

It is deplorable that the fact of an ordinary engineer, chancing to see in a local paper a photograph of a so-called prehistoric fish-trap, and associating it with the previously unknown fate of one of Spain's boldest seamen, should in any sense be offensive to a scientist. An engineer knows that when he takes his sharpest pencil and runs it along the edge of his best tee-square, the resulting line does not lie evenly between its extremities. A huntsman knows his dog only follows the scent by continually getting off it; and I have a suspicion that a scientist only advances knowledge by seeing things that his predecessors failed to see, or viewed through a fog.

ON AUSTRALIAN AVIAN ENTOZOA.

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IN this note there is an endeavour to bring together under each host a list of endoparasites recorded as occurring in birds in Australia as well as the references to their occurrence. These have been allotted under their respective headings as Protozoa, Trematoda, Cestoda, Nematoda, and Acanthocephala. Many of our birds have a geographical range extending far beyond Australia, some of them being common Old-world forms. Many parasites have been described from some of these hosts, but unless the entozoa were taken from birds from the Australian region, they

have been neglected in this account. The term Australia is being used in a wide sense so as to include forms from New Guinea and the adjacent islands such as Bismarck Archipelago and the Aru Islands.

Following the scientific name of each bird, there will be found its number (indicated as M.) in Gregory Matthews'¹ Hand-list. As this ornithologist follows R. Bowdler Sharpe's Hand-list of Birds² in regard to genera and species, his list may be considered as authoritative in regard to the correct nomenclature of the birds in question. Then follows its number (H.) in the second edition of Robert Hall's Key.³ Thus the host in question may be readily placed. The popular name given is in most cases taken from Hall's List. The range of each bird may be found by consulting either of these works, more especially the former.

My thanks are due to my colleague at the Bureau, Dr. J. Burton Cleland, who has very materially assisted me with specimens of birds and helminths; to Mr. A. J. North, Ornithologist to the Australian Museum, Sydney, who has kindly identified many birds for me and has helped me in regard to certain points in avian synonymy; to Dr. F. Tidswell, the Director of the Bureau; to Mr. G. P. Darnell-Smith, also of this Bureau; and Mr. A. S. Le Souef, Curator of the Royal Zoological Gardens, Sydney, and Mr. T. Steel, for kindly sending me specimens.

It may not be out of place to mention that this paper is part of a scheme to more fully investigate our bird-life.

¹ G. Matthews, "Hand-list of the Birds of Australasia," published as a Supplement to the *Emu*, vol. VII, 1907-8, 108 pages.

² R. Bowdler Sharpe, "A Hand-list of the Genera and Species of Birds," (British Museum Publications, the volumes extending over many years.) I have consulted this work for information concerning nomenclature.

³ R. Hall, "A key to the Birds of Australia," Melbourne, 2nd Edition, 1906.

Dr. Cleland¹ has undertaken to examine the stomach contents with a view to finding out the economic value of these birds (from an agricultural standpoint) and has just published some interesting information along these lines. We are endeavouring conjointly to study our avian haematozoa, while I am more particularly interesting myself in the helminths, especially the cestodes.

In addition to the parasites enumerated, there is now at my disposal a goodly number of tapeworms from various Australian birds, but as these are not yet worked up no reference is being made to them in this paper. Many of the following references† are also to be found in Linstow,² Fuhrmann,³ and Sweet.⁴

Order CASUARIIFORMES.

(A) Family DROMÆIDÆ.

1. *Dromaeus novae-hollandiae*, Lath. (M. 1, H. 764). Emu. Cestoda:—i. *Davainea australis*, Krabbe, *Dansk. Vidensk. Selsk. skr. naturvid. math. Afd.*, (5) Vol. VIII, 1869, p. 343 (Australia); Krefft, *Trans. Entmol. Soc., N.S. Wales*, II, 1871, p. 210; Johnston, *Journ. Roy. Soc. N.S. Wales*, XLIII, 1909, p. xxix (New South Wales).

This species was very briefly described by Krabbe as *Taenia australis*, his specimen coming from an Emu which had died in the Copenhagen Zoological Gardens after having been there a considerable time. This led Krabbe to remark that the cestode might be proper to this bird, or that this

¹ Cleland, "Examination of Contents of Stomachs and Crops of Australian Birds, *Agric. Gazette*, N. S. Wales, XXI, 1910, pp. 401-5; and in the *Emu*, IX, April, 1910.

² Linstow, O. v., "Compendium der Helminthologie," 1878; Nachtrag 1889.

³ Fuhrmann, O., *Zoolog. Jahrb.*, Suppl. Bd. x, Heft 1, 1908.

⁴ Sweet, G., *Proc. Roy. Soc., Victoria*, XXI, (N.S.) 1908, pp. 454-502.

All works which I have not been able to consult, but which are mentioned in this paper will be designated thus †.

might have been a case of "accidental" infection during its stay in the Gardens.

Blanchard¹ recognised from Krabbe's figures that this parasite belonged to the genus *Davainea*. Krefft merely mentioned the worm. I formally recorded its occurrence in this host in New South Wales, and have recently examined specimens of *D. australis* collected from the intestine of an Emu in the Strelley River district (North-west of West Australia) by Dr. J. B. Cleland.

- ii. *Cotugnia collini*, Fuhrmann, *Cent. f. Bakt.*, I, Orig., XLIX, 1909, p. 116.

This parasite was collected in Eastern Australia.

(B) Family CASUARIIDÆ.

2. *Casuarius casuarius*, Linn. (Syn. *C. galeatus*, Bonn.)
Cassowary.

This species does not live on the mainland, but is restricted to New Guinea and the adjacent islands. The Australian representative is *C. australis*, Wall.

Nematoda:—*Sclerostomum* (= *Strongylus*) *boularti*, Mégnin, †
Journ. d. l'Anat. et Physiol., Paris, xx, 1884, p. 455—
found in the trachea, (locality ?)

Order COLUMBIFORMES.

(A) Family COLUMBIDÆ.

3. *Macropygia nigrirostris*, Salvad.

Nematoda:—*Heterakis australis*, Von Linstow, *Arch. f. Naturg.*, LXIII, 1897, p. 285. (Bismarck Archipelago).

(B) Family TRERONIDÆ.

4. *Carpophaga vanwycki*, Cass. A fruit-eating Pigeon.

Cestoda:—*Cittotaenia Kuvaria*, Shipley, "Entozoa" in
Wiley's "Zoological Results," v, 1900, p. 552. (New
Britain.)

¹ Blanchard, *Mem. Soc. Zool., France*, iv, 1891, p. 434.

Shipley described this worm as *Coelodela Kuvaria*, making it the type of a new genus *Coelodela*. Fuhrmann¹ showed that this was a synonym of *Cittotaenia*.

5. *Zonoenas brenchleyi*, Gray (Syn. *Carpophaga brenchleyi*, Gray). Brenchley's Fruit-pigeon.

Nematoda:—*Ceratospira ophthalmica*, Von Linstow, *Arch. f. Naturg.*, XLIII, 1897, p. 286. (Bismarck Archipelago.)

This Filariid was taken from the orbital cavity of the above pigeon and originally described as *Ancyracanthus ophthalmicus*. Ransom² removed it into the genus *Ceratospira*.

(C) Family GOURIDÆ.

6. *Goura albertisi*, Salvad.

Cestoda:—*Davainea goura*, Fuhrmann, *Centr. f. Bakt.*, I, Orig., XLIX, 1909, p. 106, (New Guinea.)

7. *Goura coronata*, Linn. The crowned pigeon.

Cestoda:—*Echinococcus* sp., Crisp, *Proc. Zool. Soc., Lond.*, 1860, p. 192.

Crisp recorded the occurrence of "hydatids (*Echinococci*) in the liver and other viscera" of one of these birds which had died at the London Zoological Gardens. Linstow³ quotes Crisp's reference, but sets down the parasite as *Echinococcus gourae coronatae*, by which he means merely *Echinococcus* from *Goura coronata*.

(D) Family PERISTERIDÆ.

8. *Caloenas nicobarica*, Linn. The Nicobar pigeon.

Cestoda:—*Davainea paucitesticulata*, Fuhrmann, *Centrb. f. Bakt.*, I, Orig., XLIX, 1909, p. 106.

The locality from which the parasite was collected is not stated, though the geographical distribution of the host is

¹ Fuhrmann, *Centr. f. Bakt.*, I, Orig. xxix, 1901, p. 761; *Ibid.*, xxxii, 1902, p. 142, and *Zool. Jahrb. Syst.*, xxii, 1905, p. 312.

² Ransom, "Dept. Agric. U.S.A., Bur. Animal Ind." Bull. 60, 1904, p. 30.

³ V. Linstow, "Compendium der Helminthologie," 1878, p. 120.

given. As a number of other parasites collected from various birds in New Guinea are described in the same paper, it may be assumed that Papua was the locality from which this cestode was obtained.

No parasites have, as far as I know, been described from pigeons (native) from the mainland of Australia.

Order RALLIFORMES.

Family RALLIDÆ.

9. *Porphyrio melanonotus*, Temm., (M. 62, H. 591). The Bald Coot.

Trematoda:—*Distomum* sp., Krefft, *Trans. Entomol. Soc. N.S. Wales*, II, 1871, p. 213. (N.S. Wales or Queensland.)

Order PODICIPEDIDIFORMES.

(A) Family PODICIPEDIDÆ.

10. *Podiceps novaehollandiae*, Steph. (M. 65, H. 739). The Black-throated Grebe.

Cestoda,—i. *Taenia novaehollandiae*, Krefft, *l.c.*, p. 216. (New South Wales or Queensland.)

ii. *Taenia paradoxa*, Krefft, *l.c.*, p. 217. (New South Wales or Queensland.)

These two parasites were very imperfectly described and roughly figured by Krefft. Neither belongs to the genus *Taenia*, but until the types have been re-examined, their systematic position is not known. Krefft described the forms as infesting the intestine of the little grebe *Podiceps australis*. The generic name is evidently meant for *Podiceps*. I cannot find any reference to the specific name. This difficulty seems to have occurred to Professor Fuhrmann,¹ who lists the tapeworms under *Lophaethia cristata*, Linn., (M. 67, H. 741) the tippet-grebe. Mr. A. J. North kindly informed me that Krefft's *P. australis* is really *P.*

¹ Fuhrmann, "Die Cestoden der Vögel," *Zoolog. Jahrb.*, Suppl. Bd. x, Heft 1, 1908, p. 133.

novaehollandiae, hence it is under this host that the parasites should in future be placed. Fuhrmann¹ has suggested that *Taenia novaehollandiae* may be *Dioicocestus*. I prefer to leave it as *T. novaehollandiae* until Krefft's types shall have been re-examined.

The name *Taenia paradoxa* is preoccupied having been used by Rudolphi in 1809 for a cestode infesting species of *Scolopax*, *Charadrius*, and *Gallinago*. Rudolphi's parasite (= *Choanotaenia paradoxa*, Rud.) is quite distinct from Krefft's species, which, like his *T. novaehollandiae*, possesses doubled genitalia in each segment, a fact not mentioned by Krefft in regard to his *T. paradoxa*. The types are so badly preserved that it is difficult to say whether *T. paradoxa* and *T. novaehollandiae* are distinct, and accordingly I have refrained from re-naming *T. paradoxa*, Krefft, until I have made out the anatomy of both species.

Many parasites have been described from *L. cristata* from other parts of the world, but not from Australia.

Krefft does not give a definite locality for most of his specimens.

Order SPHENISCIFORMES.

Family SPHENISCIDÆ.

11. *Aptenodytes* sp. A penguin.

Cestoda:—*Taenia zederi*, Baird, *Proc. Zool. Soc. Lond.*, 1853, p. 24 (Antarctic); Baird, *Ann. Mag. Nat. Hist.*, (Ser. 2), 1855, p. 75; Baird, "Catalogue of Entozoa in British Museum," 1853, p. 85.

This parasite was obtained from the stomach of an Antarctic penguin. Baird does not mention any scientific name for the host. Krefft² merely quoted Baird's reference. Diesing³ placed the parasite under *Aptenodytes* sp. Lin-

¹ *Loc. cit.*, p. 88.

² Krefft, *Trans. Entomol. Soc. N. S. Wales*, ii, 1871, p. 211.

³ Diesing, *Sitzb. d. K. Akad. Wien.*, XLIX, 1864, p. 417. †

stow¹ and Fuhrmann² have followed Diesing. Krefft and Sweet³ have given the host as a penguin, following Baird. Krefft called the worm *T. cederi*. The common penguin in Antarctica appears to be the Emperor penguin, *Aptenodytes fosteri*, Gray (M. 68, H. —), this being as far as I know the only species of that genus found in those regions. Probably the assumption that Baird's specimen came from an *Aptenodytes* is correct. Fuhrmann⁴ in 1899 suggested that *T. zederi* might be a synonym of *Tetrabothrius macrocephala*, Rud., but in 1908 he⁵ regarded it as an undefined species.

Order PROCELLARIIFORMES.

(A) Family PUFFINIDÆ.

12. *Priocella glacialoides*, Smith (Syn. *Thalassoeca glacialoides*, Smith), (M. 87, H. 677). The silver-grey petrel.

Cestoda:—*Tetrabothrius heteroclitus*, Dies. Linstow, "Report on the Entozoa," in Challenger Report, Zoology, XXIII, 1888, p. 14. (Southern Ocean—Antarctic.)

This species was taken by the Challenger Expedition, from *Priocella glacialoides* and from the Cape Petrel, *Daption capensis*, Linn. (M. 101, H. 688), the latter bird being captured in the South Atlantic and consequently, is not included here. The parasite was described by Linstow as *Tetrabothrium auriculatum*, Linst., but Fuhrmann⁶ has shown that both this species and *Taenia suliceps*, Baird, are synonyms of *Tetrabothrius heteroclitus*, Dies.

(B) Family DIOMEDEIDÆ.

13. *Diomedea albatrus*, Pall. (Syn. *D. brachyura*, Temm.) (M. 108, H. 696). The short-tailed Albatross.

¹ Linstow, "Compendium der Helminthologie," 1878, p. 175.

² Fuhrmann, *Zool. Jahrb. Suppl.*, 1908, l.c., p. 136.

³ Sweet, *Proc. Roy. Soc. Victoria*, (n.s.) XXI, 1908, p. 478.

⁴ Fuhrmann, *Centr. f. Bakt.*, I, Orig., XXV, 1899, p. 873.

⁵ Fuhrmann, *Zool. Jahrb.*, Suppl. X, 1908, p. 93.

⁶ Fuhrmann, *Centr. f. Bakt.*, I, Orig., XXV, 1899, p. 874.

Cestoda:—i. *Tetrabothrius torulosus*, Linstow, "Report on the Entozoa," Challenger Report, Zoology, 1888, p. 14.

This was described very briefly by Linstow from specimens collected in the Pacific Ocean, probably to the north of Australia. The inclusion of this and the following parasites from this host in our known Australian entozoan fauna is thus doubtful. Fuhrmann¹ gave much fuller account of the worm in 1899.

ii. *Tetrabothrius heteroclitus*, Dies., Linstow, *l.c.*, 1888, p. 13.

Linstow examined some headless fragments also obtained by the Challenger and described them as belonging to a new species *Taenia diomedae*, Linst., though he stated that this might be identical with *Taenia suliceps*, Baird,² a parasite collected from *Diomedea exulans*, Linn. Fuhrmann³ showed that *T. diomedae*, Linst., *T. suliceps*, Baird, and *Tetrabothrium auriculatum*, Linst., were all synonymous with *Prosthecoctyle* (i.e. *Tetrabothrius*) *heteroclita*, Dies.

Nematoda:—*Ascaris diomedae*, Linstow, *l.c.*, 1888, p. 6.

This round worm was taken from the stomach.

14. *Diomedea exulans*, Linn. (M. 109, H. 695). The great wandering albatross.

Cestoda:—*Tetrabothrius diomedae*, Fuhrmann in Shipley, (*vide infra*) p. 557. Shipley, "Entozoa" in Willey's Zoological Results, v, 1900. p. 557, (Western Pacific to N.E. of Australia?)

These specimens were collected by Dr. Willey during his expedition to the islands lying to the north-east of Australia. The species in question was described by Fuhrmann as *Prosthecoctyle diomedae*, and published along with

¹ Fuhrmann, *Centr. f. Bakt., Orig.*, xxv, 1899, p. 871; *Proc. Roy. Soc. Edinb.*, xxii, 1899, p. 643.

² Baird, *Proc. Zool. Soc. Lond.*, 1859, p. 111; *Ann. Mag. Nat. Hist.*, (3) iv, 1859, p. 240.

³ Fuhrmann, *Centr. f. Bakt. Orig.*, xxv, 1899, p. 874; *Proc. Roy. Soc. Edinb.*, xxii, 1899, p. 648.

some further notes by Shipley, in the latter's account of the entozoa collected by Willey. *Prosthecoctyle* is now generally regarded as a synonym of *Tetrabothrius*.

Nematoda:—*Gnathostoma shipleyi*, Stossich, *Boll. Soc. Adriat.*, xx, 1900, and in Shipley (*vide infra*) p. 561. Shipley, *l.c.*, p. 560. (Western Pacific, etc.)

This interesting worm was also collected by Willey.

Order LARIFORMES.

Family LARIDÆ.

15. *Sterna bergii*, Licht. (M. 125, H. 647). The crested tern.

Trematoda:—*Holostomum musculosum*, Johnston, (S. J.), *Proc. Linn. Soc. N. S. Wales*, xxix, 1904, p. 112. (New South Wales.)

Though several parasites have been described from this host, the above mentioned is the only reference known to me, dealing with the identification of forms collected in Australia.

16. *Larus novae-hollandiae*, Steph. (M. 137, H. 659). The silver gull.

Trematoda:—*Holostomum Hillii*, Johnston, (S. J.), *l.c.*, 1904, p. 111. (New South Wales.)

Order CHARADRIFORMES.

Family CHARADRIIDÆ.

17. *Haematopus fuliginosus*, Gld., (Syn. *H. unicolor*, Wagl) (M. 145, H. 602). The sooty oyster catcher.

Linstow¹ described a tapeworm *Taenia increscens*, Linst. obtained from this bird in New Zealand by the Challenger Expedition. It is still imperfectly known and I am not including it in this list of Australian entozoa.

18. *Charadrius dominicus*, Müll. (M. 151, H. 608). The lesser golden plover.

¹ Linstow, *l.c.*, 1888, p. 13.

I have taken from the intestine of this bird some small cylindrical distomid trematodes (*Echinostomum* sp.) whose anterior end is provided with a circlet of hooks. (Near Sydney, N. S. Wales.)

19. *Himantopus leucocephalus*, Gould, (M. 161, H. 618).
The white headed stilt.

Trematoda:—*Monostomum* sp.

Dr. Cleland collected a number of flukes belonging to the Monostomidæ and apparently to this genus. They were found in the oesophagus and in the body cavity of the bird. I cannot state which was the correct habitat, as there was a perforation of the wall of the alimentary canal. (Murray River, South Australia).

Cestoda:—i. *Taenia coronata*, Krefft, *l.c.*, p. 220. (N.S.W.)

ii. *Taenia rugosa*, Krefft, *l.c.*, p. 223. (N.S.W.)

Both of these species are insufficiently described, and have not as a consequence, been assigned to their true genera. Fuhrmann¹ lists them under the imperfectly known forms.

In regard to *T. rugosa*, Krefft, the specific name *rugosa* was already preoccupied in the genus *Taenia* being used by Diesing² for a tapeworm from the small intestine of a Brazilian monkey, *Cebus (Eriodes) hypoxanthus*. Consequently Krefft's species requires re-naming. I would suggest that this worm be dedicated to my friend, Mr. Charles Hedley, Assistant Curator of the Australian Museum, Sydney. As I hope to point out in a later communication, this parasite is not a *Taenia*, but belongs to the family *Acoleidae*, and probably to the genus *Acoleus*. Accordingly the helminth may be listed temporarily as *Acoleus hedleyi*, nom. nov. Dr. Cleland has recently

¹ Fuhrmann, *Zool. Jahrb.*, Suppl. *l.c.*, 1908, p. 93.

² Diesing, "Systema helminthum, i, 1850, p. 502.

collected the same species from the intestine of the above named stilt, at Tailem Bend, Murray River, South Australia.

The name *Taenia coronata* was already used by Creplin for a cestode which also infests Charadriid birds (*Edicnemus crepitans*, Temm. and *Ægialites nivosa*, Cass). A comparison between Krefft's species and the description of *T. coronata*, Crepl. (= *Choanotaenia coronata*, Crepl.) as given by Diesing¹ and Krabbe, shows them to be distinct. As a specific name, *australiensis* might be given. A brief examination of Krefft's type leads me to regard it as a *Dilepis*. Both *Acoleus hedleyi* and *Dilepis australiensis* will form subjects for further study, as the Curator of the Australian Museum has kindly given me access to the type material.

iii. *Davainea* sp.

I have identified as belonging to this genus some very small tapeworms of about two mm. in length, and consisting of about a dozen segments, collected by Dr. Cleland from a bird shot at Tailem Bend, Murray River, South Australia.

iv. *Hymenolepis* sp.

A rather small unarmed species of this genus was also collected by Dr. Cleland from the intestine of the same bird. (Murray River, South Australia.)

Order ARDEIFORMES.

(A) Family CICONIIDÆ (CICONIINÆ in "Matthews' Handlist")

20. *Xenorhynchus asiaticus*, Lath., (M. 199, H. 723). The jabiru or black-necked stork.

Cestoda:—*Clelandia parva*, Johnston, (T. H.), *Jour. Proc. Roy. Soc. N. S. Wales*, XLIII, 1909, p. 139. (N. S. Wales.)

There is a slight doubt as to the true host of this parasite.

¹ Diesing, *l.c.*, p. 537. * Krabbe, *l.c.*, p. 275.

(B) Family ARDEIDÆ.

21. *Herodias timoriensis*, Less. (syn. *H. alba*, Gld. nec Linn.) (M. 203, H. 710). The white egret.

Trematoda:—*Distomum* sp., Krefft, l.c., p. 213. (New South Wales or Queensland.)

22. *Notophox novae-hollandiae*, Lath., (syn. *Ardea novae-hollandiae*, Lath.) (M. 204, H. 711.) The white-fronted heron.

Trematoda:—*Holostomum simplex*, Johnston, (S. J.), *Proc. Linn. Soc. N. S. Wales*, xxix, 1904, p. 112. (N.S.W.)

23. *Notophox pacifica*, Lath. (syn. *Ardea pacifica*, Lath.) (M. 215, H. 712). The white-necked heron or pacific crane.

Trematoda:—*Distomum* sp., Krefft, l.c., p. 213. (N.S.W. or Queensland).

24. *Nycticorax caledonicus*, Gmelin (M. 210, H. 717). The night heron or Nankin crane.

Nematoda:—*Ascaris* sp. (an immature female) Linstow, *Arch. f. Naturg.*, LXIII, 1897, p. 283. (Bismarck Archipelago.)

Nicholls¹ mentioned finding tapeworms in this host in Victoria, but the reference has no scientific value.

Many entozoa are known from some members of this family which are found in Australia, e.g. *Ardea cinerea*, Linn., *Herodias timoriensis*, Less., etc., but since they have not been recognised in Australia, they are not included in this list.

Order ANSERIFORMES.

Family ANATIDÆ.

25. *Chenopsis (Chenopsis) atrata*, Lath. (syn. *Cygnus atratus* Lath.) (M. 216, H. 744). The black swan.

Trematoda:—i. *Hemistomum intermedium*, Johnston, (S. J.), *Proc. Linn. Soc. N. S. Wales*, xxix, 1904, p. 110. (N.S.W.)

¹ Nicholls, *Victorian Naturalist*, xxi, 1904-5, p. 147.

ii. *Monostomum* sp.

I have some large flukes (family *Monostomidæ*) belonging to this genus, taken from the pharynx of a black swan in Victoria, by Mr. A. S. Le Souef.

Krabbe¹ in 1869 described a cestode *Taenia liophallos* (= *Hymenolepis liophallos*, Krabbe) from Leuckart's collection, taken from this host. He also² gives a very brief account of *Taenia micrancristota*, Wedl.³ (= *Hymenolepis micrancristota*, Wedl.) described from material collected in Hungary. Linstow⁴ recorded both of these tapeworms under this host. Fuhrmann⁵ does not place either of these under this bird, but under *Cygnus musicus*, Bechst. Ransom⁶ lists the two under *Olor cygnus*, Linn. Sharpe⁷ regards both *C. musicus* and *O. cygnus* as synonyms of *Cygnus cygnus*, Linn.

Besides the above cestodes, a nematode, *Heterakis vesicularis*, Rud. (= *H. papillosa*, Bloch) has been recorded by Schneider⁸ as being taken from the caecum of *Chenopsis atrata* in the Zoological Gardens, Berlin. He mentioned that the bird had lived a long time in the Gardens and consequently the occurrence of this parasite in Australia did not necessarily follow. In 1906, Linstow⁹ gave an account of another nematode *Heterakis circumvallata*, Linst., from this bird (Königsberg Museum) but no locality is given.

Both Sharpe⁷ and Matthews¹⁰ give the range of this bird as "Australia generally and Tasmania." It has been

¹ Krabbe, *Bidrag til Kundskab om Fuglenes Bændelorme*, 1869, p. 43.

² Krabbe, *l.c.*, p. 43.

³ Wedl., *Sitzb. d. K. Akad.*, Wien., VIII, p. 6.†

⁴ Linstow, "Compendium der Helminthologie," 1878, p. 150.

⁵ Fuhrmann, *Zool. Jahrb.*, Suppl. Bd., x, Heft 1, 1908, p. 149.

⁶ Ransom, "Smithsonian Instit. U.S. Nat. Museum, Bull. 69," 1909, pp. 94, 111.

⁷ Sharpe, "Handlist of Birds," Vol. I, 1899, pp. 207, 208.

⁸ Schneider, "Monographie der Nematoden," 1866, p. 76.

⁹ Linstow, *Arch. f. Naturg.*, 1906, I, (3) p. 251.

¹⁰ Matthews, "Handlist of the Birds of Australasia," 1908, p. 34.

introduced into Europe, and has apparently become parasitised by helminths which occur normally in other birds. I am omitting the cestodes and nematodes from this list of Australian avian entozoa.

26. *Anas superciliosa*, Gmel., (M. 226, H. 753). The black duck.

Cestoda:—i. *Taenia cylindrica*, Krefft, *l.c.*, p. 220, (N.S.W. or Queensland.)

ii. *Taenia flavescens*, Krefft, *l.c.*, p. 219. (N.S.W. or Queensland.)

iii. *Taenia bairdii*, Krefft, *l.c.*, p. 224. (N.S.W. or Queensland.)

iv. *Fimbriaria pediformis*, Krefft, *l.c.*, p. 222. (N.S.W. or Queensland.)

Unfortunately none of Krefft's species are recognisable from his figures and descriptions, and but for the fact that his types (or at any rate most of them) have been preserved, one would be justified in disregarding them. The three first mentioned cestodes are very imperfectly described. Their true generic position is unknown. The fourth species which was described as *Taenia pediformis*, also infests the teal (*Nettion castaneum*, Eyton). Fuhrmann¹ suggests that this species is probably a synonym of *Fimbriaria fasciolaris*, Pall. A cursory examination of the single specimen of *T. pediformis* now in the Australian Museum, Sydney, leads me to think that Fuhrmann is right. A thorough examination of Krefft's type would decide the question of identity. Miss Sweet² wrongly quotes Krefft in reference to the occurrence of *Taenia malleus*, G., (i.e. *Fimbriaria fasciolaris*, Pall.) in Australia.

27. *Nettion (Nettion) castaneum*, Eyton, (syn. *Anas castaneum*, Eyton). (M. 227, H. 754). Teal.

¹ Fuhrmann, *Zool. Jahrb.*, Suppl. Bd. x., Heft 1, 1908, p. 91.

² Sweet, *Proc. Roy. Soc., Victoria*, (n.s.) xxi, 1908, p. 476.

Protozoa:—*Halteridium nettii*, Johnston, T. H. and Cleland, in *Proc. Linn. Soc. N.S.W.*, 1909, p. 503. (N.S.W.)

This sporozoan infests the red-blood corpuscles. It was first published under the name *H. nettionis*, a "lapsus calami" for the genitive *H. nettii*.

Cestoda:—*Fimbriaria pediformis*, Krefft, *l.c.*, p. 222. (N. S. Wales or Queensland.)

Krefft gives *Anas punctata* as the host of this worm. Mr. North informed me that the name of this species is *N. castaneum*, Eyton. Linstow does not mention this host in the Supplement to his Compendium.

28. *Spatula rhynchotis*, Lath. (M. 231, H. 757). The blue-winged shoveller.

Cestoda:—*Taenia flavescens*, Krefft, *l.c.*, p. 219. (N.S.W. or Queensland.)

This tapeworm also occurs in *Anas superciliosa*.

29. *Aythya australis*, Gould (syn. *Nyroca australis*, Gld.) (M. 234, H. 761). The white-eyed duck or widgeon.

Cestoda:—*Diploposthe tuberculata*, Krefft, *l.c.*, p. 215. (N.S.W. or Queensland.)

This tapeworm was indifferently described by Krefft as *Taenia tuberculata*. Monticelli¹ regarded it as a synonym of *Taenia bifaria* v. Sieb. In 1891 Blanchard² suggested that it might belong to the genus *Ophryocotyle*. Diamare³ in 1900 referred to the imperfect account given by Krefft. Fuhrmann⁴ in 1906 showed that *T. bifaria* was identical with *Diploposthe laevis*, Bloch, and stated that *T. tuberculata* was almost certainly a *Diploposthe* and perhaps synonymous with *D. laevis*, though the wide difference in the geographical distribution of the hosts in each case led

¹ Monticelli, *Boll. della Soc. d. nat. in Napoli*, v, 1891, p. 151.

² Blanchard, *Mem. Soc. Zool. France*, iv, 1891, p. 443.

³ Diamare, *Centr. f. Bakt. etc.*, xxviii, 1900, p. 849.

⁴ Fuhrmann, *Centr. f. Bakt.*, I, Orig., xl, pp. 217-224.

him to regard it as being probably a different species. My examination of Krefft's material shows that the parasite is a typical *Diploposthe*, but I am not yet certain of its identity or otherwise, with *D. laevis*. Fuhrmann¹ in 1908 listed it as a different species, viz., *D. (?) tuberculata*, the specific name being evidently a misprint for *tuberculata*.

30. *Biziura lobata*, Shaw (M. 236, H. 763). The musk duck.

Cestoda:—*Taenia moschata*, Krefft, l.c., p. 223. (N.S.W. or Queensland.)

An imperfectly known form.

Order PELICANIFORMES.

Family PLOTIDÆ.

31. *Plotus novae-hollandiae*, Gould (M. 242, H. 729.) The darter.

Nematoda:—*Ascaris* sp., Krefft, l.c., p. 213. (N.S.W. or Queensland.)

No parasites appear to have been identified from Australian material collected from members of other families (e.g. *Phalacrocoracidae*, *Pelicanidae*, etc.) belonging to this order of birds.

Order ACCIPITRIFORMES.

Family FALCONIDÆ.

32. *Circus spilothorax*, Salvad. and D'Alb. A harrier.

Nematoda:—*Heterakis dolichocerca*, †Stossich, *Boll. Mus. Genova*, 1902 No. 106. (New Guinea.)

33. *Astur fasciatus*, Vig. and Horsf. (syn. *A. approximans*, Vig. and Horsf.). (M. 258, H. 24.) The goshawk.

Acanthocephala:—*Echinorhynchus* sp.

I have taken this worm, a comparatively long and thin parasite, from the intestine. (Near Sydney, N.S.W.)

¹ Fuhrmann, *Zool. Jahrb.*, Suppl., Bd. x, 1, 1908, p. 85.

34. *Baza bismarcki*, Sharpe. A crested hawk.

Nematoda:—*Ascaris australis*, Linstow, *Arch. für Naturg.*, LXIII, 1897, p. 282. (Bismarck Archipelago.)

The parasite was taken from the stomach of this bird. The same species has been described as inhabiting the intestine of an owl, *Ninox odiosa*, Scl. (vide infra).

35. *Falco lunulatus*, Lath. (M. 277, H. 15.) The little falcon (white-fronted falcon).

Nematoda:—*Filaria* sp.

Some long nematodes collected by Dr. Cleland from the mesentery of this falcon at Burracoppin, West Australia in 1907, belong to this genus.

36. *Hieracidia berigora*, Vig. and Horsf. (M. 278, H. 16). The striped brown hawk.

Nematoda:—*Filaria guttata*, Schneider, "Monogr. d. Nematoden," 1866, p. 92. (South Australia.)

Order STRIGIFORMES.

Family BUBONIDÆ.

37. *Ninox odiosa*, Sclater.

Nematoda:—i. *Filaria* sp., Linstow, *Arch. f. Naturg.*, LXIII, 1897, p. 284. (Bismarck Archipelago.)

The specimens were taken from the body cavity, and since they were immature, could not be specifically determined.

ii. *Ascaris australis*, Linstow, *l.c.*, p. 282. (Bismarck Archipelago.)

As mentioned above, this parasite occurs also in a hawk *Baza bismarcki*, Sharpe.

38. *Ninox boobook*, Lath. (M. 283, H. 29). The boobook owl

Keartland¹ mentions that he found great numbers of thread worms between the skin and the skull of this bird, but his reference is of no value for the purpose of this paper.

¹ Keartland, *Victorian Naturalist*, XXI, 1904-5, p. 147.

Order PSITTACIFORMES.

(A) Family LORIIDÆ.

39. *Lorius erythrothorax*, Salvad.

Cestoda:—*Moniezia trichoglossi*, Linstow, Diamare, *Centr. f. Bakt.*, I, Orig., XXVIII, 1900, p. 846; and †*Boll. Mus. Zool. Anat. comp.*, Genova, No. 91, 1900. (New Guinea.)

40. *Trichoglossus novae-hollandiae*, Gmel. (syn. *T. swainsoni*, Jard. and Selby). (M. 301, H. 468). Blue-bellied lorikeet or Blue Mountain lorikeet.

Nematoda:—*Filaria sp.*, Bancroft, *Proc. Roy. Soc. Queensland* VI, 1890, p. 61. (Queensland.)

Bancroft found embryo-filariæ (*Microfilaria*) in the blood of this bird.

Cestoda:—*Moniezia trichoglossi*, Linstow, "Report on Entozoa Challenger Rep.," *Zool.*, XXIII, 1888, p. 14. (North Queensland.)

(B) PSITTACIDÆ.

41. *Eclectus pectoralis*, Müll. The purple-breasted parrot.

Nematoda:—*Hystrichis sp.*?

I have a few specimens of a nematode (*Strongylidae*) apparently belonging to this genus, taken from this host by Mr. A. S. Le Souef, the parrot coming originally from New Guinea.

(C) Family CYCLOPSITTACIDÆ.

42. *Cyclopsittacus suavissimus*, Sclater (syn. *S. nanus*, De Vis.)

Cestoda:—*Moniezia trichoglossi*, Linstow, Diamare, *Centr. f. Bakt.*, I, Orig., XXVIII, 1900, p. 846; and †*Boll. Mus. Zool. Anat. Comp. Genova*, No. 91, 1900. (New Guinea.)

43. *Cyclopsittacus diophthalmus*, Hombr. and Jacq.

Cestoda:—*Moniezia Beauforti*, Janicki, † in "Nova Guinea Rés. Expéd. Sc. Néerlandaises," Nouvelle Guinea, v, 1906. (New Guinea.)

(D) Family CACATUIDÆ.

44. *Cacatua roseicapilla*, Vieill. (M. 324, H. 489.) The Rose-breasted Cockatoo (Galah).

Cestoda :—*Davainea leptosoma*, Dies. (Australia.)

I have not been able to find the reference to the occurrence of this tapeworm in above-named cockatoo, and am giving this reference, *fide* Fuhrmann¹ (1908).

A good deal of discussion has taken place regarding the correct nomenclature of one of the above cestodes, *Moniezia trichoglossi*. It was originally described by Linstow² from fragmental material collected by the Challenger Expedition from *Trichoglossus novae-hollandiae*. He regarded it as a new species, and called it *Taenia trichoglossi*. In 1900, Diamare³ described a parasite from *Cyclopsittacus suavisimus* and *Lorius erythrothorax*, which he named *Paronia carrinoi*, this being the type of a new genus *Paronia*. In 1901, he⁴ mentioned that *P. carrinoi* was probably identical with *T. trichoglossi*, but thought that his name should stand as the correct one on account of the imperfect description of the latter. In 1901 Fuhrmann⁵ after having examined Linstow's original material, stated that these two worms were identical, and that the genus *Paronia* was probably synonymous with *Moniezia*. He however retained the name *P. carrinoi*. In 1902,⁶ he gave a much fuller account of the parasite, definitely assigning it to *Moniezia*. In a footnote to this paper, Dr. M. Braun (p. 122) mentioned that if *T. trichoglossi* were found to be identical with *P. carrinoi*, then in spite of the insufficient original description the former name must stand. In other words he

¹ Fuhrmann, *Zool. Jahrb.*, l.c., 1908, p. 160.

² Linstow, 1888, l.c., p. 14.

³ Diamare, *Centr. f. Bakt. etc.*, xxviii, 1900, p. 846; †*Boll. Mus. Zool. Anat. Comp. Genova*, No. 91, 1900.

⁴ Diamare, l.c., xxx, 1901, p. 369.

⁵ Fuhrmann, *Centr. f. Bakt. etc.*, xxix, 1901, p. 758; *Zool. Anz.*, xxiv, 1901, p. 273. ⁶ *Id.*, *Cent. f. Bakt.*, cit., xxxii, 1902, p. 122.

believed that the name should be *Paronia* (i.e. *Moniezia*) *trichoglossi*. Meanwhile Linstow,¹ in a short note on this subject, pointed to the fragmentary and scolex-less condition of his material and the imperfect knowledge of cestode anatomy in 1888 as reasons for his incomplete descriptions. He went on to say that he did not regard *T. trichoglossi* as a specific name but merely as a name to indicate an undefined *Taenia* from *Trichoglossus*. Fuhrmann² in 1908 gave a very brief summary of the above discussion, and accepted *M. carrinoi*, Diam., as the true name. I have listed the parasite under Linstow's name, as it seems to me that Braun's contention is right even in the face of Linstow's remarks, and that the correct name is *Moniezia trichoglossi*, Linstow. In his original account, Linstow himself called it a new species, consequently his giving it a binomial name and a description, though short and incomplete, is sufficient ground for retaining his name for the cestode, especially as his types were still available. Had the specimens been lost, then the species might reasonably have been disregarded as not being identifiable from the account. But the re-examination of the types having led to the establishing of identity between it and the later described *M. carrinoi*, the latter name must fall into synonymy.

Order COCCYGES.

Family CUCULIDÆ.

45. *Centropus* (*Nesocentor*) *ateralbus*, Less.

Nematoda:—*Filaria* sp., Linstow, *Arch. f. Naturg.*, XLIII, 1897, p. 284. (Bismarck Archipelago.)

This parasite, a female, was taken from the body cavity of the above mentioned cuckoo.

¹ Linstow, *Centr. f. Bakt. etc.*, xxxi, 1902, p. 32.

² Fuhrmann, *Zool. Jahrb.*, Suppl. Bd. x, Heft 1, 1908, p. 38.

Order CORACIIFORMES.

(A) Family PODARGIDÆ.

46. *Podargus strigoides*, Lath. (M. 376, H. 437). The tawny frogmouth (More-pork).

Nematoda:—*Filaria* sp., Bancroft, *Proc. Roy. Soc. Queensland*, VI, 1890, p. 62. (Queensland.)

Bancroft found embryo-filariae (*Microfilaria* sp.) in the blood.

(B) Family CORACIIDÆ.

47. *Eurystomus pacificus*, Lath. (syn. *E. australis*, Swainson). (M. 381, H. 441.) The dollar-bird or roller.

Nematoda:—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

Filarial embryos (*Microfilaria*) were seen in the blood.

(C) Family ALCEDINIDÆ.

48. *Dacelo gigas*, Bodd. (M. 386, H. 447). The laughing jackass or brown kingfisher.

Protozoa:—*Halteridium* sp. (N.S. Wales.)

I have seen a blood-film containing this sporozoan.

Trematoda:—*Hemistomum triangulare*, Johnston, (S.J.) *Proc. Linn. Soc. N.S.W.*, XXIX, 1904, p. 108. (N.S. Wales.)

Cestoda:—*Similuncinus daceionis*, Johnston, (T. H.), *Rec. Austr. Mus.*, VII, 1909, p. 246. (N.S. Wales.)

49. *Halcyon (Saurophaga) saurophaga*, Gould. A kingfisher
Trematoda:—*Distomum porrectum*, Braun., *Centr. f. Bakt.*, I, Orig., XXV, 1899, p. 714. (Bismarck Archipelago).

50. *Halcyon (Sauropatis) sanctus*, Vig. and Horsf. (M. 391, H. 452). The sacred kingfisher.

Acanthocephala:—*Echinorhynchus horridus*, Linstow, *Arch. f. Naturg.*, LXIII, 1897, p. 290. (Bismarck Archipelago.)

I have seen a specimen of *Echinorhynchus* sp. taken from this host in New South Wales, but have not examined it sufficiently to be able to compare it with *E. horridus*.

Order PASSERIFORMES.

(A) Family MUSCICAPIDÆ.

51. *Petroeca goodenovii*, Vig. and Horsf. (M. 444, H. 93.)
The red-capped robin.

Cestoda :—*Hymenolepis* sp. (Hallett's Cove, South Australia).

Imperfect scolexless fragments were taken by me from a specimen collected by Dr. Cleland.

52. *Myiagra rubecula*, Lath. (syn. *M. plumbea*, Vig. and Horsf.) (M. 488, H. 143). The leaden flycatcher.

Nematoda :—*Filaria* sp., Bancroft, l.c., p. 61. (Queensland.)

This *Microfilaria* was found in the blood.

53. *Myiagra nitida*, Gould. (M. 490, H. 144.) The satin flycatcher.

Protozoa :—*Halteridium* sp.

A sporozoan found by Dr. Cleland and myself in the blood of this bird (N.S. Wales).

(B) Family CAMPOPHAGINÆ.

54. *Coracina sclateri*, Finsch., (syn. *Graucalus sclateri*, Finsch.) A cuckoo-shrike.

Nematoda :—*Diplotrriaena tricuspis*, Fedtsch., Linstow, *Arch. f. Naturg.*, LXIII, 1897, p. 283 ; and *Mitth. Zool. Samml. Mus. Naturk.*, Berlin, I, (2) 1899, p. 25. (Bismarck Archipelago.)

This parasite has been taken from the body cavity of *Coracina sclateri*, *Cisticola exilis* and *Calornis metallica*, in the Australian region as well as from a great number of song-birds in other parts of the world. Linstow in 1897 recorded the worm as *Filaria tricuspis*, but in 1905¹ he removed it to the genus *Aprocta*. Quite recently Railliet and Henry² have placed the species under *Diplotrriaena*.

¹ Linstow, *Arch. f. Naturg.*, LXXI, 1905, p. 273.

² Railliet and Henry, *Bull. Soc. Path. Exotique*, III, 1910, p. 154.

(C) Family TIMELIIDÆ.

55. *Psophodes crepitans*, Lath. (M. [526, H. 223). The coachwhip bird.

Acanthocephala :—*Echinorhynchus* sp.

I have taken specimens from birds collected by Dr. J. B. Cleland (Sydney).

56. *Pomatorhinus frivolus*, Lath. (syn. *Pomatostomus temporalis*, Vig. and Horsf.) (M. 529, H. 226.) The babbler.

Nematoda :—*Filaria* sp., Bancroft, l.c., p. 61. (Queensland.)

Microfilaria seen in the blood.

57. *Pomatorhinus superciliosus*, Vig. and Horsf. (syn. *Pomatostomus superciliosus*, Vig. and Horsf.) (M. 530, H. 227.) The white-browed babbler.

Protozoa :—*Halteridium* sp. (Hallett's Cove, Adelaide, S. Australia.)

This parasite has been detected by Dr. Cleland and myself in the red blood corpuscles of this bird. It possesses large pigment granules.

Acanthocephala :—*Echinorhynchus* sp.

Specimens were collected by Dr. Cleland at Hallett's Cove, near Adelaide, South Australia. They were encysted in the subcutaneous tissues of the neck and throughout the body, also in the fascial layer between the thoracic muscles, sometimes deeply embedded, apparently also occasionally in the muscle-substance itself surrounded by a small area of disintegration. This parasite occurs in similar situations in *Pomatorhinus rubeculus* and *Climacteris wellsi* in West Australia, and in *Aphelocephala leucopsis* in S. Australia.

58. *Pomatorhinus rubeculus*, Gould (syn. *Pomatostomus rubeculus*, Gld.) (M. 532, H. 229). The red-breasted babbler.

Acanthocephala :—*Echinorhynchus* sp.

This parasite was identified by me from material collected by Dr. Cleland on the Shaw River in the north-west of West Australia. Their position was remarkable, the worms being embedded in the subcutaneous tissues and in the superficial muscles, reminding one of the Trematode *Monostomum faba*, Bremser, which lives in a similar situation in many passerine birds in Europe.

(D) Family TURDIDÆ.

59. *Oreocichla lunulata*, Lath. (syn. *Geocichla lunulata*, Lath.) (M. 544, H. 160.) The mountain thrush.

Protozoa :—*Halteridium geocichlae*, Cleland and Johnston, *Journ. Roy Soc. N.S.W.*, XLIII, 1909, p. 85. (N.S.W.)

This sporozoon infests the erythrocytes of the blood.

Nematoda :—*Filaria* sp. (*Microfilaria* sp.)

I have seen filarial embryos in a blood film made by Dr. Cleland. (N.S.W.)

Acanthocephala :—*Echinorhynchus* sp.

A specimen has been identified by me from material collected by Dr. Cleland from the intestine of this bird. (N.S.W.)

(E) Family SYLVIIDÆ.

60. *Cisticola exilis*, Vig. and Horsf. (M. 552, H. 186.) The grass warbler.

Nematoda :—*Diplotrinaena tricuspis*, Fedtsch. Linstow, *Arch. f. Naturg.*, LXIII, 1897, p. 283, and *Mitth. Zool. Samml. Mu. Naturk.*, Berlin, I, (2), 1899, p. 25. (Bismarck Archipelago.)

This parasite lives in the body cavity and also infests *Coracina sclateri*, *Calornis metallica*, and other birds, mainly passerines. (See No. 54.)

(F) Family LANIIDÆ.

61. *Gymnorhina tibicen*, Lath. (M. 647, H. 243). The black-backed magpie.

Nematoda ;—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

Bancroft recorded the occurrence of embryos in the blood of this host. Dr. Cleland and I have also met with a *Microfilaria* in blood films from a local bird. (N.S.W.)

62. *Craticus destructor*, Temm. (syn. *C. torquatus*, Lath.) (M. 658, H. 252.) The butcher bird or collared crow-shrike.

Nematoda :—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

The embryos (*Microfilaria*) were seen in the blood, the adults inhabiting the peritoneal cavity.

(G) Family CERTHIIDÆ.

63. *Climacteris wellsi*, Grant.¹ A tree-creeper.

Acanthocephala :—*Echinorhynchus* sp.

This parasite lives in the subcutaneous tissues of the neck of this host. It also occurs in *Pomatorhinus rubeculus*, *P. superciliosus* and *Aphelocephala leucopsis*. The specimens were collected by Dr. Cleland on the Shaw River in the north-western portion of West Australia.

(H) PARIDÆ.

64. *Aphelocephala leucopsis*, Gould (syn. *Xerophila leucopsis*, Gld.) (M. 689, H. 239.) The white-faced tit-mouse.

Acanthocephala :—*Echinorhynchus* sp. (Hallet's Cove, S. Australia.)

This encysted parasite was collected by Dr. Cleland from the subcutaneous and superficial muscular tissues. It occurs in certain other birds such as *Pomatorhinus* and *Climacteris*.

(J) Family ZOSTEROPIDÆ.

65. *Zosterops caeruleus*, Lath. (M. 712, H. 301). The silver-eye.

Protozoa :—*Halteridium* sp.

This haematozoon has been frequently met with by Dr. Cleland and myself in blood films taken by us from this host (N.S.W.)

¹ Kindly identified by Mr. Gregory Matthews for Dr. Cleland.

(K) Family MELIPHAGIDÆ.

66. *Melithreptus atricapillus*, Lath. (syn. *M. lunulatus*, Shaw). (M. 733, H. 307.) Black-cap, or lunulated honey-eater.

Protozoa :—*Halteridium* sp.

This blood parasite has been seen by Dr. Cleland and myself (N.S.W.)

67. *Ptilotis chrysotis*, Lath. (syn. *P. lewini*, Swainson auct.) (M. 770, H. 329.) The yellow-eared honey-eater.

Cestoda :—*Choanotaenia* sp. (See also No. 69.)

Collected by Dr. Cleland at Milson Island, Hawkesbury River.

68. *Ptilotis chrysops*, Lath. (M. 775, H. 336.) The yellow-faced honey-eater.

Protozoa :—*Halteridium ptilotis*, Cleland and Johnston, *Journ. Proc. Roy. Soc. N.S. Wales*, XLIII, 1909, p. 77.

A blood parasite (N.S.W.)

69. *Ptilotis leucotis*, Lath. The white-eared honey-eater. (M. 778, H. 339).

Cestoda :—*Choanotaenia* sp.

A long thin tapeworm infests *Ptilotis leucotis*, *P. chrysotis*, *Meliornis novae-hollandiae* and *M. sericea*. Its scolex is small and unarmed, but otherwise its characters closely resemble those of the genus *Choanotaenia*. Specimens were taken from *P. leucotis* by Dr. Cleland at Milson Island, Hawkesbury River (N.S.W.).

70. *Ptilotis plumula*, Gould. (M. 787, H. 349). The plumed or yellow-fronted honey-eater.

Protozoa :—*Halteridium* sp.

This haemoprotozoon has been seen by Dr. Cleland and myself in films taken by him from a Western Australian specimen.

71. *Meliornis novae-hollandiae*, Lath. (M. 799, H. 354.)

The New-holland or whiskered honey-eater.

Protozoa :—*Halteridium meliornis*, Cleland and Johnston, *l.c.*, p. 85. (N.S.W.)

Cestoda :—*Choanotaenia sp.* (See also No. 69.)

Specimens were collected by Dr. Cleland in Sydney district.

Acanthocephala :—*Echinorhynchus sp.*

I have taken a specimen from the intestine (N.S.W.)

72. *Meliornis sericea*, Gould. (M. 801, H. 356.) The white-cheeked honey-eater.

Cestoda :—*Choanotaenia sp.* (See also No. 69.)

Specimens were collected by Dr. Cleland and myself in the Sydney district and by the former at Hawkesbury River.

73. *Myzantha garrula*, Lath. (syn. *Manorhina garrula*, Lath. (M. 804, H. 360.) Noisy minah or soldier bird.

Nematoda :—*Filaria sp.*, Bancroft, *l.c.*, p. 61. (Queensland.)

An adult was found in the peritoneal cavity whilst embryos (*Microfilaria*) were abundant in the blood.

74. *Acanthochoera carunculata*, Lath. (M. 808, H. 363.) The red-wattle bird (gill-bird).

Nematoda :—*Ascaris sp.*, Krefft, *l.c.*, p. 213. (N.S.W. or Queensland.)

Krefft merely stated that Mr. G. Masters had taken *Ascaris* from the eye of this host. The worms are very small and probably belong to the *Filariidae* and not to the *Ascaridae*.

75. *Annelobia lunulata*, Gould (syn. *Acanthochoera lunulata*, Gld.) (M. 811, H. 366.) The little wattle-bird.

Protozoa :—*Trypanosoma sp.*, seen by Dr. Cleland and myself in films kindly forwarded by Dr. Bancroft from Queensland. These films also showed the presence of two different species of *Microfilaria*.

Nematoda—*Filaria sp.*, Bancroft, *l.c.*, p. 61. (Queensland.)

Embryos (*Microfilaria*) were seen in the blood, an adult being found in the pericardium.

76. *Entomyza cyanotis*, Lath. (M. 813, H. 368). The blue-faced honey-eater.

Nematoda:—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

Embryos were detected in blood films.

77. *Tropidorhynchus corniculatus*, Lath. (syn. *Philemon corniculatus*, Lath.) (M. 818, H. 370.) The friar-bird (leatherhead.)

Protozoa:—*Halteridium philemon*, Cleland and Johnston, *l.c.*, p. 81. (N.S.W.)

This haematozoon was described from a local bird.

(L) Family ORIOLIDÆ.

78. *Oriolus sagittarius*, Lath. (syn. *Mimeta viridis*, Lath.) (M. 850, H. 82). The oriole.

Nematoda:—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

Embryos in the blood.

(M) Family DICRURIDÆ.

79. *Chibia bracteata*, Gould. (M. 854, H. 66.) The drongo.

Nematoda:—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

Embryos in the blood.

(N) Family EULABETIDÆ.

80. *Calornis metallica*, Temm. (M. 856, H. 400.) The shining starling.

Nematoda:—*Diplotrinaena tricuspis*, Fedtsch. Linstow, *Arch. f. Naturg.*, LXIII, 1897, p. 283; and *Mitth.. Zool. Samml. Mus. Naturk.*, Berlin, I, (2) 1899, p. 25. (Bismarck Archipelago.) (See also No. 54.)

This round worm is known to inhabit many other birds, including *Cisticola exilis* and *Coracina sclateri*.

(O) Family PTILORHYNCHIDÆ.

81. *Chlamydodera maculata*, Gould. (M. 861, H. 167.) The spotted bower bird.

Cestoda:—*Taenia chlamydoderae*, Krefft, *l.c.*, p. 225. New South Wales or Queensland.)

This imperfectly known tapeworm was described as *T. chlamydera*, this name being evidently derived from the generic name of the host (*Chlamydera maculata* in Krefft). Being a "lapsus calami" it may be altered to *T. chlamydoderae* as Linstow¹ and Fuhrmann² have already done.

82. *Sericulus chrysocephalus*, Lewin (syn. *S. melinus*, Lath.) (M. 866, H. 173.) The regent bird.

Nematoda:—*Filaria sp.*, Bancroft, *l.c.*, p. 61. (Queensland.) Embryos in the blood.

(P) Family PARADISEIDÆ.

83. *Craspedophora alberti*, Masters (syn. *Ptilorhis alberti*, Masters) (M. 870, H. 58.) The Albert rifle bird.

Cestoda:—*Biuterina clavulus*, Linstow, "Entozoa, Challenger Report," Zool., XXIII, 1888, p. 12. (Cape York North Queensland.)

This parasite was imperfectly described by Linstow as *Taenia clavulus*. Blanchard³ in 1891 thought that this species was probably a *Davainea*. Fuhrmann⁴ in 1902 gave a full account of a cestode from certain birds of paradise, which he called *Biuterina paradisea*, making it the type of his new genus *Biuterina*, but in 1908 he⁵ stated that his species was synonymous with *Taenia clavulus*, Linst., after having examined the original specimens collected by the Challenger Expedition. This parasite has been taken from several species of birds of paradise. Miss Sweet¹ misquotes Fuhrmann as her authority for stating that *Aporina alba*, Fuhrm. occurs in *Ptilorchis* (sic) *alberti*, whereas Fuhr-

¹ Linstow, "Compend. d. Helm.," Nachtrag, 1889, p. 36.

² Fuhrmann, Zool. Jahrb., Suppl. Bd. x, (1) 1908, p. 96, p. 179.

³ Blanchard, Mem. Soc. Zool. France, IV, 1891, p. 440; and Arch. d. Parasitol., II, 1899, p. 216.

⁴ Fuhrmann, Zool. Anz., xxv, 1902, p. 357.

⁵ Fuhrmann, Zool. Jahrb., 1908, *l.c.*, p. 68.

mann² states that this Anoplocephalid cestode was taken from a Brazilian parrot, *Pyrrhura* sp.

84. *Paradisea raggiana*, Sclater. Raggi's bird of paradise.
Cestoda:—*Biuterina clavulus*, Linst. Fuhrmann, *Zool. Anz.*, xxv, 1902, p. 357. (New Guinea.)

85. *Paradisea apoda*, Linn. The great bird of paradise.
Nematoda:—i. *Filaria flabella*, Linstow, "Entozoa, Challenger Report," *Zool.*, xxiii, 1888, p. 9. (Aru Islands.)

This parasite was found under the skin and in the abdominal cavity. Linstow³ mentions that it is the same worm as *Filaria* sp. mentioned by Willemoes-Suhm.⁴

- ii. *Filaria paradiseae*, Linstow, *l.c.*, p. 11. (Aru Islands).

86. *Manucodia chalybeata*, Penn. A Manucode.
Cestoda:—*Davainea paradisea*, Fuhrmann, *Centr. f. Bakt.*, i, Orig., XLIX, 1909, p. 112. (New Guinea.)

(Q) Family CORVIDÆ.

87. *Corone australis*, Gould (syn. *Corvus australis*, Gld.) (M. 874, H. 45.) The crow.

Nematoda:—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

Embryos were found in the blood, the adults occurring in the peritoneal cavity. Dr. Cleland and I have seen embryofilariae (*Microfilaria*) in blood smears taken from a local bird by Mr. A. R. MacCulloch (N.S.W.).

88. *Strepera graculina*, White. (M. 875, H. 46.) The pied crow-shrike.

Nematoda:—*Filaria* sp., Bancroft, *l.c.*, p. 61. (Queensland.)

Embryos in the blood.

89. The following parasites have been described from Papuan hosts whose names are not known:—

- i. *Davainea appendiculata*, Fuhrmann, *Centr. f. Bakt.*, i, Orig., XLIX, 1909, p. 114.

- ii. *Davainea echinata*, Fuhrmann, *l.c.*, p. 115.

¹ Sweet, *Proc. Roy. Soc. Victoria*, xxi, (N.S.) 1908, p. 466.

² Fuhrmann, *Zool. Anz.*, xxv, 1902, p. 359; *Centr. f. Bakt. Orig.*, xxxii, 1902, p. 135.

³ Linstow, "Comp. d. Helm.," Nachtrag, 1889, p. 37.

⁴ Willemoes-Suhm, *Zeitschr. f. Wiss. Zool.*, xxxvi, p. 63. †

It appeared to me that it would be of some scientific as well as of economic value to bring together all the references known to me, concerning the occurrence of endoparasites in domesticated and introduced birds in Australia. In addition to those mentioned in the following list, there are others which I have not yet identified. The fact that many of these introduced birds harbour the same tape-worms as in other parts of the world, seems to show that the larval stages have probably accommodated themselves to local intermediate hosts.

90. *Gallus gallus*, L., var. *domesticus*. The domestic fowl.

Protozoa:—*Spirochaeta marchouxi*, Nuttall, (syn. *S. gallinarum*, R. Blanchard). Cleland, *Journ. West. Austral. Nat. Hist. Soc.*, June, 1906; *Rep. Austr. Assoc. Adv. Sci.*, 1907, p. 688; *Journ. Trop. Vet. Sci.*, iv, 1909, p. 495; (West Australia). Dodd, *Rep. Vet. Surgeon, Q'land.* 1908-9, p. 16; (North Queensland). Johnston, *Journ. Roy. Soc. N.S.W.*, XLIII, 1909, p. xvi; (N.S.W.),

This spirochaete is the cause of fowl tick-fever or spirochaetosis (spirillosis). Its real name is perhaps *S. anserina*, Sacharoff, since Galli-Valerio¹ regards both *S. gallinarum*, R. Bl. and *S. marchouxi*, Nuttall to be identical with the earlier described *S. anserina*, which produces a similar sprochaetosis in geese and ducks. Doflein,² Nuttall,³ Lühe⁴ and Calkins⁵ regard them as different organisms, the last mentioned author placing them both under *Treponema*, and calling the fowl tick-fever organism *Treponema gallinarum*, March. and Salimbeni, 1903. Cleland recorded

¹ Galli-Valerio, *Centr. f. Bakt.*, Orig., L, 1909, p. 198.

² Doflein, "Lehrbuch der Protozoenkunde," 2 Aufl., 1909, p. 333.

³ Nuttall, Warburton, Cooper and Robinson, "Ticks, a Monograph of the Ixodoideæ," Part 1, Argasidae, 1908, p. 8 etc., also p. 85 etc. In a footnote on p. 88 of this important work it is stated that *S. gallinarum*, R. Blanch. 1905, is a synonym of *S. marchouxi*, Nuttall, 1904. *S. anserina*, Sacharoff is treated as a different organism (p. 89).

⁴ Lühe in Mense's "Handb. d. Tropenkrankheiten," III, 1906, p. 185.

⁵ Calkins, "Protozoology," 1909, p. 219.

the spirochaete as *Spirillum* sp.; Dodd, as spirochaetes, and myself as *S. anserina* (*S. gallinarum*). There are some other references to fowl tick-fever (*e.g.* in Agr. Gaz. N.S.Wales), but as the organism is not referred to in any way I have omitted them. The transmitter of the organism in Australia is the so-called "fowl-tick" *Argas persicus*, Oken, (syns. *A. americana*, Packard, *A. miniatus*, Koch), which is reported as being able to inflict serious injuries on human beings^{3, 1} in certain parts of the world, *e.g.* Persia. This tick is fairly common in New South Wales, but seems to restrict its action to poultry. Blanchard² regards *A. miniatus*, Koch (syn. *A. americana*) as being quite distinct from, though closely allied to, *Argas persicus*.

Trematoda:—*Prosthogonimus ovatus*, Linst. (formerly confused with *Distomum ovatum*, Rud.)

Spencer³ referred to the presence of small flukes in eggs from Victorian fowls. Though he does not refer to the helminth by name, yet his description evidently refers to the above named parasite. This usually infests the bursa of Fabricius of young birds, and has been occasionally found in the oviduct, and even in the eggs of mature fowls in other parts of the world.⁴

Cestoda:—*Hymenolepis carioca*, Magalh. Johnston, *Proc. Linn. Soc. N.S. Wales*, xxxiv, 1909, p. 599. (N.S.W.)

This delicate tapeworm does not seem to have been previously recognised in Australia. The same remark applies equally to the following species.

- ii. *Davainea cesticillus*, Molin. Johnston, *l.c.*, p. 599. (N.S.W.)
- iii. *Davainea tetragona*, Molin. Johnston, *l.c.*, p. 599. (N.S.W.)
- iv. *Davainea echinobothrida*, Mégnin. Johnston, *Journ. Proc. Roy. Soc. N.S.W.*, XLIII, 1909, p. xv. (Fiji.)

¹ Braun, 'Animal Parasites of Man,' Engl. transl., 3rd Edit., 1906, p. 371.

² Blanchard, "L'Insecte et L'Infection," Fasc. 1, 1909, p. 60, 61.

³ Spencer, *Proc. Roy. Soc. Vict.*, (N.S.) I, 1888, p. 109.

⁴ Braun, *Centr. f. Bakt.*, xxix, 1901, p. 12-19.

The last reference is to the occurrence of the parasite in Fijian fowls, and is inserted here in order that it may not be overlooked. I have recently recognised the worm in material collected from a hen in the Sydney district. This parasite (*D. echinobothrida*) frequently imbeds its scolex and part of its strombila so deeply into the mucosa and submucosa of the fowl's intestine that it produces a nodule or "tumour" somewhat comparable to those produced by the larvae of the nematode *Oesophagostomum columbianum* Curtice, in the intestinal walls of sheep, and by the larvae of *Oes. radiatum*, Rud. (syn. *Oes. inflatum*, Schn.) which infests the ox, both of these nematodes being commonly met with in these hosts in New South Wales. The condition produced in the fowl is usually called the "nodule disease," or more correctly "nodular Taeniasis."

v. *Davainea* sp., Bradshaw, l.c., p. 50. (N.S.W.)

vi. *Choanotaenia infundibulum*, Bloch., (syns. *Taenia infundibuliformis*, Goeze, *Monopylidium infundibulum*, Bl.).
N.S. Wales, not previously recorded.

I have now identified these as *D. tetragona*, Molin.

vii. *Cysticercus* sp., Perrie, l.c., p. 821. (N.S.W.)

I have seen Perrie's specimen, which resembles a hydatid in appearance. I am inclined to regard it as *Echinococcus veterinorum*, Rud. (*E. polymorphus*, Dies.). Brown¹ mentions the occurrence of hydatids in fowls, but does not state whether they occur locally. He² also mentions two other tapeworms, viz. *Choanotaenia infundibulum*, Bloch, and *Davainea proglottina*, Davaine, but does not refer to any locality. The latter of these parasites should be omitted from the list of our known entozoan fauna until recognised by some worker in parasitology. The nematodes and cestodes mentioned by Bradshaw as occurring in a fowl were identified by me.

¹ Brown, *Agric. Journ. Vict.*, I, 1902, p. 698. ² *Loc. cit.*, p. 698.

Nematoda:—*Ascaris* sp., Perrie, *Agric. Gaz. N.S.W.*, III, 1892, p. 821. (N.S.W.)

This reference should be to *Heterakis perspicillum*.

- ii. *Heterakis perspicillum*, Rud. (syn. *H. inflexa*, Rud.) Cobb, *Agr. Gaz. N.S.W.*, VII, 1896, p. 747; *ibid.*, IX, 1898, p. 316; *ibid.*, XVI, 1905, p. 561 (N.S.W.). Johnston, *Proc. Linn. Soc. N.S.W.*, XXXIV, 1909, p. 412. Bradshaw, *Farmers' Bulletin*, No. 15, Dept. Agric. N.S.W., 1909, p. 50.

This large ascarid is fairly common in our fowls though not so abundant as the smaller *Heterakis papillosa*, Bloch.

- iii. *Heterakis compressa*, Schneider, *Monogr. d. Nemat.* 1866, p. 71. (South Australia.)

This parasite was described from material collected from South Australian fowls. Both Railliet¹ and Neumann² give a summary of Schneider's account. Leiper³ also refers to it in describing an allied worm *Heterakis numidae*, Leiper, taken from the guinea fowl, *Numida ptilorhyncha*, Licht., in the Soudan. I have taken specimens from a hen in Sydney, which I regard as belonging to this species, as they fully agree with the scanty account given by Schneider.

- iv. *Heterakis papillosa*, Bloch., Cobb, *Agr. Gaz. N.S.W.*, VII, 1896, p. 748 (N.S.W.) Johnston, *Proc. Linn. Soc. N.S.W.* XXXIV, 1909, p. 412 (N.S.W.). Bradshaw, *Farmers' Bulletin*, No. 15, Dept. Agric. N.S.W., 1909, p. 50. (N.S.W.)

As mentioned before, this small nematode is very common in local fowls, especially in the caecum. I have also taken it from the caecum of a turkey (vide infra) (N.S.W.)

- v. *Heterakis* sp. (N.S.W.)

¹ Railliet, "Traité de Zoologie médicale et agricole," 2nd edition, 1895, p. 406.

² Neumann, "Parasites," Eng. transl. 2nd edit., 1905, p. 409.

³ Leiper, in "Third Report Wellcome Research Labs.," Khartoum, 1908, p. 193.

Mr. Thos. Steel of Sydney kindly forwarded me a chicken harbouring abundance of nematodes which I have not yet been able to identify specifically.

- vi. *Oxyuris* sp., Perrie, l.c., p. 822. (N.S.W.)

This reference should be to *Heterakis papillosa*.

- vii. *Oxyspirura mansonii*, Cobbold (syn. *Spiroptera emmerezii*, Mégnin), Tryon, *Ann. Rept. Entomologist, etc.*, Dept. Agr. Q'land, 1907-8, p. 88; Dodd, l.c., 1908-9, p. 20 etc. (Queensland); Johnston, *Journ. Proc. Roy. Soc. N.S.W.*, 1909, p. xv. (Northern N.S.W.)

This tiny worm was formerly known as Manson's eye worm, *Filaria mansonii*. Ransom¹ in 1904, showed that it belonged to the genus *Oxyspirura*.

- vii. *Syngamus trachealis*, Siebold, Brown, *Agr. Journ. Vict.*, II, 1904, p. 73, p. 175 (Victoria?). Johnston, l.c., XLIII, 1909, p. xv (N.S.W.)

The "gape-worm" of poultry appears to be rare in Australia. It lives in the trachea, firmly attached to the mucosa. Since the male remains permanently attached to the female, the parasite has often been termed the "forked worm." Mr. E. A. Le Souef, Curator of the Zoological Gardens, Perth, West Australia, informed me that this parasite occurs in fowls and turkeys in that State.

- vii. *Dispharagus nasutus*, Rud. (Sydney.)

This filariid was collected by me from the stomach of a fowl sent by Mr. T. Steel. It has not been previously recorded from Australia.

- Acarida:—i. *Acarus depilis*, Brown, *Brit. Med. Journ.*, II, 1897, p. 1675 (Victoria, South Australia).

This acarid has been recorded from the subcutaneous tissue of poultry. The original description is extremely scanty, the name *A. depilis* being practically a *nomen*

¹ Ransom, "Dept. Agric. U.S.A. Bureau of Animal Industry," Bull, 60, 1904, p. 25.

nudum, but judging from the few points of structure and the habitat mentioned, I think that this parasite is identical with *Cytodites nudus*, Viz.

- ii. *Cytodites nudus*, Vizioli, Johnston, *Proc. Linn. Soc. N.S. Wales*, xxxv, 1910 (N.S.W.).

This tiny parasite was found in considerable numbers infesting the mesentery of a local hen. Most members of the *Acarida* (*Acarina*) lead a free or ectoparasite existence, while a few penetrate into the skin, e.g. *Demodex*, *Sarcoptes*, *Psoroptes*, etc. *Sarcoptes* (*Cnemidocoptes*) *mutans*, Robin, the itch mite which produces the disease known as "scaly leg" of poultry, and which occurs in this State,¹ comes under this group. Very few actually pass deeply into the tissues. Examples of the latter group are *Cytodites*, *Falciger* (in certain stages) and others, some of which inhabit the trachea and other passages.

91. *Meleagris gallopavo*, Linn. The turkey.

- Nematoda:—i. *Heterakis papillosa*, Bloch., Johnston, *Proc. Linn. Soc. N.S. Wales*, xxxiv, 1909, p. 412. (N.S.W.)

This round worm lives in the caecum of the turkey and fowl.

- ii. *Syngamus trachealis*, v. Sieb.

Mr. E. A. Le Souef of the Zoological Gardens, Perth, informed me of the occurrence of the "gape-worm" in Western Australian turkeys and fowls.

Bradshaw² regards the disease known locally as "black-head," as the same as that known under this name in the United States, and produced by a protozoan, *Amoeba* (*Entamoeba*) *meleagridis*, Th. Smith. Films taken from the inflamed areas in the intestine and liver and examined by Dr. F. Tidswell, Dr. Cleland, and myself show the presence of very numerous organisms which are probably

¹ Bradshaw, *lc*, p. 78; also *Agric. Gaz. N.S. Wales*, xvii, 1906, p. 125; Rainbow, *Rec. Austr. Mus.*, vi, (3), p. 190. ² Bradshaw, *l.c.*, p. 99.

A. meleagridis, but the identification is not yet completed. The form of the parasite showed considerably resemblance to a Coccidian, Doflein¹ remarking the same thing in regard to Theobald Smith's figures of it. A more detailed account will be published shortly by the Director in the annual report of the Bureau of Microbiology.

92. *Anas boschas*, Linn. The duck.

Cestoda:—*Hymenolepis* sp., Johnston, *Proc. Linn. Soc. N. S. W.* xxxiv, 1909, p. 190. (N.S.W.)

The specimens were very small and immature. The scolex was unarmed.

93. *Anser cinereus*, Meyer dom. The goose.

Cestoda:—*Hymenolepis lanceolata*, Bloch., Johnston, *Agric. Gaz. N.S.W.*, xx, 1909, p. 582; *Rec. Austr. Mus.*, vii, 1909, p. 331 (N.S.W.).

94. *Columbia livia*, Bonn., dom. The pigeon.

Nematoda:—*Ascaris* sp., Krefft, *l.c.*, p. 212. (New South Wales or Queensland).

This reference should be to *Heterakis maculosa*.

ii. *Heterakis maculosa*, Rud., Johnston, *Proc. Linn. Soc. N.S.W.*, xxxiv, 1909, p. 412 (N.S.W.)

Acarida:—*Falciger rostratus*, Bucholz., Sweet, *Proc. Roy. Soc. Victoria*, xxi, (N.S.) 1908, p. 500, 523.

The hypopial stage of this mite was found deeply buried in the subcutaneous tissues.

95. *Passer domesticus*, Linn. The sparrow.

Protozoa:—*Plasmodium passeris*, Johnston and Cleland, Johnston, *Agric. Gaz. N.S. Wales*, xx, 1909, p. 584; *Rec. Austr. Mus.*, vii, 1909, p. 344; *Jour. Trop. Vet. Sci.*, v, 1910, pp. 353, 357; Johnston and Cleland, *Proc. Linn. Soc. N.S.W.* 1909, p. 507 (N.S.W.)

This sporozoan infests the red corpuscles of the blood. It was first recorded by me as *Plasmodium praecox*, Gr.

¹ Doflein, "Lehrb. d. Protozoenkunde," 2 Aufl., 1909, p. 508.

and Fel.? The differences between *P. praecox* and our forms were thought by us to be of sufficient importance to justify the separation of the latter as a different species *P. passeris*.

Cestoda:—*Monopylidium passerinum*, Fuhrm., Johnston, *Agric. Gaz. N.S.W.*, xx, 1909, p. 584; *Journ. Roy. Soc. N.S.W.*, XLIII, 1909, p. 405; *Jour. Trop. Vet. Sci.*, v, 1910, pp. 353, 357; Johnston and Cleland, *Proc. Linn. Soc. N.S.W.*, xxxiv, 1909, p. 507 (N.S.W.).

96. *Sturnus vulgaris*, Linn. The starling.

This bird is now very common in the settled districts of New South Wales.

Cestoda:—*Hymenolepis farciminosa*, Goeze.

Some specimens forwarded to me by Mr. S. J. Johnston of the Biology Department, Sydney University, as well as others collected by Dr. Cleland at Berry, belong to the above species. (Sydney, Berry, N.S. Wales.)

97. *Merula merula*, Linn. (syn. *Turdus merula*, Linn.) The blackbird.

This bird has become well established in South and South-eastern Australia.

Cestoda:—*Hymenolepis serpentulus*, Schrank.

This parasite was identified from material collected by Dr. Cleland, near Adelaide (South Australia).

98. *Rhinochetus jubatus*, Verr. and Des Murs. The Kagu.

This is not an Australian bird, since it lives only in New Caledonia. Mr. H. E. Finckh, of Mosman, Sydney, recently forwarded me a dead specimen of this rare bird, and from its intestine I have obtained numerous very small cestodes about 4 mm. long, with well developed suckers and an armed rostellum and alternating genitalia. These have been provisionally determined as *Amoebotaenia* sp., though the genital organs alternate somewhat irregularly.

ADDENDUM:—The record of *Holostomum* sp. from the gull and jackass mentioned by David (*Jour. Proc. Roy. Soc. N.S.W.*, xxxiv, 1900, p. xx.) evidently refers to *Holostomum hillii* from *Larus novae-hollandiae* and *Hemistomum triangulare* from *Dacelo gigas*, respectively, (*vide supra*).



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