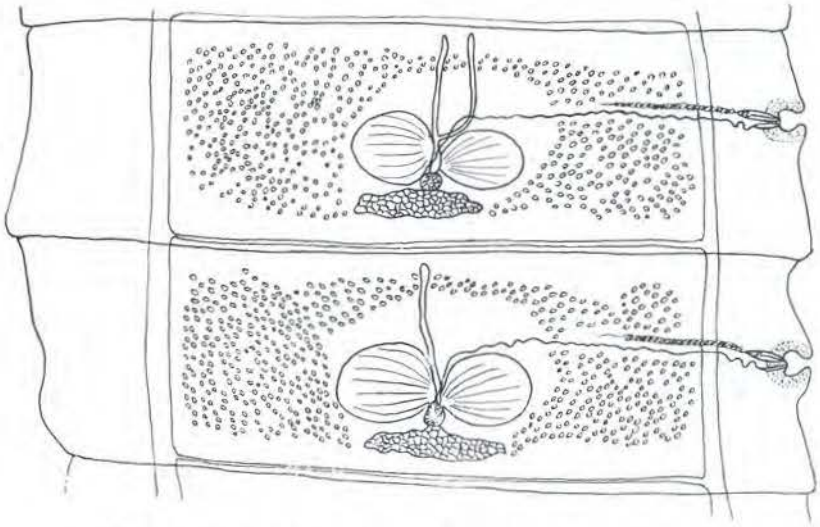

Fig. 2. *T.bubesei* sp. nov. Mature segment.

The vagina opens behind and on the same level as the cirrus sac; its initial portion is slightly enlarged, after which it forms a few large loops; after crossing the excretory canals it is continued inwards as a wavy line skirting the anterior margin of the poral ovarian lobe.

The two ovarian lobes are hemispherical, the aporal lobe being larger than the poral; the yolk gland is reticular and extends almost the width of the ovary. The uterus reaches the anterior edge of the segment and the main lateral branches are few in number, generally only 3 to 5 are present on either side, but occasionally 6 or 7 are present (Fig. 3). In some strobilae (3 out of 7 strained) there was a curious tendency for the main uterine stem to become double in some of its segments; in such cases the lateral branches were limited to the outer margin of each stem. The eggs are numerous, oval, thick-shelled and pitted, measuring 0·039 by 0·031 mm. to 0·042 by 0·032 mm.; the shell is 0·006 mm. thick.

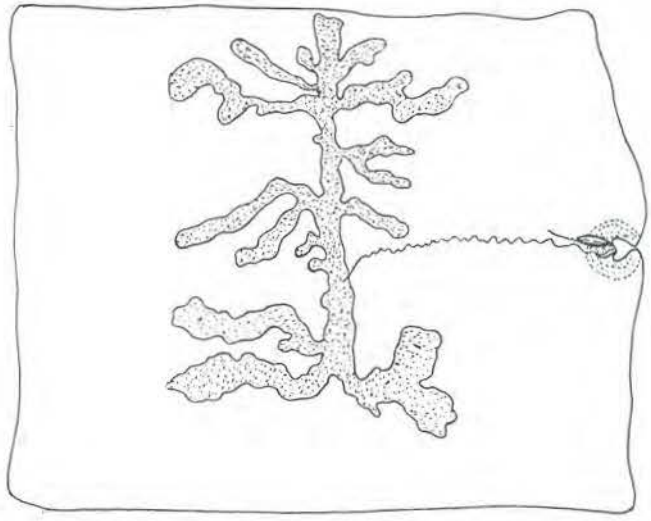

Fig. 3. *T.bubesei* sp. nov. Uterus.

Discussion.—*T. regis* Baer, 1923 is the only cestode described from a lion. The above described species differs from it by its large size, greater number of rostellar hooks which are smaller, greater number of testes which extend to the posterior level of the yolk gland, the wavy outline of the vagina, and the larger number of lateral uterine branches which are not confined to the anterior and posterior ends of the main stem. Its closest relative appears to be *T. pisiformis* (Block, 1780), which species it resembles in that the number of hooks exceed 40 and their size and shape are also very similar, and in that the vagina is wavy; it differs from this species, however, in that the number of hooks always exceed 40, the base of the small hook is not bifid, the cirrus sac does not reach or cross the excretory canals, the testes form a narrow bridge anterior of the ovary, no testes are present behind the yolk gland, and the lateral uterine branches are not so many.

Specific Diagnosis.—Taeniadae reaching a length of 55 cms. by 6-9 mm. broad and having nearly 400 segments; there are 42 to 46 rostellar hooks in two circles; the larger hooks are 0·235 to 0·273 mm. long and the smaller hooks 0·136 to 0·18 mm. long. The

testes number 500 to 600, do not pass round back of yolk gland and form a narrow bridge in anterior portion of segment; they leave a large clear space round the female glands. The cirrus sac does not reach excretory canals. Uterus shows a tendency to be double in its anterior half and the lateral uterine branches generally number three to five on either side, occasionally there may be seven. Eggs oval with pitted shell, measuring 0·039 by 0·031 mm. to 0·042 by 0·032 mm.

Host.—*Leo leo krugeri.* (Rbts.)

Locality.—Transvaal.

Location.—Small intestine.

Types in the Onderstepoort Helminthological collection.

*Taenia gonyamai** sp. nov.

This cestode was collected in association with *T. bubesei* on one occasion and separately on two others. Macroscopically it appeared thinner and paler than the former species, although in section the musculature in these two species appears to be equally developed.

The length of the strobilae reaches 52 cms. with a maximum breadth of 8 mm. in its 3rd and 4th fifth. There are about 260 segments of which the 190th to 220th are mature and these segments are about 4 mm. long by 6 mm. broad; ripe segments become much elongated and may reach a length of 33 mm. by 4 mm. broad.

In twelve scolices the number of hooks varied from 32 to 38 and the large hooks were from 0·188 to 0·209 mm. long and the smaller hooks 0·122 to 0·142 mm. long from the tip of the blade to the tip of the handle (Fig. 4). In practically all the larger hooks the blade and handle were more or less in a straight line and the outline of the handle was smooth except for a distinct notch on its dorsal side.

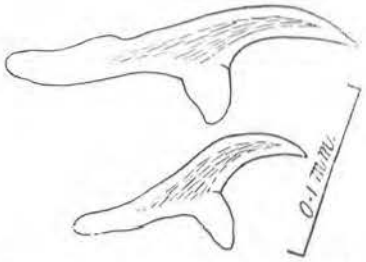

Fig. 4. *T. gonyamai* sp. nov. Large and small hooks.

In transverse sections of mature segments (Plate 1, Fig. 2) the cuticle is 0·008 to 0·01 mm. thick; the underlying transverse muscles form a very thin layer. The longitudinal muscles occupy most of the cortical parenchyma and consist mostly of irregularly scattered muscle fibres of which the innermost are grouped together into

* " Gonyama " is Swazi word for " lion ".

bundles with 2 to 15 fibres each, the majority consisting of 3 to 8 fibres each, each fibre being 0·005 to 0·007 mm. thick. The inner transverse muscles form a band 0·029 to 0·035 mm. thick. Dorso ventral muscle fibres are present and are especially evident in the medulla. Only a few chalk bodies are present and these are practically confined to the cortex; they are oval and measure up to 0·014 by 0·011 mm.

The ventral excretory canals have a diameter of 0·133 by 0·098 mm. to 0·124 by 0·191 mm. and are situated 0·9 to 1·1 mm. from the lateral margin. The dorsal excretory vessel have a diameter of 0·025 to 0·029 mm. and are situated 0·04 to 0·145 mm. on the dorso-lateral corner of the ventral canals. The nerve cord has a diameter of 0·073 to 0·087 mm. and is situated about 0·75 mm. from the lateral margin; the two accessory lateral nerves are distinct.

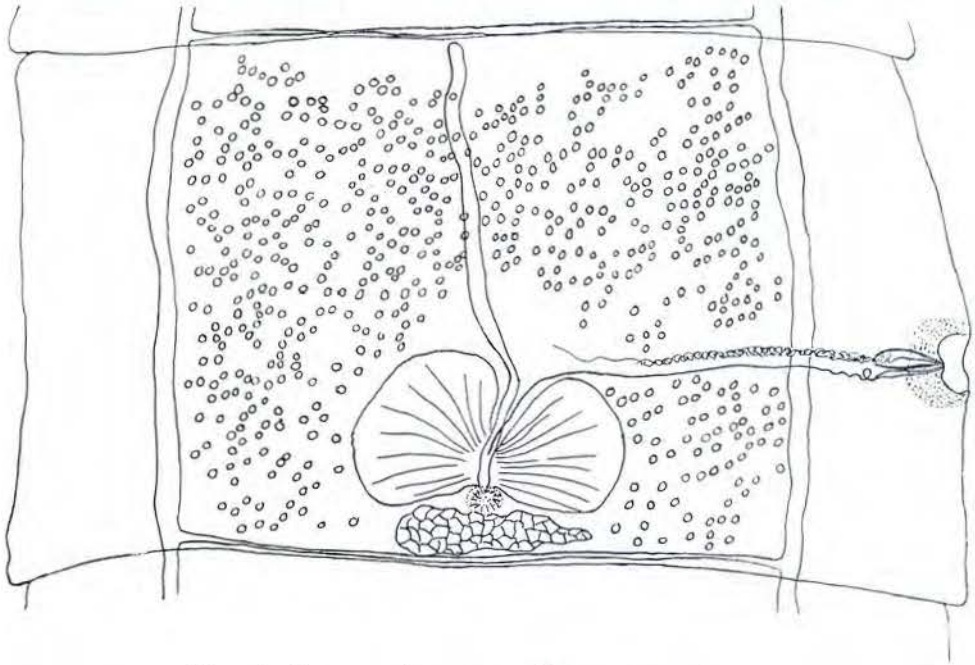

Fig. 5. *T.gonyamai* sp. nov. Mature segment.

The genital atria alternate irregularly and are situated just behind the middle of the segment in mature segments; the atrium is large and deep but not prominent measuring 0·38 mm. across and 0·23 mm. deep; its floor is more or less flat, a prominent genital cone being absent. (Fig. 5.) The cirrus sac is club-shaped and does not reach the ventral excretory canal; it measures 0·4 to 0·44 mm. long with a thickness of 0·12 to 0·15 mm. The cirrus is unarmed and is 0·04 mm. thick at its base. The vas deferens forms a few coils inside the cirrus sac and is intricately coiled before and after crossing the excretory canal; it passes between the excretory canals and dorsal of the nerve. The testes are numerous numbering between

500 and 600; they are arranged in a single layer in the dorsal half of the medulla; they have a diameter of about 0·07 mm; they extend from the posterior level of the yolk gland, just miss the lateral edges of the ovarian lobes, and the poral and aporal testes are united together by a broad bridge of testes in front of the ovary; only a relatively small hemispherical space in front of the ovary is free of testes.

The initial portion of the vagina is slightly inflated and then forms a few conspicuous waves or loops; after crossing the excretory canals its course is straight although in some segments it may be slightly wavy; the genital glands are as found in *T. hydatigena*. The uterus extends through the length of the segment and differs from that of *T. hydatigena* in possessing more lateral branches and generally not showing the massing of uterine branches at its anterior and posterior extremities; these branches number from 14 to 18 on either side (Fig. 6). The eggs are oval, thick-shelled and pitted; they measure 0·029 to 0·031 mm. by 0·032 to 0·04 mm. and the shell is 0·006 mm. thick.

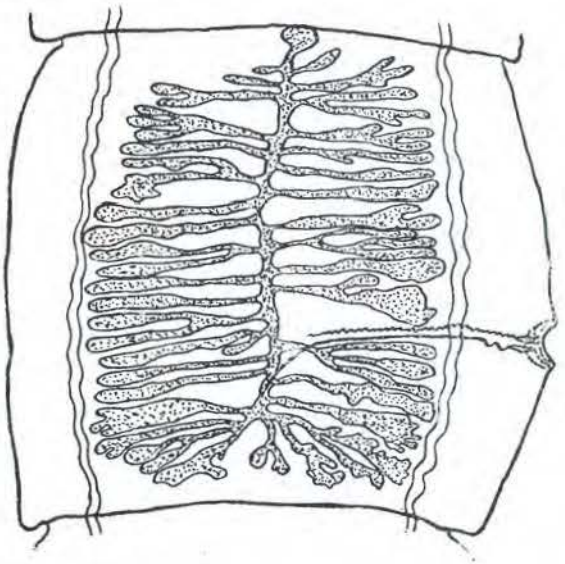

Fig. 6. *T.gonyamai* sp. nov. Uterus.

Discussion.—This species resembles *T. hydatigena* but can be distinguished from it in that the rostellar hooks do not exceed 38 in number, the dorsal edge of the handle of the blade is always notched, the vagina is coiled prior to crossing the excretory canal and there are more uterine branches.

In *T. hydatigena* the blade and handle form an obtuse angle and the outline of the handle is sinuous; although this is their normal appearance the writer found variations in his material of this species showing gradations from such hooks to hooks with the blade almost in a straight line with the handle and the outline of the handle varying from sinuous to smooth with a dorsal notch.

Specific Diagnosis.—Taeniadae reaching 52 cm. in length carrying 32-38 rostellar hooks in two rows; large hooks 0·188 to 0·209 mm. long, smaller hooks 0·122 to 0·143 mm. long; edge of handle of large hooks smooth but carries a dorsal notch. Male and female genitalia as in *T. hydatigena* except that initial portion of vagina is coiled, the uterus has 14 to 18 lateral branches and the eggs are oval, thick-shelled and pitted.

Host.—Leo leo krugeri. (Rbts.)

Locality.—Transvaal.

Location.—Small intestine.

Types in the Onderstepoort Helminthological Collection.

From Leopard.

Taenia Ingwei sp. nov.*

This species is represented by two complete worms, 3 fairly long fragments with scolices and four older fragments. The two complete worms are 250 and 270 mm. long and have a maximum breadth of 3·7 and 4·6 mm. respectively; the end segments are bell-shaped and measure 5·5 to 6·0 mm. long by 3 to 3·8 mm. wide at their posterior margins. The whole strobila is hard and is bent in a zig-zag manner; the collector informed the writer that this appearance was also noticed, although not so marked, when these worms were removed alive from the freshly killed leopard.

The head is small and measured from 0·72 to 0·79 mm. across, the four suckers are rounded and not prominent and have a maximum diameter of 0·29 mm; the rostellum measures 0·39 mm. across and carries 32 to 34 hooks in two circlets (Fig. 7); the larger hooks are 0·197 to 0·202 mm. long and the smaller 0·148 to 0·151 mm. The neck is very short, only 0·46 mm. long and is 0·07 to 0·76 mm. broad.

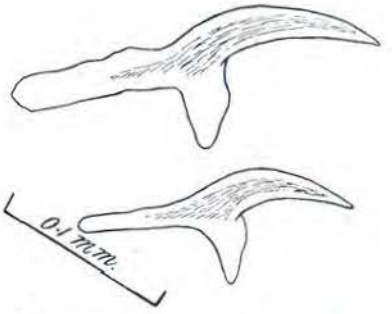

Fig. 7. *T. ingwei* sp. nov. Large and small hooks.

In sections of mature segments (Plate 1, Fig. 3) it is seen that the cuticle is remarkably thick and corrugated and may attain a thickness of 0·035 mm; this is probably the reason for the hardness of the worms and the peculiar shape of the strobila. The subcuticular transverse fibres form a layer 0·009 mm. thick. The cortex

* "Ingwe" is Zulu word for "leopard".

has a thickness of about 0·23 mm. and its inner portion, for a thickness of about 0·175 mm., is occupied by the longitudinal muscles; these are well developed and consist mostly of muscle bundles there being very few isolated fibres towards the periphery; the bundles are crowded together and each consists of 20 to 30 fibres each having a thickness of 0·004 to 0·006 mm. The inner transverse muscles are well developed and form a layer 0·04 to 0·045 mm. thick. The medulla has a thickness of 0·174 to 0·188 mm. and is traversed by numerous stout dorso-ventral muscle fibres which branch outwards through the cortex. Both the cortex and medulla are crammed with numerous oval chalk bodies measuring 0·024 by 0·015 mm. and less. The ventral excretory canals are situated 0·85 to 0·87 mm. from the edge of the segment and have a diameter of 0·104 by 0·075 mm. to 0·133 by 0·087 mm.; the dorsal excretory vessels are situated some 0·07 mm. from the ventral excretory canal in its inner dorso-lateral corner; they have a diameter of 0·015 to 0·023 mm. The lateral nerve is 0·072 to 0·087 mm. from the ventral excretory canal and has a diameter of about 0·06 mm. The genital ducts pass between the excretory canals and dorsal of the nerve.

The genital atria alternate irregularly, are prominent and fairly deep; they are about 0·32 mm. across by 0·26 mm. deep and at their base there is a dome-shaped genital cone.

The cirrus sac is club-shaped, reaches but does not cross the excretory canals; its maximum length is 0·435 mm. and maximum thickness 0·087 mm. The vas deferens forms a few coils in the cirrus sac and after passing the excretory canals become intricately coiled. The denseness of the cuticles makes it difficult to arrive at a correct estimate of the number of the testes, but there appear to be between 400 and 500; they leave a clear space round the female glands and they extend backwards to the level of the yolk gland but not behind; the testicular bridge in front of the ovary occupies about half of the length of the segment in front of the female glands.

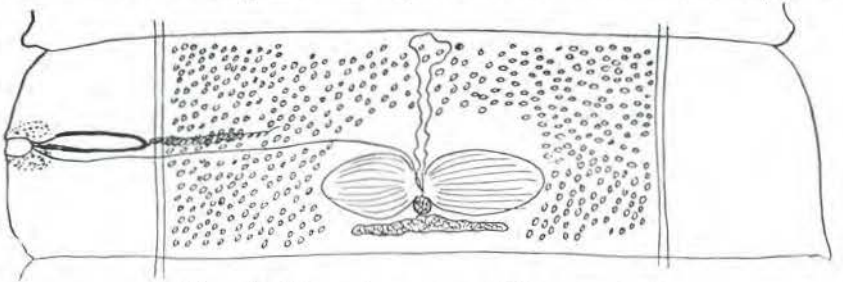

Fig. 8. *T.ingwei* sp. nov. Mature segment.

The vagina opens on the genital cone behind the cirrus sac and is straight i.e. no waves or coils are present in its transverse course (Fig. 8). The female glands show no special characteristics. The uterus carries 6 to 10 lateral branches (Fig. 9) each of which may terminate in several club-shaped secondary branches; the most anterior branch is massive and gives off several short club-shaped branches on its anterior face. The eggs are oval and the 0·006 mm. thick shell is pitted; they are from 0·035 to 0·038 mm. long by 0·028 mm. in diameter. The hexacanth hooks are 0·012 mm. long.

Discussion.—The size and number of the hooks may be considered to fall into the range of those of *T. hydatigena*, *T. gonyamai* and *T. hlosei;* however, its smaller strobila with its peculiar shape, its much thickened cuticle and the greater development of its musculature, easily serve to distinguish it from these three species.

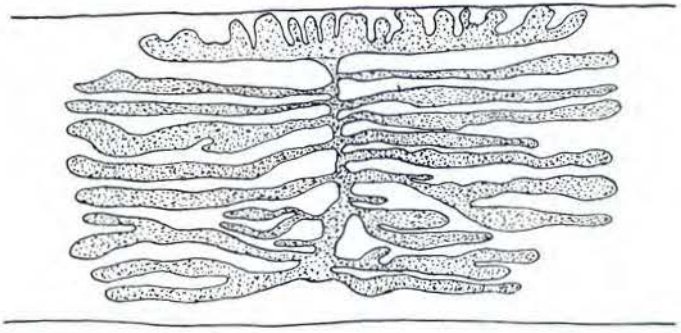

Fig. 9. *T.ingwei* sp. nov. Uterus.

Specific Diagnosis.—Taeniadae reaching a length of 270 mm. by 4·6 mm. broad. Strobila hard and bent zig-zag even in living specimens. Rostellum carries 32 to 34 hooks in two circlets; large hooks 0·197 to 0·202 mm. long small hooks 0·148 to 0·151 mm. long. Neck short and thick. Cuticle thick and musculature well developed. Numerous chalk bodies in parenchyma. Genital atria large and prominent; about 400-500 testes not extending backwards beyond vitelline gland, leaving a fairly wide space round ovary and forming a fairly wide bridge anterior of female glands. Vagina straight; uterus with 6 to 10 lateral branches and anterior branch massive with several anterior club-shaped secondary branches. Egg oval and shell pitted, 0·035 to 0·038 mm. long by 0·028 mm. in diameter.

Host.—*Panthera pardus.*

Location.—Small intestine.

Locality.—Northern Transvaal.

Types in the Onderstepoort Helminthological Collection.

From Cheetah.

*Taenia Hlosei** sp. nov.

This species was represented by two almost complete worms and several fragments, seven of which carried scolices. The almost complete specimens were 325 and 400 mm. long and had a maximum breadth of 9 mm. and 8·5 mm. respectively, their end segments measured 6·5 mm. broad by 4·5 mm. long and 5·5 mm. broad by 5 mm. long respectively. As some of the fragments contained longer end segments, reaching 7 mm. long by 4·5 mm. broad and as these were bell-shaped whereas those of the two measured specimens were rectangular, it is certain that in complete specimens the lengths would be some 50 mm. longer than those mentioned above.

* "Hlosi" is Zulu word for "cheetah".

The scolex is large, 1 to 1·1 mm. across and carries 4 prominent rounded suckers having a diameter of 0·5 mm.; the rostellum is 0·45 mm. thick and carries a double circlet of 36 to 40 hooks. The larger hooks are 0·209 to 0·215 mm. long and the shorter ones 0·145 to 0·151 mm. long (Fig. 10). The upper margin of the handle of the large hook is generally sinuous, but it may vary from being practically smooth to possessing a distinct notch.

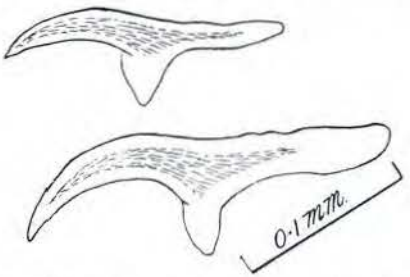

Fig. 10. *T.hlosei* sp. nov. Large and small hooks.

The neck is short and broad and measures about 1 mm. long by 0·9 mm. broad.

In sections of mature segments (Plate 1, Fig. 4) the cuticle has a thickness of 0·017 to 0·023 mm. and is followed by a thin layer of subcuticular transverse muscle fibres; the cortex is 0·26 to 0·29 mm. thick of which the inner half is traversed by the longitudinal muscle layer; this layer is composed internally of small irregularly scattered muscle bundles containing 5 to 10 fibres each, each fibre having a diameter of 0·004 to 0·006 mm.; externally this layer is composed of scattered single muscle fibres. The inner transverse muscles are well developed and form a layer 0·029 to 0·035 mm. thick. The medulla has a dorso-ventral thickness of 0·3 to 0·43 mm. Both the cortex and medulla are closely packed with numerous oval chalk bodies reaching a maximum size of 0·02 by 0·25 mm.

The ventral excretory canals are large and have a diameter of 0·145 by 0·116 mm. to 0·215 by 0·104 mm. and are situated 0·8 to 0·9 mm. from the edge of the segment. The dorsal excretory canal has a darker staining wall, 0·017 to 0·023 mm. in diameter and is situated 0·03 to 0·058 mm. from the ventral excretory canal on the inner dorso-lateral corner. The nerve is prominent and measures about 0·09 mm. across. The genital ducts pass between the excretory canals and dorsal of the nerve.

The genital atria are prominent and situated just behind the middle of the segment; the atria have a depth of about 0·35 mm. and are about 0·23 mm. across; there is a prominent genital cone at their base.

The cirrus sacs are club-shaped and extend to but do not cross the excretory canals; they are from 0·475 to 0·487 mm. long with a maximum thickness of 0·133 mm. The vas deferens forms a few coils in the cirrus sac and after crossing the excretory canals it becomes very densely coiled. The testes appear to be in the vicinity

of 400 to each segment and generally do not extend beyond the posterior level of the vitelline gland; occasionally, however, a few may be present further back. They leave a large clear space round the female glands and are more concentrated laterally; they form a fairly wide bridge of loosely scattered testes in the uterine field; they are arranged in a single layer in the dorsal half of the medulla and have a dorso-ventral diameter of 0·133 to 0·145 mm.

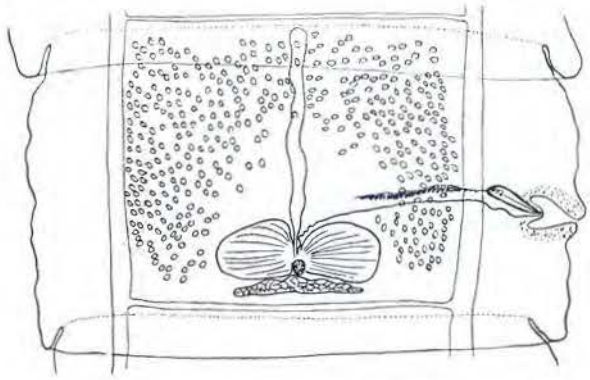

Fig. 11. *T.hlosei* sp. nov. Mature segment.

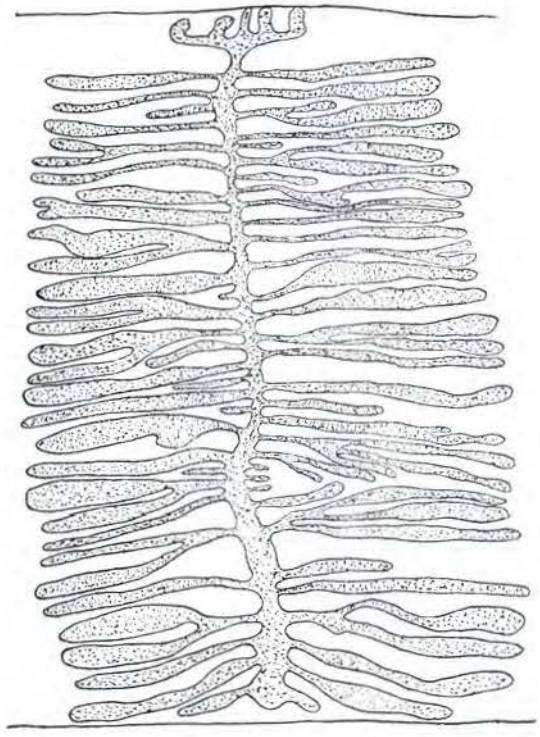

Fig. 12. *T.hlosei* sp. nov. Uterus.

The vagina opens behind the cirrus sac on the genital cone; its course is practically straight, although in some segments it may be very slightly wavy before crossing the excretory canals (Fig. 11). The ovary and vitellarium show no special differentiating characters. The uterus has from 20 to 30 lateral branches (Fig. 12) arising from the main uterine stem; generally the number is about 24; they are long and narrow and are closely packed together. The eggs are oval with pitted shell and measures 0·032 by 0·026 mm. to 0·035 by 0·029 mm. and the shell is 0·0045 to 0·006 mm. thick.

Discussion.—The size of the large hooks falls in the range of those of *T. hydatigena, T. ingwei* and *T. gonyamai*, but the small hooks are generally slightly larger than those of the latter species. The much greater number of uterine branches easily distinguishes it from *T. ingwei* and *T. hydatigena* and from the latter species it also differs by its smaller strobila and numerous chalk bodies. Its closest relative is *T. gonyamai* from which it differs, however, by having more uterine branches, less testes, better developed musculature and numerous chalk bodies.

Specific Diagnosis.—Taeniadae reaching a length of about 450 mm. by 9 mm. broad and provided with 36 to 40 rostellar hooks in two circlets; the larger hooks measuring 0·209 to 0·218 mm. long and the smaller 0·142 to 0·151 mm. The neck is relatively short and thick and the parenchyma is thickly crammed with numerous chalk bodies. There are about 400 testes, concentrated laterally, leaving a large clear space round the female glands, generally not extending behind the vitelline gland, and forming a fairly broad bridge in the anterior half of the segment. Th vagina is practically straight and the uterus carries from 20 to 30 lateral branches. The eggs are oval and possess a pitted shell; they measure 0·032 to 0·035 mm. long by 0·026 to 0·029 mm. in diameter.

Host.—Acinomyx jubatus jubatus (Erxl.)

Location.—Small intestine.

Locality.—Northern Transvaal.

Types in the Onderstepoort Helminthological collection.

Taenia acinomyxi sp. nov.

Only one specimen of this species was obtained; it was 350 mm. long and 3 to 3·2 mm. broad in its posterior half; the strobila is thick and oval in cross section and has a thickness of 2 to 2·2 mm. in mature and older segments. The posterior margin of each segment is raised so that the strobila appears serrated.

The head is 0·9 mm. broad and the rounded suckers have a diameter of 0·35 mm.; the rostellum is 0·435 mm. thick and carries a double circlet of 38 hooks; the large hooks are 0·218 to 0·227 mm. long and the upper edge of the handle is sinuous; the small hooks are 0·128 to 0·136 mm. long (Fig. 13).

The cuticle is 0·015 mm. thick and the following subcuticular transverse muscle fibre layer is 0·014 mm. thick (Plate 1, Fig. 5); the cortex has a thickness of 0·56 to 0·59 mm. and the longitudinal

muscles are distributed practically throughout its whole thickness. The longitudinal muscles, just external of the inner transverse muscles, form a definite layer of small bundles, each containing 5 to 10 fibres, the layer being composed of a single sheet of bundles; a clear space separates this layer from the rest of the muscle fibres, which are irregularly scattered through the rest of the cortex and are composed of small pillars of fibres; generally each of these pillars is built up of 2 to 5 fibres placed one above the other, only occasionally are two fibres found side by side. The fibres have a diameter of 0·007 to 0·008 mm. The inner transverse muscles form a layer 0·052 to 0·058 mm. thick and the medulla is from 0·79 to 0·82 mm. thick. Numerous chalk bodies are present, but are slightly more numerous in the cortex; they are oval and reach a size of 0·02 by 0·013 mm. The dorso-ventral musculature is well developed.

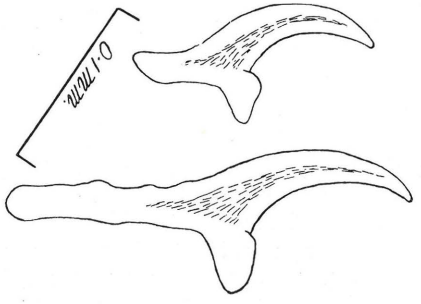

Fig. 13. *T.acinomyxi* sp. nov. Large and small hooks.

The excretory canals are large, the ventral being 0·162 by 0·08 mm. to 0·19 by 0·085 mm. in diameter and the dorsals have a diameter of 0·029 to 0·03 mm. The former are situated 0·4 to 0·46 mm. from the lateral margins and the dorsal vessels are just inside the ventral vessels in the plane of the testes. The nerve, which is 0·087 mm. high and 0·029 mm. broad, lies just lateral of the ventral excretory vessels. The transverse connections of the ventral vessels are large, having practically the same dimensions as the main vessels.

The genital ducts pass between the excretory vessels but dorsal of the nerve.

The genital atria alternate irregularly and are situated just behind the middle of the segment in mature segments and at the junction of the second and last thirds in the oldest segments present. They are somewhat funnel shaped with a maximum cross diameter of 0·12 mm. and 0·29 mm. deep. They are not prominent. Mature segments are 2 to 2·2 mm. long and 3·2 mm. broad. The cirrus sac reaches but does not cross the excretory canals and in mature segments is somewhat club-shaped up to 0·335 mm. long and 0·125 mm. thick; its position is not transverse but it lies in a plane extending diagonally dorsalwards towards the dorsal excretory vessel. The vas deferens makes a few coils in the cirrus sac and immediately after emerging becomes densely coiled dorsal of and beyond the ventral excretory canal (Fig. 14). There are from 250 to 300 testes arranged

in a single layer in the dorsal half of the medulla; they are dorso-ventrally elongated measuring 0·175 to 0·19 mm. deep by about 0·35 tot 0·43 mm. broad. The testes form a large lateral band on either side of the ovary and some testes even lie dorsal of its lateral margins; they extend backwards beyond the posterior level of the yolk gland but are not present behind it; they encroach into the zone of the vagina and vas deferens but leave a large open space in front of the ovary, and the two lateral bands are joined towards the anterior margin of the segment by a narrow bridge of only two to three testes. The vagina makes a few conspicuous loops prior to crossing the excretory canals after which it passes inwards and is regularly convoluted. The ovary, shell and yolk glands show no

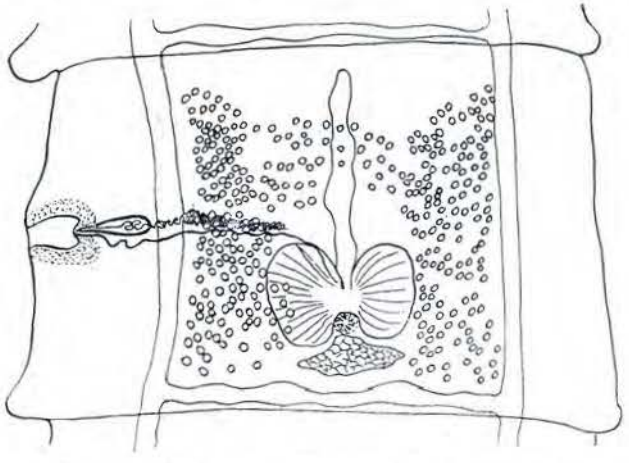

Fig. 14. *T.acinomyxi* sp. nov. Mature segment.

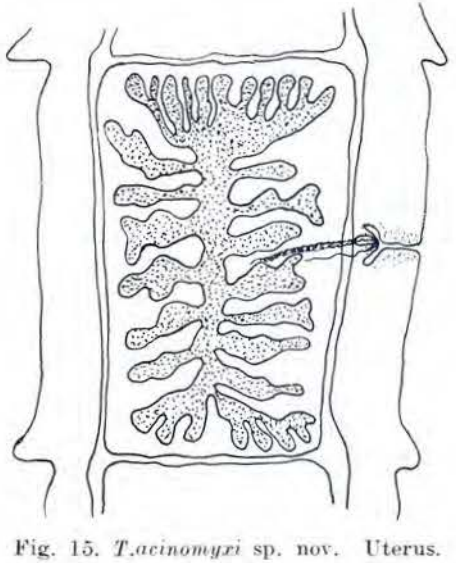

Fig. 15. *T.acinomyxi* sp. nov. Uterus.

special characteristics. The oldest segments are 3·3 mm. long by 2·5 mm. broad, but as they do not contain ripe eggs it is probable that ripe segments will be longer. The uterus has 8 to 10 branches (Fig. 15).

Discussion.—The number and size of the rostellar hooks and the number of uterine branches appear to ally this species to *T. hydatigena* from which it can, moreover, be easily distinguised by its firmer and oval strobila, smaller number and different arrangement of its testes and by the different arrangement of its longitudinal muscles. It differs from *T. hlosei* sp. n., from the same host, by the external shape of its strobila, the different distribution of its longitudinal muscles, its generally longer large hooks and smaller small hooks, in that its lateral uterine branches are considerably less in number, and it also has fewer testes arranged differently.

Specific Diagnosis.—Taeniadae having a firm and oval strobila reaching a length of 35 cms. and possibly over. Rostellum with 38 hooks, in two circles; the larger hooks 0·218 to 0·227 mm. long and the small hooks 0·128 to 0·136 mm. long; handle of large hook with sinuous dorsal border; 250 to 300 testes extending from behind level of yolk gland and forming two lateral bands united anteriorly by a narrow bridge 2 to 3 testes wide; they overlap lateral margins of ovary and leave large clear space in front of female glands. Cirrus sac reaches but does not cross excretory canals; uterus with 8 to 10 lateral branches; longitudinal musculature consists of a single layer of bundles external of inner transverse muscles and of numerous small pillars of fibres scattered through cortex. Numerous chalk bodies present.

Host.—*Acinomyx jubatus jubatus* (Erxl.)

Location.—Small intestine.

Locality.—South West Africa.

Types in Onderstepoort Helminthological Collection.

From Jackal.

Taenia jakhalsi sp. nov.

Four specimens of this species were available for study; the material was killed and fixed with slight stretching in formalin. The longest specimen measured 550 mm. in length with a maximum breadth of 4 mm.; the end segments reach a length of 4·6 mm. by 3 mm. broad and are roughly rectangular in shape.

The scolex is from 0·922 to 0·956 cc. broad and the four suckers are rounded and have a diameter of 0·371 to 0·394 mm. The rostellum is 0·315 to 0·405 mm. across and carries a double circlet of hooks; the four scolices have 30, 32, 32 and 32 hooks each. The large hooks are from 0·195 to 0·22 mm. long and the small 0·131 to 0·142 mm. long (Fig. 16); the blade of the large hooks meets the axis of the handle at an obtuse angle and the upper edge of the handle is slightly sinuous. The scolex is followed by a neck which is from 0·79 to 1·01 mm. long by 0·56 to 0·7 mm. broad.

In mature segments the cuticle is from ·012 to 0·014 mm. thick and is followed by a layer of subcuticular transverse muscle fibres 0·007 mm. thick (Plate 1, Fig. 6). The cortex is about 0·24 mm. thick and the longitudinal muscle fibres are scattered through practically its whole thickness; these muscles consist internally of small bundles containing 3 to 7 fibres each, although occasionally a bundle is present which may contain up to 10 fibres; towards the periphery there are only irregularly scattered single fibres. The fibres have a cross section of 0·007 to 0·01 mm. The inner transverse muscles form a layer 0·015 to 0·017 mm. thick. Dorso-ventral muscle fibres are well developed. The parenchyma of both the cortex and the medulla is thickly crammed with numerous chalk bodies reaching 0·012 by 0·02 mm. in size. The excretory system is remarkable for the almost complete suppression of the dorsal excretory canals, whose position is, however, indicated by a small patch of darker staining cells; where traces of this canal are seen then its diameter does not exceed 0·003. The ventral excretory canal is large and has a maximum diameter of 0·223 by 0·145 mm. and is situated 0·48 to 0·5 mm. from the lateral margin. The nerve measures about 0·06 by 0·035 mm. across and lies just lateral of the excretory canal. The genital ducts pass between the excretory canals and dorsal of the nerve

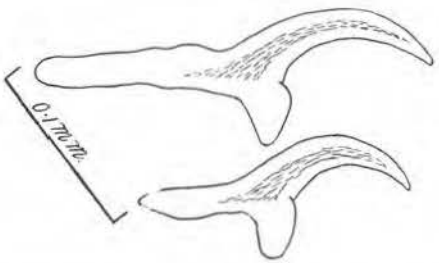

Fig. 16. *T. jakhalsi* sp. nov. Large and small hooks.

The irregularly alternating genital atria are fairly prominent and are up to 0·23 mm. deep by 0·12 mm. across. The cirrus sac is club-shaped and crosses the ventral excretory canal but does not extend inwards beyond it (Fig. 17); it is 0·45 to 0·464 mm. long with a maximum thickness of 0·133 mm. The vas deferens is coiled inside the cirrus sac and on emerging is thrown into numerous large loops. The testes, of which there appear to be between 400 and 500, are generally arranged in a single sheet in the dorsal half of the medulla; occasionally, however, two testes may be seen one above the other; they form two prominent lateral bands extending from the posterior level of the yolk gland to the anterior margin of the segment; these two bands are joined together by a narrow bridge of testes, 2 to 5 testes broad, extending along the anterior margin of the segment; a large space in front of the female glands is left free of testes.

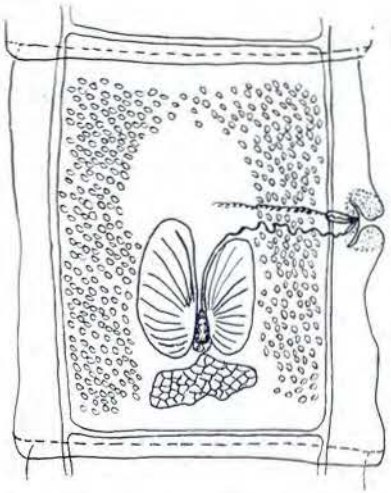

Fig. 17. *T.jakhalsi* sp. nov. Mature segment.

The vagina opens on the same level as but behind the cirrus sac on the dome-shaped genital cone; it is thrown into a few loops prior to crossing the excretory canals after which it passes inwards forming conspicuous convolutions through its whole course; as a rule it just misses the anterior margin of the poral ovarian lobe but in some cases it may cross over this lobe as in *T. ovis*. The ovarian lobes are rounded and the yolk gland is as broad as the ovary. The uterus carries 6 to 10 main lateral branches each of which may give off 2 to 4 secondary branches. The eggs are still immature.

Discussion.—The narrow testicular bridge and the wavy vagina allies this species to *T. bubesei* described above from which it differs, however, by its smaller number of rostellar hooks which are also smaller in size, by its greater number of uterine branches, in that the cirrus sac crosses the ventral excretory canal and in that the dorsal excretory canal is very small or suppressed. The number of hooks, their size and shape, show some similarity to those of *T. hydatigena*, but the arrangement of the testes in this species is quite different.

Specific Diagnosis.—Taeniadae reaching a length of 550 mm. with head less than 1 mm. broad; rostellum with 30 to 32 hooks in two circlets; large hooks 0·195 to 0·22 mm. long, small hooks 0·131 to 0·142 mm. long. Neck about 1 mm. long. Dorsal excretory vessel very small or suppressed; ventral excretory vessel large. Longitudinal musculature of small bundles of generally 3 to 7 fibres each scattered in inner portion of cortex, and from centre of cortex outwards scattered single fibres only. Testes number 400 to 500, generally in a single layer, occasionally 2 testes deep; testes leave a large clear space in front of female glands and form a narrow bridge towards anterior margin of segment. Cirrus sac crosses ventral excretory canal but does not extend inwards beyond it.

Vagina forms large loops before crossing excretory canals, afterwards wavy; it may pass over the edge of the poral ovarian lobe. Uterus with 6 to 10 lateral branches. Eggs immature.

Host.—*Thos mesomelas mesomelas.* (Schreber.)

Location.—Small intestine.

Locality.—Umtata, Cape Province.

Types in Onderstepoort Helminthological Collection.

*Taenia pungutchui** sp. nov.

Fragments which appear to belong to six different worms were present; unfortunately there were no heads, neither were there any ripe segments contained mature eggs. The longest fragment present, which had only its head and neck missing, was 52 mm. long; its maximum breadth was 3·6 mm. and its end segment was 1·46 mm. long by 2·5 mm. broad. A mounted fragment 35 mm. long had 39 segments, its posterior-most segment had already lost its male and female glands but the eggs contained in the uterus were still very immature; in the anterior-most segment the genital glands were just appearing and their ducts were quite distinct. It would thus appear that fully mature worms may reach a length of about 70 mm. or slightly more and the number of segments probably less than 100.

The excretory system consists of a pair of large and lateral ventral canals joined to each other by a transverse canal at the posterior end of each segment; they have a diameter of 0·093 by 0·075 mm. and are situated about 0·55 mm. from the edge of the segment. The dorsal excretory canals are very small and have a thickened wall; they have a diameter of about 0·006 mm. and are situated dorso-lateral and to the inner side of the ventral canals; in sections of two worms they occupied this position, but in sections of a third the dorsal excretory canal of the left side was ventro-lateral and to the inner side of the ventral canal; in the two normal worms the genital ducts passed over the ventral excretory canals and nerve and under the dorsal excretory canal and in the abnormal specimen this was also the case on the right side but on the left side the genital ducts passed over the dorsal excretory canal and under the ventral excretory canal and nerve. The lateral nerve cords are large and conspicuous, measure 0·06 mm. by 0·032 mm. in section and are situated just lateral of the ventral excretory canals and about 0·5 mm. from the edge of the segment.

The cuticle is thick measuring 0·015 to 0·023 mm. in thickness; the longitudinal muscles are fairly well developed (Plate 1, Fig. 7) and occupy an area 0·15 mm. thick in the cortical parenchyma; they consist of irregularly scattered muscle bundles containing up to 25 fibres each; the larger bundles are more internal in position and the smaller ones towards the periphery; the muscle fibres have a cross section of 0·004 to 0·005 mm. A distinct layer of transverse fibres

* "Pungutchu" is Zulu word for "jackal".

about 0·025 mm. thick separates the cortex from the medulla. Dorso-ventral muscle fibres are well developed especially in the medulla. A few round to oval chalk bodies 0·012 mm. to 0·011 by 0·014 mm. in diameter are present in the cortex.

The genital atria alternate irregularly, are very prominent and are situated in the middle or just anterior of the segment margin; they are somewhat cup-shaped, about 0·2 mm. wide and 0·175 mm. deep (Fig. 18). The base of each atrium is raised to form a small cone on the top of which the openings of the male and female ducts are placed.

The cirrus sac is club-shaped, 0·32 to 0·38 mm. long, with a maximum diameter of 0·07 to 0·08 mm.; it does not reach the ventral excretory canal; the cirrus is small and unarmed; the vas deferens forms a few coils in the cirrus sac and after emerging from it it is thrown into numerous dense coils before and after passing the excretory canals. The testes number about 200 to 250 and have a diameter of 0·09 to 0·095 mm.; they are arranged in two layers and there are about 100 on the poral and the rest on the aporal side. They occupy practically the whole area between the excretory canals not occupied by the female glands, extending backwards to the posterior level of the yolk gland and lying close up to the lateral margins of the ovary; the only area clear of testes is a hemispherical area anterior of the ovary; a narrow bridge of testes, two to four broad, joins the aporal to the poral testicular group anterior of this clear area.

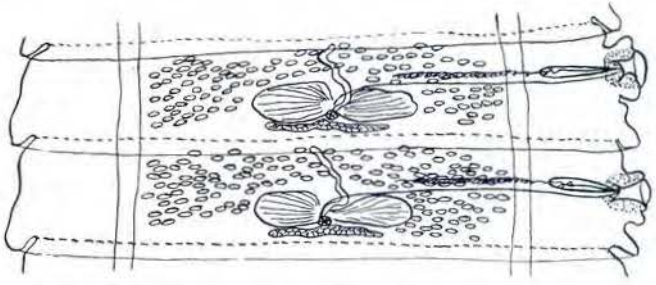

Fig. 18. *T.pungutchui sp. nov.* Mature segment.

The external opening of the vagina is on the same level but behind that of the cirrus sac; it passes inwards in a straight line no convulsions or waves being formed during its course; it just skirts the anterior margin of the poral ovarian lobe and then passes obliquely backwards; sometimes it may cross the anterior margin of the ovary as in *T. ovis*. The poral ovarian lobe is smaller than the aporal lobe and both have the outline of a truncated oval. The shell gland almost fills the vertical space of the medulla between the circular muscles and behind the ovary; it is about 0·2 mm. deep by 0·145 mm. wide and lies between the ovary and yolk gland. The uterus extends to the anterior margin of the segment and in the oldest segments available it was provided with 8 to 10 lateral branches on either side (Fig. 19).

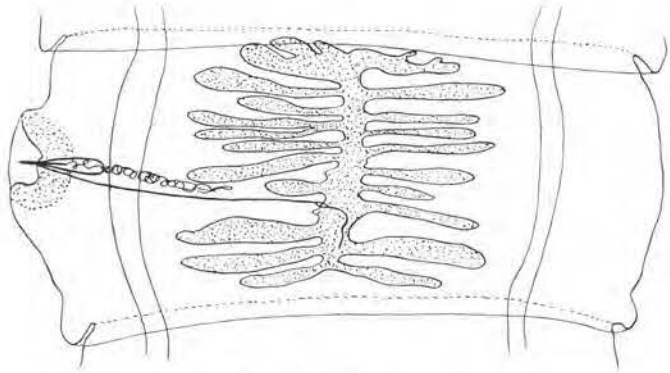

Fig. 19. *T. pungutchui* sp. nov. Uterus.

Discussion.—Notwithstanding the fact that this material is incomplete, there are, however, sufficient characters to distinguish it from the known species of *Taenia*. Such characters are the thick cuticle, relatively short strobila, relatively few testes forming a narrow bridge in front the female glands and arranged in a double layer in the medulla and the moderate number of lateral uterine branches. The thick cuticle, short strobila and number of uterine branches appear to ally it to *T. ingwei* described above, but it may be distinguished from this species by its smaller number of testes arranged in a double layer in the parenchyma and forming a narrower bridge in front of the ovary; and in that its longitudinal musculature is not so well developed, the bundles being fewer and more scattered, and that it has only a few chalk bodies.

Specific Diagnosis.—Taeniadae which may possibly attain a length of 70 mm. and be built up of about 100 segments. Cuticle relatively thick and musculature fairly well developed; chalk bodies small in number. Genital atria very prominent. About 200-250 testes forming a narrow bridge in front of female glands and arranged in two layers in the medulla. Vagina more or less straight; uterus with 8 to 10 lateral branches.

Host.—Thos mesomelas mesomelas. (Schreber).

Location.— Small intestine.

Locality.— Northern Transvaal.

Types in the Onderstepoort Helminthological Collection.

Taenia multiceps Leske, 1780.

A large number of specimens of this species was obtained from an undetermined jackal (*Thos mesomelas?*) killed by a farmer in the Philippolis District of the Orange Free State. This particular farmer had suffered severe losses from gid in his sheep and as he had no dogs on his farm he could not account for the infection; however, an intensive search revealed the presence of a few jackals which on being killed were found to harbour this tapeworm. The strobila are short, reaching a maximum length of only 160 mm. but this may be

due to the very heavy infestation of the host; otherwise the writer's specimens agree very well with Hall's (1919) description except that the reflexed loop of the vagina, before crossing the excretory canals, was seldom seen.

Taenia serialis (Gervais, 1847) Baillet, 1863.

A few specimens attaining a maximum length of 150 mm. were obtained from a jackal killed in the Amsterdam district of the Transvaal. In addition numerous specimens were also obtained by experimental feeding of a dog with the larval stages obtained from a hare.

Wild Dog.

Taenia pisiformis (Block, 1780) Gmelin, 1790.

One specimen of this species was obtained from a wild dog (*Lycaon pictus*?) from South West Africa. It carried 36 hooks, the large hooks being 0·22 mm. long and the small hooks 0·15 mm. long; there were between 400 and 500 testes which passed and joined behind the yolk gland. The cirrus sac crossed the ventral excretory canal and the uteri had 10 to 12 uterine branches. The presence or absence of a vesicula seminalis was not determined.

Resume.

Seven species of *Taenia*, hitherto unrecorded, are here described, namely *T. bubesei* and *T. gonyamai* from lions, *T. ingwei* from a leopard, *T. hlosei* and *T. acinonyxi* from cheetahs and *T. jakhalsi* and *T. pungutchui* from jackals; in addition the species *T. multiceps* and *T. serialis* are recorded from jackals and *T. pisiformis* from a wild dog.

REFERENCES.

BAER, J. G. (1923). "Resultats zoologiques du voyage der Dr. P. A. Chappius au Nil Superieur." *Rev. Suisse de Zool.*, Vol. 30, pp. 337-352. Geneva.

BAER, J. G. (1927). "Contributions to the Helminth Fauna of South Africa." *11th and 12th Rept. Direct. Vet. Ed. and Res.* pp. 63-136, Pretoria.

BAYLIS, H. A. (1937). "Records of some Helminths from the Spotted Hyaena." *Ann. Mag. Nat. Hist.* Ser 10, Vol. 20, pp. 438-441. London.

DEFFKE, O. "Die Entozoa des Hundees". *Arch. f. wissensch. u. prakt. Dierheilk.*, Vol. 17, pp. 1-60. Berlin.

HALL, M. C. (1919). "The Adult Taenoid Cestodes of Dogs and Cats and of related Carnivores in North America." *Proc. U.S. Nat. Mus.* Vol. 55, pp. 1-94. Washington.

LOEWEN, S. L. (1929). "A new Cestode *Taenia rileyi* n. sp. from a Lynx". *Parasit.*, Vol. 21 pp. 469-471. Cambridge.

MEGGITT, F. G. (1928). "Report on a Collection of Cestodes mainly from Egypt. Part III. Cyclophyllidea (conclusion): Tetraphyllidea." *Parasit.*, Vol. 20 pp. 315-328. Cambridge.

SKINKER, M. C. (1935). "Two new species of Tapeworms from Carnivores and a redescription of *Taenia laticollis* Rudolphi, 1819." *Proc. U.S. Nat. Mus.*, Vol. 83. (2980) pp. 211-220. Washington.

Species of Taenia from Mammals. (*Partly from Baer*, 1927.)

Species.	Length in mm.	Number of hooks.	Size of Large hooks in mm.	Size of Small hooks in mm.	Number of testes.	Number of main uterine branches.	Size of eggs in mm.	Hosts.	Distribution.
T. infantis Bacig., 1922	300	35–40	0·41	0·26	?	?	0·035–0·04	*Homo sapiens*	South America.
T. taeniaeformis (Batsch., 1786)	150–160	26–52	0·38–0·42	0·25–0·27	Numerous	17–18	0·031–0·037	*Felis catus, Felis* spp. *Uncia concolor* etc.	Europe, Asia, U.S.A., S. Amer., S. Africa.
T. laticollis Rud., 1819	50–140	38–42 (60)	0·38–0·42	0·214–0·238	180–250	10–15	0·028–0·032 × 0·04	*Lynx lynx ; L. fasciatus ; L. rufus, Canis lestes*	Europe and U.S.A.
T. rileyi Loewen, 1929	310	32	0·34–0·386	0·212–0·22	450–550	7–11	0·029 × 0·033	Lynx	U.S.A.
T. macrocystis Dies, 1850	120	60–74	0·32–0·365	0·18–0·2	Relatively few	8·15	0·034–0·048 × 0·025–0·027	*Cervaria* spp. *Catapuma jaguarandi, Felis* spp. etc.	S. America and U.S.A.
T. parva Baer, 1927	55	44	0·361	0·228	500	9–14	0·027 × 0·023	*Genetta ludia*	South Africa.
T. reiracta Linst, 1904	550	34	0·308	0·211	?	Immature	—	*Vulpes ferrilatus*	Tibet. ?
T. regis Baer, 1923	160	32	0·29	0·19	200	2–3	0·04	*Leo leo*	Sudan.
T. pisiformis (Floch, 1780)	600–2,000	34–48	0·225–0·294	0·132–0·177	400–500	8–14	0·037 × 0·032	*Canis familiaris ; Thos.* sp. *Felis catus Panthera pardus* etc.	Cosmopolitan.
T. omissa Luhe, 1910	500–600	40	0·27 –0·29	0·09	?	4–5	0·04	*Uncia concolor ; Oncoides tigrina*	South America.
T. bubesei n. sp	450–550	42–46	0·235–0·273	0·136–0·18	500–600	3–7	0·044–0·046 × 0·041–0·055	*Leo leo krugeri*	South Africa.
T. lyncis, Skinker, 1935	640	33–46	0·22 –0·258	0·159–0·208	200–500	4–10	0·025 × 0·028–0·035	*Lynx rufus ; Uncia concolor*	U.S.A.
T. hyaenae Baer, 1927	300	32–38	0·196–0·223	0·124–0·156	300	up to 26, usually 12–14	0·027 × 0·034	*Hyaena brunnea*	South Africa.
T. acinomyxi n. sp	350	38	0·218–0·227	0·128–0·136	250–300	8–10	Immature	*Acinomyx jubatus*	South Africa.
T. jakhalsi n. sp.	550	30–32	0·195–0·22	0·131–0·142	400–500	6–10	Immature	*Thos mesomelas mesomelas*	South Africa.
T. hlosei n. sp	325–400	36–40	0·209–0·218	0·142–0·151	300–400	20–30	0·026–0·029 × 0·032–0·035	*Acinomyx jubatus jubatus*	South Africa.
T. hydatigena Pallas, 1766	750–5,000	22–44	0·17 –0· 22	0·11 –0·16	600–700	5–10	0·034–0·035 × 0·038–0·039	*Canis familiaris, Thos lupus ; T. mesomelas*	Cosmopolitan.
T. ingwei n. sp	250–270	32–34	0·197–0·202	0·148–0·151	400–500	6–10	0·028 × 0·035–0·038	*Panthera pardus*	South Africa.
T. gonyamai n. sp	450–520	32–38	0·188–0·209	0·112–0·142	500–600	14–18	0·029–0·031 × 0·032–0·04	*Leo leo krugeri*	South Africa.
T. ovis (Cobbold, 1869)	450–1,000	24–36	0·156–0·188	0·096–0·128	300	20–25	0·024–0·028 × 0·03–0·034	*Canis familiaris*	Europe, Africa, Australia, U.S.A.
T. solium Linn, 1767	2,000–8,000	25–50	0·16 –0·18	0·11 –0·14	Numerous	7–10	0·031 × 0·056	*Homo sapiens*	Cosmopolitan.
T. gaigeri (Hall, 1916)	250–1,800	28–32	0·16 –0·18	0·115–0·15	200–225	12–15	0·025–0·03	*Canis familiaris*	India, Ceylon.
T. crassiceps Rud, 1810	120–220	32–34	0·186	0·135	?	8	0·019 × 0·025	*Vulpes alopex*	Europe.
T. serialis (Gerv., 1847)	200–720	26–32	0·135–0·175	0·78 –0·12	Numerous	20–25	0·029–0·03 × 0·031–0·034	*Canis familiaris*	Europe, Asia, Australia, U.S.A., and South Africa.
T. multiceps (Leske, 1780)	400–1,000	22–32	0·15 –0·17	0·09 –0·13	200	9–26	0·029–0·037	*Canis familiaris, C. nebrascensis, Vulpes lagopus*	Cosmopolitan.
T. krabbei Moniez, 1879	260	26–34	0·148–0·17	0·085–0·12	260	10	?	*Canis familiaris*	Iceland, Alaska.
T. antarctica Fuhrm, 1922	250	28–34	0·144–0·156	0·092–0·102	500	13–15	0·02	*Canis familiaris*	Antarctic.
T. balaniceps Hall, 1910	240	28–32	0·145	0·093–0·098	Numerous	16–17	0·027–0·033 × 0·029–0·037	*Canis familiaris : Cervaria rufa*	U.S.A.
T. packi Christenson, 1930	360–400	26–32	0·14 –0·15	0·096–0·1	300	8–12	?	*Canis familiaris* (expt. infection)	U.S.A.
T. brachysoma Setti, 1899	100	30–32	0·135–0·145	0·095–0·105	?	10–12	0·032	*Canis familiaris*	Italy.
T. brauni Setti, 1897	100–180	30–32	0·13 –0·14	0·085–0·09	?	10–12	0·035–0·038	*Canis familiaris*	Erythrea, Italy.
T. taxidiensis Skinker, 1935	100	?	0·09 –0·95	?	150–125	11–19	?	*Taxidea taxus*	U.S.A.
T. erythraea Setti, 1897	140–170	20	0·085	0·095	?	6–14	0·027–0·028	*Thos mesomelas*	Abyssinia.
T. polyacantha Leuck, 1856	120	62	0·058	0·034	?	8	0·022–0·028	*Vulpes alopex*	Europe.
T. pungutchei n. sp.	70	?	?	?	200–250	8–10	Immature	Jackal	South Africa.
T. saginata (Goeze, 1782)	4,000–10,000	Nil	Nil	Nil	Numerous over 1,000	15–30	0·02–0·03 × 0·03–0·03	*Homo sapiens*	Cosmopolitan.
T. philippina Garrison, 1907	800–1,000	Nil	Nil	Nil	?	?	0·023–0·035 × 0·035–0·041	*Homo sapiens*	Philippines.
T. confusa Ward, 1895	5,000–8,000	Nil	Nil	Nil	?	14–18	0·03 × 0·039	*Homo sapiens*	Texas.
T. bremmeri Stephens, 1908	?	Nil	Nil	Nil	?	22–24	0·03 × 0·039	*Homo sapiens*	Nigeria.
T. triserrata Meggitt, 1928	250	?	Three Rows, 0·16, 3rd 0·12	1st 0·21, 2nd	?	?	0·032 × 0·027	*Felis* sp.	Paraguay.
T. monostephanos Linstow, 1905	145	29	0·19 –0·21	Nil	?	Numerous	0·036 × 0·029	Lynx	Russia.

PLATE I.

Variations in Musculature of Various Species of Taenia.

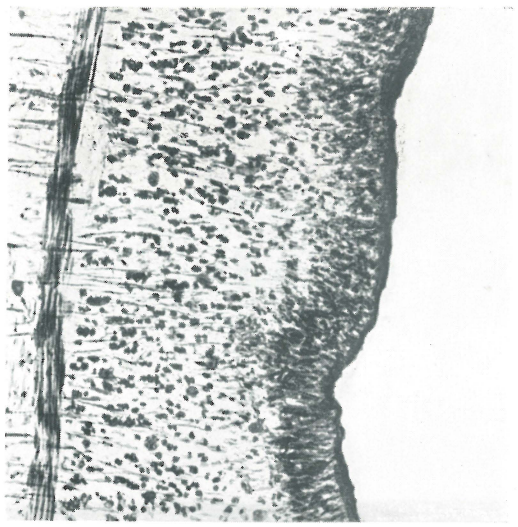

Fig. 1. *T.bubesei.*

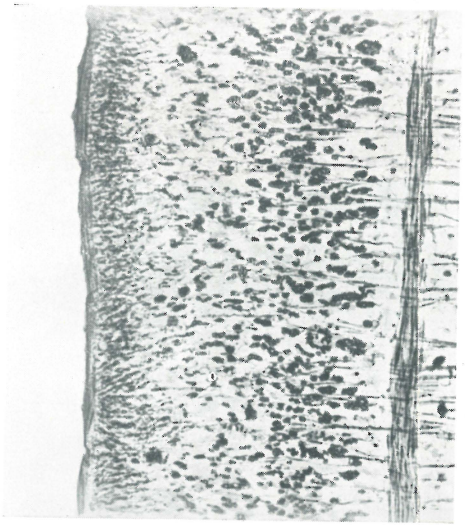

Fig. 2. *T.gonyamai.*

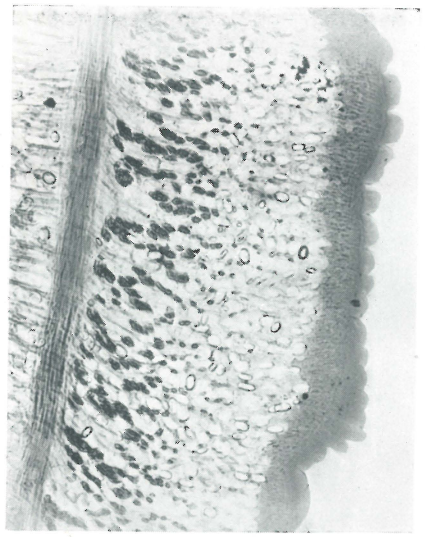

Fig. 3. *T.ingwei.*

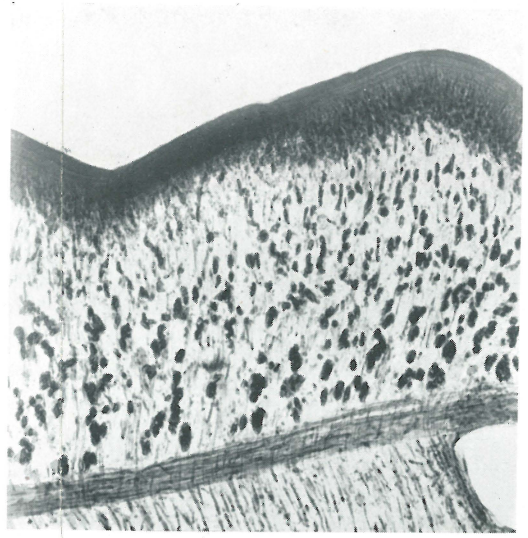

Fig. 4. *T.hlosei.*

Fig. 5. *T.acinomyxi.*

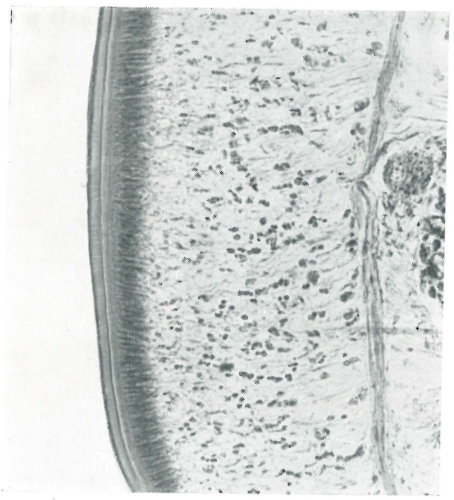

Fig. 6. *T.jakhalsi.*

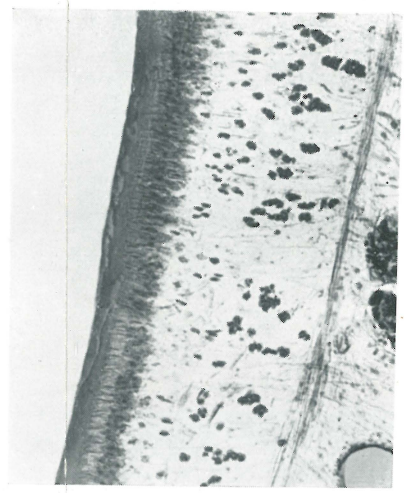

Fig. 7. *T.pungutchui.*

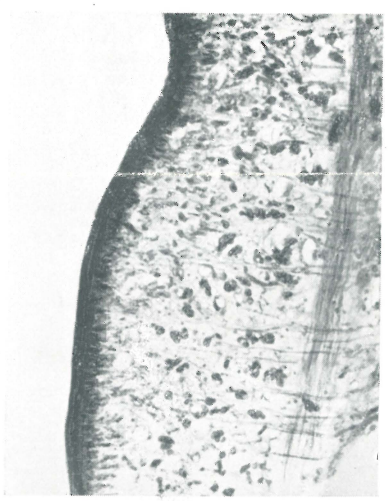

Fig. 8. *T.hydatigena.*

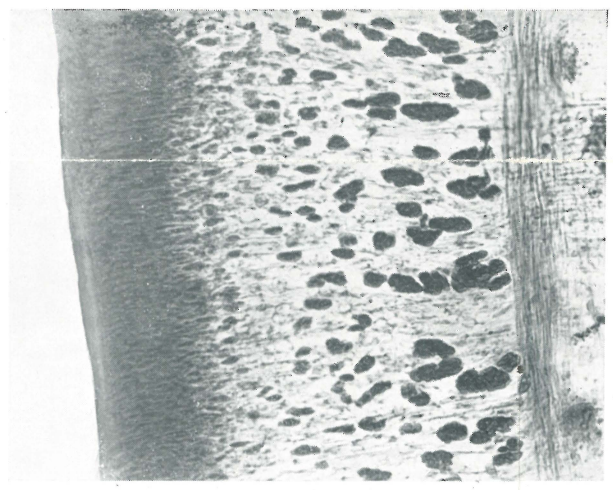

Fig. 9. *T.pisiformis.*

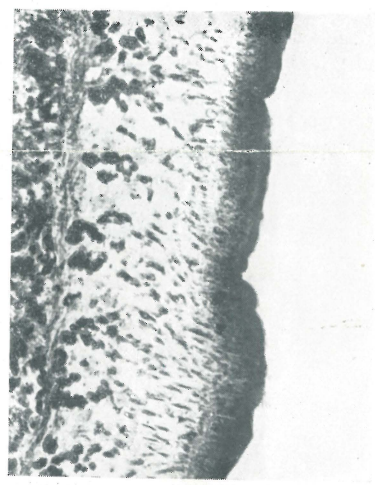

Fig. 10. *T.ovis.*

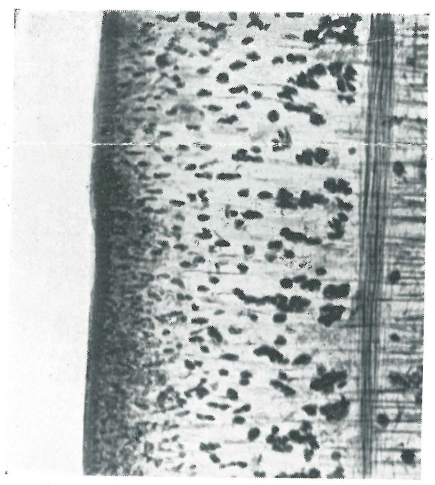

Fig. 11. *T.hyaenae* (co-type).