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PROCEEDINGS
OF THE
ROYAL SOCIETY
OF
QUEENSLAND
FOR 1916.

VOL. XXVIII.

— Edited by —
A. B. WALKOM, B.Sc.

*The Authors of Papers are alone responsible for the statements made and
the opinions expressed therein.*

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THE
Royal Society of Queensland.

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HIS EXCELLENCY SIR HAMILTON GOOLD-ADAMS,
G.C.M.G., C.B., ETC.

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ERRATA.

- p. 37, line 34. For "*Heterophyces*" read "*Heterophyes*."
- p. 42, line 5. Delete "Breinl, 1913d; Nicoll."
- p. 45, line 16. Delete "sp." after Casuariiformes.
- p. 51, line 16. For "*cyaocephala*" read "*cianocephala*."
- p. 56-60. For Jnstn., 1911f read Jnstn., 1911c.
- p. 59, line 20. For "larvae" read "larval."
- p. 67, line 22. For "oliogochaetes" read "oligochaetes."

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Abstract of Proceedings of the Royal Society of Queensland.

PROCEEDINGS OF ANNUAL MEETING, 27TH MARCH, 1916.

Dr. T. Harvey Johnston, President, in the Chair.

His Excellency the Governor was present, attended by Captain Cozens, A.D.C.

The President announced that Volume XXVII, Part 2, of the Proceedings was published, and would be issued to members in a few days.

The Annual Report of the Council for 1915 was adopted on the motion of Dr. Shirley, seconded by Dr. Richards.

The Financial Statement was received on the motion of Mr. J. B. Henderson, seconded by Mr. H. A. Longman.

Mr. J. Bain was unanimously elected a member of the Society.

Messrs. Paul Sylow and W. D. Francis were proposed as members of the Society.

No other nominations for office bearers having been received, the president declared the following elected for the year 1916 :

Patron : His Excellency Sir Hamilton Goold-Adams, G.C.M.G., C.B., etc.

President : R. Hamlyn-Harris, D.Sc.

Vice-president : E. H. Gurney.

Hon. Treasurer : B. Dunstan, F.G.S.

Hon Secretary and Editor : A. B. Walkom, B.Sc.

Hon. Librarian : C. D. Gillies, B.Sc.

Members of Council : W. R. Colledge, T. H. Johnston, M.A., D.Sc., H. A. Longman, H. C. Richards, D.Sc., J. Shirley, D.Sc.

Hon. Auditor : Professor H. J. Priestley, M.A.

The new President was then installed, and he thanked members for his election to the office.

Dr. Hamlyn-Harris then asked the retiring President to deliver his address.

The address was divided into two parts, the first dealing with the activities of the Society during the past year, and to scientific matters in general in Queensland and Australia ; the second part of the address was of a scientific nature, the subject being " A census of the internal parasites recorded from Queensland." A number of lantern slides and many interesting specimens were exhibited in illustration of the subject, and special attention was paid to the parasites of man, and some of the domesticated animals in Queensland.

His Excellency the Governor thanked the Society for his re-election to the office of patron, and proposed a hearty vote of thanks to Dr. Johnston for his address.

Mr. J. F. Bailey seconded the vote of thanks, which was carried.

Dr. Johnston thanked the meeting for their appreciation.

THE ROYAL SOCIETY OF QUEENSLAND

BALANCE SHEET for the Year 1915.

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Ar.

RECEIPTS		£	s.	d.	EXPENDITURE.		£	s.	d.
Balance from 1914	49	12	10	Printing (H. Pole & Co.)	111	13	2
Subscriptions	.. ..	..	..	..	Postage—	.. ..	..	..	..
For 1914 and previous years	.. ..	24	3	6	Monthly Notices	.. ..	2	3	4
For 1915	.. ..	69	7	0	Librarian and Postage of Proceedings	.. ..	4	5	0
For 1916	.. ..	1	1	0	Biology Section	.. ..	0	10	0
Donations	.. ..	94	11	6	General	.. ..	3	18	4
Sundry Small Receipts	.. ..	1	2	6	Insurance	.. ..	10	16	8
	.. ..	0	8	11½	General Petty Cash, etc.	.. ..	1	2	6
	.. ..	..	..	..	Attendance and Refreshments	.. ..	2	6	1
	.. ..	..	..	..	Card Index for Library	.. ..	2	4	0½
	.. ..	..	..	..	Hire of Furniture	.. ..	2	12	0
	.. ..	..	..	..	Hire of Car	.. ..	1	2	6
	.. ..	..	..	..	Bank Charge	.. ..	1	2	6
	.. ..	..	..	..	Balance—	.. ..	0	10	0
	.. ..	..	..	..	In Bank	.. ..	12	5	3
	.. ..	..	..	..	In Hand	.. ..	0	1	1
	.. ..	..	..	..			12	6	4
	.. ..	..	..	..			145	15	9½
	.. ..	..	..	..			145	15	9½

Examined and found Correct.
 GEORGE J. MACKAY, FOR GEO. WATKINS, Hon. Auditor.
 29/2/16.

E. H. GURNEY,
 Hon. Treasurer.

ABSTRACT OF PROCEEDINGS, 1ST MAY, 1916.

The ordinary monthly meeting was held in the Geology Lecture Theatre in the University, at 8 p.m.

Dr. Hamlyn-Harris, President, in the chair.

The minutes of the previous ordinary monthly meeting were read, and confirmed.

Miss Buckland Taylor, and Messrs. A. H. Chisholm and A. Valentine Soul, were proposed as members.

Messrs. W. D. Francis and Paul Sylow, were elected as members of the Society.

The following papers were read:—

1. The supposed Artiodactyle Queensland Fossils, by H. A. Longman.

Remarks were made by Dr. Johnston and Mr. A. B. Walkom.

2. The origin of manganiferous and ferruginous incrustations in rocks and streams, by W. D. Francis.

The paper was discussed by Drs. Johnston and Richards, and Messrs. Longman, Saint-Smith, Walkom and White.

3. The origin of iron and manganese ore in bogs and streams, by W. D. Francis.

Remarks were made by Drs. Johnston and Richards

Mr. H. A. Longman exhibited a live specimen of *Neprurus asper*, Gthr., the "Ball-tailed Gecko," from Central Queensland, which had been donated to the Queensland Museum. This lizard has a big head, large eyes, a rough skin which brings to mind the test of a sea-urchin, long angular legs and a tail which ends in a ball, and is one of the quaintest reptiles found in Australia. It has a curious habit of raising itself to the full height of its thin legs, and then lowering its body to near the ground, this being done repeatedly. When disturbed it often gives a short side spring, and emits a cough-like bark which has gained for it the name of "Barking Lizard." In captivity it will feed on small grasshoppers.

ABSTRACT OF PROCEEDINGS, 29TH MAY, 1916.

The ordinary monthly meeting was held in the Geology Lecture Theatre in the University, at 8 p.m.

Dr. Hamlyn-Harris, President, in the chair.

The minutes of the previous meeting were read and confirmed.

Miss Buckland Taylor, and Messrs. A. Valentine Soul, and A. H. Chisholm were elected ordinary members of the Society.

The following paper was read:—

Some preliminary notes on the habits of the Dawson River Barramundi, *Scleropages leichhardtii*, by Dr. T. L. Bancroft (communicated by Dr. T. Harvey Johnston.)

The President and Mr. Longman offered remarks on the paper.

The President (Dr. Hamlyn-Harris) communicated some notes on Kaiva Kuku and Semese dances of Papua, illustrating his remarks with a series of exhibits and lantern slides.

He also showed an interesting example of a clay cap or emblem of mourning from an aboriginal grave at Thylungra Station, S.W. Queensland, weighing 13lbs. 12½ozs. and measuring 14ins. x 8ins. The head dress had been dried in an elongated form and was still in the rough.

Specimens of this kind were worn by either male or female mourners until the clay wasted away with age or it might be removed by remote relatives after a week or so and placed on the grave should the tribe move camp.

Dr. Butler-Wood exhibited some specimens of fossil bones from post-tertiary deposits in the Chinchilla district, including teeth of *Pallimnarchus pollens*, De Vis, a fragment of the mandible of an extinct kangaroo, probably *Macropus cooperi*, and molars of a nototheroid mammal.

A skin of *Hydrus platurus*, L., a widely-distributed sea snake, which was secured at Caloundra and presented to the Queensland Museum, was exhibited by Mr. H. A.

Longman. The specimen was of special interest, being no less than $45\frac{1}{2}$ inches in length, and considerably longer than any previously recorded specimen.

Mr. C. T. White exhibited the following specimens, all collected in the neighbourhood of Brisbane :

1. Fruits of *Solanum aculeatissimum* with several growths like smaller fruit clustered round the base, these are quite hollow and in most cases attached for the greater part of their length to the ordinary fruit.

2. Photograph of *Musa sp.* (Sugar Banana) in the garden of Mr. Parker, Kangaroo Point, showing an inflorescence growing out laterally from the stem about 3ft. below its normal position; this condition has been previously noted by H. Newport, in Northern Queensland (Queensland Agric. Jl, 31, p. 186.) Specimens of *Lantana camara* showing basal cohesion of opposite pair of leaves; this condition is not at all uncommon in *Lantana* and has been previously noted in New South Wales by Fletcher (Proc. Linn. Soc. N.S.W. 39, pp. 89 and 162.)

4. Specimens of *Sonchus oleraceus* and *Emilia sonchifolia* in which a large number of abortive buds on slender stalks were produced in the flower heads in place of the ordinary florets; floral proliferation in the order Compositae is quite common and has been noted in *Sonchus* in New South Wales by Hamilton (Proc. Linn. Soc. N.S.W. 38, p. 605.)

ABSTRACT OF PROCEEDINGS, 26TH JUNE, 1916.

The ordinary monthly meeting was held in the Geology Lecture Theatre in the University, at 8 p.m.

Dr. Hamlyn-Harris, President, in the chair.

The minutes of the previous monthly meeting were read and confirmed.

The president announced that a message of condolence with the relatives of the late Field Marshal Lord Kitchener

had been despatched to the Governor on behalf of the Society, for transmission through the proper channels.

The following specimens, etc., were exhibited.—

1. A series of Queensland lichens, by Miss H. Cleminson, M.Sc. (for Dr. Shirley.)
2. (a) An electromagnet, (b) a section of a meteorite showing troilite, widmanstatten figures and flow structure, (c) a collection of models of gem stones, by Dr. H. C. Richards.
3. Specimens of *Peripatus*, by Dr. T. H. Johnston.
4. Hyaline Species of *Daphnia*, by Mr. Colledge.
5. Mr. H. A. Longman exhibited a skin of *Python amethystinus*, Schneid, twenty one feet long (without head), and thirteen inches wide. The markings corresponded with those of var. B in the British Museum Catalogue of Snakes. The reptile was secured near Cairns by Mr. J. L. Branford, who donated it to the Queensland Museum.

He also exhibited a crab which he and Mr. Douglas Ogilby had identified as *Podophthalmus vigil* (Fabr.) — a species not previously recorded, except as a fossil, from Australian Waters.

6. Mr. A. H. Chisholm exhibited a nest and eggs of *Falcunculus frontatus*, the crested shrike-tit of Eastern Australia, taken from a tree top in N.W. Victoria. The nest is constructed of fine threads of bark hammered off eucalypts, the exterior being bound with filmy substance from cocoons.
7. Mr. A. B. Walkom exhibited a number of specimens of a Crustacean (probably a macrurous decapod) obtained from the Cretaceous rocks of Woody Island; these probably form a new record for the Eastern Cretaceous of Queensland.
8. Dr. Hamlyn-Harris exhibited photographs of whales stranded at Perkins Islands, Tasmania, (kindly lent by Sir Arthur Morgan); and also examples of pictographic art of the Queensland aboriginal.

ABSTRACT OF PROCEEDINGS, 31ST JULY, 1916.

The ordinary monthly meeting was held in the Geology Lecture Theatre in the University, at 8 p.m.

Dr. Hamlyn-Harris, President, in the chair.

The minutes of the previous monthly meeting were read and confirmed.

The President referred to the loss the Society had suffered in the death of one of the oldest members, Mr. George Watkins, and expressed the members' sympathy with Mrs. Watkins and family. The late Mr. Watkins had been a member since 1884, and since 1905 had acted as honorary auditor. The Hon. A. J. Thynne and Mr. Gurney spoke appreciatively of Mr. Watkins.

The President announced that the Biology Section had been allowed to lapse, on account of an insufficient number of members interested.

At the invitation of the President, Dr. Richards explained the aims and objects of the Commonwealth Bureau of Science and Industry, and intimated that the State Committee for Queensland was anxious that any problems in which scientific research might aid industry, should be brought before their notice.

The subject was discussed by the Hon. A. J. Thynne, Dr. Johnston, Messrs. Gurney and Longman, and the President.

The following paper was read:

The Endoparasites of the Dingo, *Canis dingo*, Blumb.,
by T. H. Johnston, M.A., D.Sc.

Remarks were made by Messrs. Gurney and Longman.

ABSTRACT OF PROCEEDINGS, 28th AUGUST, 1916.

The ordinary monthly meeting was held in the Geology Lecture Theatre in the University, at 8 p.m.

Dr. Hamlyn-Harris, President, in the chair.

The minutes of the previous meeting were taken as read.

Mr. H. Tryon and Mr. Lloyd, M.L.A., were proposed as members.

Lecturettes on the subject of the National Park, Lamington Plateau, were delivered by H. C. Richards, D.Sc., and J. Shirley, D.Sc., who illustrated their remarks by a series of lantern slides.

The Hon. Dr. Taylor, and Messrs. Meston, Tryon, and Longman, and the President made remarks.

ABSTRACT OF PROCEEDINGS, 25th SEPTEMBER, 1916.

The Ordinary Monthly Meeting was held in the Geology Lecture Theatre in the University at 8 p.m.

Dr. Hamlyn-Harris, President, in the chair. The minutes of the previous meeting were read and confirmed.

Mr. W. Lloyd, M.L.A., was elected a member.

The library exchanges for the month were laid on the table.

Mr. H. A. Longman exhibited a series of crania, some of which were sectioned, to illustrate distinctive cerebral characteristics of the Dingo (*Canis dingo*) and the Marsupial Wolf (*Thylacinus cynocephalus*). The cranial foramina and their associations were demonstrated by marked flexible rods, and comment was made on their allotment as either salient or variable characters in classification.

Dr. Hamlyn-Harris exhibited three varieties of fire-sticks; (a) the lengthy form described by Roth; (b) a smaller form, the sticks being only about one foot in length, and provided with a wooden human figure, the eyes of which were used in contact with the twirling wands. These two were shown to emphasise the primitive nature of (c) a very valuable set of fire-sticks received from Mr. E. J. Banfield, Dunk Island. These consisted of very rough sticks (possibly one of the "Cotton-trees," *Hibiscus* sp.), just torn down and used then and there, and afterwards thrown away and discarded.

Mr. B. Dunstan exhibited specimens of fossil insects.

Dr. H. C. Richards exhibited a number of fragments of the carapace of a tortoise, and also specimens, probably ostracods, from the Redbank Plains.

Mr. C. T. White exhibited (1) a small collection of plants made by Mr. H. A. Longman, at Currumbin Creek, Southern Queensland, in March, 1916. The more interesting records were :—*Stephania aculeata*, Bail. ; *Elæocarpus kirtoni*, F.v.M., the identification of which with *E. longifolius*, C. Moore (*non*. Blume *nec*. Wallace), and *E. bauerlenii*, Maid. et Bak., has been pointed out by Maiden and Betche in Proc. Linn. Soc., N.S.W., 23 (1898), 772 and 33 (1908), 305 ; *Marsdenia rostrata*, R.Br. ; *Utricularia pygmaea*, R.Br., flowers pale yellow ; *Glochidion ferdinandi*, Muell. Arg. var., *supra-axillaris*, Benth. (2) Specimens of *Jacksonia scoparia*, R.Br., from Stanthorpe and Brisbane, showing fasciation of the stem prominently developed and specimens of *Westringia eremicola*, A. Cunn., collected near Brisbane, showing cohesion of branches. (3) By permission of the Director, fruiting specimens of *Milletia australis*, Benth. (*M. Maideniana*, Bail.), from plants in Brisbane Botanic Gardens, some of the pods were 8in. in length and contained seven seeds. (4) Specimens of the stem of *Milletia megasperma*, F.v.M., the outer bark of the stem in this species exfoliates in thin, papery layers giving it a very characteristic appearance.

Dr. Shirley exhibited an interesting case of parasitism from Western Queensland.

ABSTRACT OF PROCEEDINGS, 30th OCTOBER, 1916.

The Ordinary Monthly Meeting was held in the Geology Lecture Theatre in the University, at 8 p.m.

Dr. Hamlyn-Harris, President, in the chair.

The minutes of the previous meeting were read and confirmed.

The library exchanges for the month were laid on the table.

The meeting then resolved itself into a Special General meeting, to consider the alteration of Rules 21 and 22. Mr. Colledge proposed, and Mr. Gurney seconded, that these rules now read as follows:—

21. **TREASURER.**—The Treasurer shall collect and receive all moneys on account of the Society, and deposit the same in a Bank approved by the Council; make all payments ordered by the Council on receipt of written authority from the Chairman of the Meeting, such payments being made by cheques signed by himself and countersigned by the Secretary.

At the Annual Meeting following his term of office, the Treasurer shall submit a balance sheet, audited by an Accountant elected at the previous Annual Meeting.

22. **SECRETARY.**—The Secretary shall attend and take minutes of the proceedings of all meetings of the Society, Council, and Committees thereof respectively; make the necessary arrangements for meetings, issue the required notices, despatch the proceedings of the Society to Members, and generally transact the ordinary routine business.

The alterations were unanimously agreed to.

The following paper was read:—

Notes on a few interesting plants collected in the vicinity of Brisbane, by G. T. White

Mr Longman and Mr. Tryon made remarks.

Mr. Chisholm exhibited a number of lantern slides of the yellow-breasted Shrike Robin (*Eopsaltria australis*) and the Satin Bower Bird.

ABSTRACT OF PROCEEDINGS, 27TH NOVEMBER, 1916.

The Ordinary Monthly Meeting was held in the Geology Lecture Theatre, in the University, at 8 p.m.

Mr. E. H. Gurney, Vice-President, in the chair.

The Chairman apologised for the absence of the President, who was unable to attend on account of ill health.

The minutes of the previous meeting were read and confirmed.

The library exchanges for the month were laid on the table.

The following paper was read :

Three Undescribed Queensland Fishes, by J. Douglas Ogilby.

The paper was communicated by Mr. H. A. Longman and remarks were made by Dr. Richards and Mr. Gurney.

Mr. C. T. White exhibited adventitious roots of *Eucalyptus robusta*, Sm., obtained by him on Bribie Island. *E. robusta* is a common species in coastal swamps in New South Wales and Southern Queensland. These adventitious roots are common in *Melaleuca linariifolia* and *M. leucadendron*, two species of Paper-barked Tea-trees, but the exhibitor had not met with any previous record of their occurrence in *Eucalyptus*; however, it is probable that most swamp trees with "papery" or "stringy" barks develop these roots.

Mr. H. A. Longman exhibited (1) a remarkable fasciated growth of *Lepidium fasciculatum*, Phellung, from the Darling Downs; this condition has also been noted for *L. ruderale*, a close ally of this common weed, in N.S.W. (Proc. Linn. Soc., N.S.W., 35 (1910), p. 805); (2) a living *Lialis burtoni*, Gray, which had recently swallowed in captivity two specimens of skink lizards (*Lygosoma tenue*)—an interesting sidelight on its habits; (3) a large living specimen of the "Bandy-bandy" snake, *Furina occipitalis*, D. and B., which is a beautiful object when in quick motion.

Mr. A. H. Chisholm exhibited a nest of *Sericornis citreigularis*, the yellow-throated scrub wren, known to the settlers as the "black-nest bird" and "Devil bird." The nest was taken on Nov. 20th from a "lawyer-cane" in thick scrub on the Blackall Ranges. It contained one broken egg. Several nests of *Sericornis magnirostris*, the large-billed scrub wren, constructed with similar artistry, were examined close by.

Library Exchanges Received. 1st January to 30th November, 1916.

AFRICA.

Natal Museum: *Annals*, Vol. 14 (2).

S. African A.A.S.: Report, 1914 (Kimberley Meeting).

AMERICA.

BRAZIL.

Instituto Oswaldo Cruz: *Memorias*, Tomo 1 (1 and 2), 2 (1, 2), 3 (1, 2), 5 (2, 3), 7 (1, 2), 8 (1).

CANADA.

Dept. of Mines:

Annual Report of Mineral Production, 1914; *Memoir*, 34, 50, 55, 58, 60, 72, 76, 79, 81, 83; *Museum Bulletin*, 20, 21, 22; Report, 291, 334; Report for 1914; Summary Report of Geological Survey for 1915.

Nova Scotia Institute of Science: *Proc. and Transactions*, xiii (3, 4), xiv. (1).

Royal Astronomical Society of Canada: *Journal*, ix. (9, 10), x. (1-8); *Observer's Handbook for 1916*.

Royal Canadian Institute: *Trans.*, xi (1); *Index*, 1852-1912.

Royal Society of Canada: *Trans.* ix (Sec. i, 2 pts.; ii., 3 pts.; iii., 4 pts.; iv., 4 pts.), x (1 pt.)

MEXICO.

Boletin Minero, Tomo 1 (2).

Instituto Geologico de Mexico: *Boletin*, 31, 32; *Parergones*, 5 (1-9).

Sociedad Cientifica: *Memorias*, 32 (11, 12), 33 (11, 12), 34 (4-9).

UNITED STATES.

Academy of Natural Sciences, Philadelphia: *Proc.*, lxxvii. (2).

American Geographical Society: *Bull.*, 47 (11, 12), *Index to Bull.*; *Geog. Review*, Jan.-Sep., 1916.

American Museum of Natural History: *Museum Journal*, 15 (7, 8), 16 (1-5); *Anthrop. Papers*, 17 (2).

American Philosophical Society, Philadelphia: *Proc.*, No. 217, 218.

Californian Academy of Science: *Proc.*, 4th Ser. 5 (3, 4).

Extra-individual Reality; its existence; by R. R. Gurley.

Field Museum of Natural History: *Pub.*, 184, 185.

Geographical Society of Philadelphia: *Bull.*, 14 (1, 3, 4).

Illinois State Laboratory: *Bull.*, 10 (index), 11 (1-5), 12 (2).

Missouri Botanic Gardens: *Annals*, 2 (1-3).

National Academy of Sciences: *Memoirs*, 12 (2), 13; *Proc.*, 1 (11, 12), 2 (1-9).

New York Academy of Sciences: *Annals*, 26 (pp. 1-394).

- New York Zoological Society: *Zoologica*, 2 (1-5); *Zoopathologica*, 1 (1).
- Ohio State University: *Bull.*, 20 (No. 34, 35); *Ohio Journal of Science*, 16 (5-8).
- Philadelphia Museums: *Ann. Rept. Commercial Museum*, 1914.
- Smithsonian Institution: *Ann. Rept.*, 1914; *Animism and Folklore of Guiana Indians*.
- University of California: *Botany*, 6 (9-12), 7 (1, 2, 5); *Zoology*, 12 (13-17), 13 (11, 12), 15 (Introd.), 16 (2-17), 17 (1-4).
- University of Illinois: *Illinois Biological Monographs*, 2 (4).
- University of Minnesota: *Agric. Experiment Station, Bull.* 148; *Current Problems*, 5; *Studies in Engineering*, 2, 3; *Social Sciences*, 2, 3.
- Wilson Ornithological Club: *Wilson Bulletin*, No. 92, 93; *Index* Vol. 27; Vol. 28 (1-3).

ASIA.

INDIA.

- Agricultural Research Institute, Pusa: *Report*, 1914-5.
- Board of Scientific Advice for India: *Annual Report*, 1914-5.
- Geological Survey of India: *Palaeontologia Indica*, Ser. xv.: *Title Page and Contents*, 5 (1-3), 6 (1-2), 7 (2); *Title Page*, 7 (1,2); *N. Ser.*, 5 (3), 6 (1); *Title Page and Contents*, 2 (1-5); 4 (3, 4); *Title Page*, 4 (1-4); *Records*, 45 (4), 47 (1-2); *Memoirs*, *Index* Vols. 21-35.
- Introduction to the Grammar of Tibetan Language* by Sarat Chandra Das.
- Report on Progress of Agriculture in India for 1914-5*.

JAVA.

- Jaarboek van het Mijnwesen*, 1914.

PHILIPPINE IS.

- Bureau of Science, Manila: *Journal of Science*, Vol. 10 [A. (6), B. (5, 6), C. (6), D. (4-6)]; 11 [A. (1-3), B. (1-2), C. (1-3), D. (1-4)].

AUSTRALASIA.

- Australasian Antarctic Expedition: Scientific Results, Zoology and Botany*, 3 (1).

NORTHERN TERRITORY.

- Geological Survey: Bull.*, 14, 15a.

NEW SOUTH WALES.

- Australian Museum: Records*, 11 (1-5); *Miscellaneous Publication*, 10.
- Botanic Gardens: Ann. Rept.*, 1914; *Census of N.S.W. Plants; Forest Flora*, 6 (6-9); *Genus Eucalyptus*, 3 (4-7).
- Dept. of Agriculture: Agricultural Gazette: 26* (12), 27 (1-11); *Labour Supplement*, 9, 10; *Science Bulletin*, 16.
- Geological Survey of N.S.W.: Ann. Rept. Dept. of Mines*, 1915; *Composition and Porosity of Intake Beds, etc.*; *Memoirs, Ethnology* No. 2, *Geology* No. 7; *Mineral Resources*, 20, 21.
- Linnean Society of N.S.W.: Proc.*, 40 (3, 4), 41 (1, 2).

Naturalists' Society of N.S.W.: Australian Naturalist, 3 (9-12).
 Royal Society of N.S.W.: Proc., 49 (4).
 Royal Zoological Society of N.S.W.: Australian Zoologist, 1 (3).
 Technological Museum: Report for 1914.
 University of Sydney: Calendar for 1916.

NEW ZEALAND.

Auckland Institute: Ann. Rept., 1915-6.
 Dominion Laboratory: 49th Ann. Rept.
 Dominion Museum: Report of Director, 1915-6.
 Geological Survey of N.Z.: Annual Rept., 8, 10.
 New Zealand Institute: Trans. 48.

QUEENSLAND.

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PRESIDENTIAL ADDRESS.

By T. HARVEY JOHNSTON, M.A., D.Sc., C.M.Z.S.
Biology Department, University of Queensland.

*Delivered before the Royal Society of Queensland, 27th
March, 1916.*

YOUR EXCELLENCY, LADIES AND GENTLEMEN,

I am departing from the usual custom of former presidents of this Society by dividing the annual address into two distinct parts, the first portion being more of the nature of a survey of the Society's affairs and a review of some recent work relating to certain biological problems of importance to Queensland, whilst the second part is offered as a purely scientific contribution under the title "A Census of the Entozoa recorded from Queensland, arranged under their Hosts."

The year 1915 was marked by increased activity of members doing research work and, as a result, more papers were offered than the Society was able to publish, owing to lack of sufficient funds. This led to your Council appointing a small deputation which interviewed the Hon. the Premier and asked for assistance from the Queensland Government. As the request was made just too late for a sum to be placed on the Estimates for the current financial year (1915-1916), the Premier generously offered to print Dr. H. C. Richards' paper on "The Volcanic Rocks of South Eastern Queensland," the expense being borne by the Chief Secretary's Department. This paper would have cost the Society over £40 to print. We, therefore, have reason to express our gratitude to the Government for its timely assistance towards the publication of original research work in this State.

With a view to increasing the interest in our monthly meetings, the Council has revived, with marked success, the practice of exhibiting specimens of note and has also regularly issued to members an abstract of the proceedings of each meeting.

Volume XXVII., Part I. was published in December last, the various numbers constituting it having been distributed earlier, as mentioned in the Part. Part II. has just come to hand.

In order to fill a long felt want, your Council is now engaged in compiling a card catalogue of the serial scientific and technical literature available in the various libraries in Brisbane, and with this end in view, has invited the co-operation of the University, the Queensland Museum, Government Scientific laboratories, the various scientific and professional societies and institutions as well as the public and parliamentary libraries. A number of the institutions have already given the desired information, while several others are now engaged in its compilation. When completed, this catalogue, which, it is hoped, will be eventually printed, should be of great assistance to Queensland workers in science.

In addition to the ordinary meetings at which papers were read, specimens exhibited, etc., there were three occasions during the year when lectures were delivered to the members. His Excellency the Governor gave an interesting address on "Sidelights on South African History within the past thirty years," a subject on which he is well qualified to speak on account of his long official connection with that portion of our Empire. Mr. F. Bridwell, Entomologist to Hawaiian Sugar Planters' Association, gave an account of the work done by parasitic insects in controlling pests of economic importance. Mr. R. J. Tillyard, M.A., B.Sc., delivered a fine lecture on the "Life History of a Dragon Fly," a subject on which he is a recognised authority. To these three gentlemen the thanks of the Society are due.

Nine members were admitted during the year, and there are now 12 corresponding members and 95 life and

ordinary members. Two corresponding and at least two ordinary members are on active service, while some others are engaged in home defence and in munition work.

During the year we suffered the loss of one of our oldest members, Mr. F. Manson Bailey, C.M.G., F.L.S., etc.,* and there also passed away Mr. C. W. DeVis, M.A. who was for a long time a prominent member, and Mr. C. W. Costin, a member for a number of years prior to 1914.

FREDERICK MANSON BAILEY, C.M.G., F.L.S., ETC.

Frederick Manson Bailey was born on the 25th March, 1827, at Hackney, London, where his father, John Bailey, was connected with Loddiges' nurseries. At the end of 1838 the latter with his family sailed for South Australia arriving there in the following March. He brought out a number of interesting plants, and soon after landing, at the request of the then Governor, he started to form a Botanic Garden, and was appointed Colonial Botanist. F. M. Bailey assisted his father in this work, and though only twelve years of age at the time, had gained some knowledge of plants from his parent. Hard times affecting the young colony, the work could not be continued, so the Baileys started farming and subsequently opened a plant nursery in Adelaide, F. M. Bailey joining his father in the undertaking, which became noteworthy for the introduction of many plants now grown in that State for commercial purposes. F. M. Bailey, with a thirst for botanical investigation, journeyed to New Zealand in 1858, but, owing to the Maori war, left there in 1861 for New South Wales and came to Queensland in the same year. From this time until his appointment as Colonial Botanist in 1881, he did a good deal of collecting in various parts of the State and contributed articles, principally for newspapers, on plant life generally. His first publication of any note was the "Handbook of Queensland Ferns," issued in 1874. Towards the end of the seventies he acted as

* I am indebted to Mr. J. Bailey, Director of the Brisbane Botanic Gardens and Government Botanist, for information supplied to me, regarding his father; and to Mr. Henry Tryon, Government Entomologist, for his generous assistance regarding Mr. C. W. DeVis' obituary notice.

botanist to the Board appointed to inquire into the diseases of live stock and plants, his work in this connection bringing him into touch with the inland parts of the State. He collaborated with the Rev. J. E. Tenison-Woods in bringing out a "Census of the Flora of Brisbane," which was published in the fourth volume (1880) of the Proceedings of the Linnean Society of New South Wales.

About the time of his appointment as Colonial Botanist, he was offered, through the Kew authorities, a position with the Government of India, but having an ambition to work up the flora of Queensland, declined it. Until a few years ago he was an active member of this Society, having held the positions of President (1890-1) and Vice-President (1891-2) and was also a member of the Council from 1883 until 1900. While the Field Naturalists' Section of the Society was in existence, he was one of the most active workers and accompanied the members on numerous excursions. His advancing age prevented him from attending our meetings during the past few years. He was a life member of our Society, and—like the late Mr. C. W. DeVis—a member of its first Council (1883). The first paper published in its Proceedings was Mr. Bailey's "Contributions to the Queensland Flora." (P.R.S. Q'land I., 1884, pp. 8-12.)

As one of the local commissioners appointed by the Queensland Government for the Exhibition held in London in 1886, and in Melbourne in 1888, he arranged for the collection and classification of an exhibit of timbers, the result being that over six hundred kinds were got together. A useful descriptive catalogue from his pen accompanied the exhibit on each occasion. On his advice a duplicate set was prepared and retained in the State and this is now on view in the Botanic Museum at the Brisbane Botanic Gardens.

Owing to his extensive knowledge of horticultural matters, especially in regard to fruit growing, his advice was eagerly sought by those interested in this subject, and many years ago he drew attention to the possibilities of the Stanthorpe district as suitable for production of European fruits. He wrote a number of articles on the

subject, one of which was "A Half Century of Notes for the guidance of Amateur Fruit Growers." In 1896 he represented the Queensland Government at a conference of fruit growers held at Wellington, N.Z., when he contributed a paper on "Queensland Blight Fungi," a subject with which he was well conversant. He paid visits to many parts of the State in connection with his work, one of the most noteworthy being that to the Bellenden Ker Ranges in company with Mr. Archibald Meston in 1889, which resulted in a number of new and interesting species being added to the flora. Another one to the islands of Torres Straits and Cape York in 1897 brought to light additional knowledge of the flora of that portion of the State and formed the subject of a paper read at the Sydney meeting of the Australasian Association for the Advancement of Science, in 1898.

He always had an aversion to interfere with the work of other botanists and this was the reason why he would not describe plants sent to him from New Guinea prior to the death of Baron von Mueller, but forwarded them to that noted scientist who then was the sole Australian worker. Afterwards, however, he contributed, as occasion offered, articles on the flora of that island, in the *Queensland Agricultural Journal*, some of the most interesting of which appear in the August, 1898, and subsequent issues. The material for these was obtained in that year while accompanying Lord Lamington's party on a visit to Sir William McGregor, who was a close friend of the late Mr. F. M. Bailey. A brief account of this trip appears in Volume XIV. of the Proceedings of this Society.

In recognition of his labours in the cause of his beloved subject he was awarded the "Clarke Memorial Medal" in 1902, by the Royal Society of New South Wales, and created a Companion of the Order of St. Michael and St. George, by His Majesty the King, in 1911.

He was president of Section D. (Biology) at the Sydney meeting of the Australasian Association for the Advancement of Science in 1911.

Fellow botanists have attached his name to about fifty species of plants to commemorate his connection with

the Australian flora, e.g., *Acacia baileyana*, F. v. M.; *Samadera baileyana*, F. v. M.; *Indigofera baileyi*, Oliv.; *Eucalyptus baileyana*, F. v. M.; *Cryptandra baileyi*, F. v. M.; *Tecoma baileyana*, Maid. & Baker; *Persea baileyana*, F. v. M.; *Dendrobium baileyi*, F. v. M.; *Bulbophyllum baileyi*, F. v. M.; *Panicum baileyi*, Benth.; *Ditrichium baileyi*, C.M.; *Dicranum baileyi*, C.M.; *Dicronella baileyana*, C.M.; *Trematodon baileyi*, Broth.; *Leucobryum baileyianum*, C.M.; *Macromitrium baileyi*, Mitt.; *Schelothemia baileyi*, Broth.; *Distichophyllum baileyianum*, C.M.; *Splachnobryum baileyana*, Broth.; *Hookeria baileyi*, Broth.; *Neckera baileyi*, C.M.; *Meteorium baileyi*, Broth.; *Homalia baileyana*, C.M.; *Isopterygium baileyianum*, C.M.; *Fabronia baileyana*, C.M.; *Plagiochila baileyana*, Steph.; *Euosmojeunea baileyana*, Steph.; *Eumitria baileyi*, Stirt.; *Ocellularia baileyi*, Mull. Arg.; *Graphus baileyana*, Mull. Arg.; *Helminthocarpum baileyianum*, Mull. Arg.; *Parmentaria baileyana*, Mull. Arg.; *Endocarpon baileyi*, Stirt.; *Pyrenula baileyi*, C.K.; *Merulius baileyi*, B. and Br.; *Clavaria baileyi*, Masee; *Cyathus baileyi*, Masee; *Ascobolus baileyi*, B. and Br.; *Nummularia baileyi*, B. and Br.; *Asterina baileyi*, B. and Br.; *Colcochæte baileyi*, Moeb.; *Spirogyra baileyi*, Schmid.; *Alsophila baileyana*, Domin.; *Hymenophyllum baileyianum*, Domin.; *Trichomanes baileyianum*, Watts; *Asplenium hookerianum baileyianum*, Domin.

He was a Fellow of the Linnean Society of London; Associé de la Société Royale de Botanique de Belgique; and Corresponding Member of the Linnean Society of New South Wales, the Royal Society of South Australia, the Royal Society of Tasmania, the Royal Society of Victoria, the Botanical Society of Edinburgh, and the Pharmaceutical Society of Great Britain

He died on 25th June, 1915, at the ripe age of 88, practically in harness, having been engaged in his botanical work up to the time of his final illness, which was a short one. Many of us will miss his kindly smile and his geniality which always awaited his friends when visiting the Herbarium. His willingness to help those interested in our flora is worthy of special mention.

It is a pleasure to us to know that his work is being continued, as far as other departmental duties will allow, by his son, Mr. J. F. Bailey, to whose duties as Director of the Brisbane Botanic Gardens, those of Government Botanist have been added, and in this sphere of labour he is being assisted by the late Mr. F. M. Bailey's grandson, Mr. Cyril T. White.

The late Mr. Bailey's publications are as follows:—

Trans. Phil. Soc. Q'land:—

A few remarks on our naturalised Solanums, III, March, 1881, 4 pp.

Proc. Roy. Soc. Q'land:—

Contributions to the Queensland Flora, I, (1), 1884, p. 9; I, (2), p. 84; I, (3), 148; A contribution towards the Flora of Mt. Perry, I, (2), 61; Fasciation in *Sicyos argulata* L. I, (2), 102; Fasciation in *Bouvardia*, III, 153; Description of a new species of *Acacia*, V, (3), 1888, 121; Description of a Queensland form of *Nipa fruticans*, V, (4), 146; Note on *Acacia melaleucoides*, V, (4), 148; Concise History of Australian Botany, VIII, (2), xvii; Notes on some plant specimens collected by Dr. T. L. Bancroft on the Diamantina, VIII, (4), 128; Description of a new Eucalypt, X, 1893, 17; Exhibit of a bunya nodule, etc., X, 1894, 53; An account of the Easter excursion . . . to Eumundi, X, 1894, 51; Obituary notice of Dr. C. Prentice, X, 50; Botanic Notes, XI, 1894, 14; Notes on the Vegetation of New Guinea, XIV, 14; Contributions to the Flora of New Guinea, XVIII, 1.

Government Printer, Brisbane.

A classified Index of the Indigenous and Naturalised Plants of Queensland, 1883; Synopsis of the Flora of Queensland, 1883-1884; Catalogue of plants in the two Metropolitan Gardens, the Brisbane Botanic Garden and Bowen Park, 1885; Occasional papers on the Queensland Flora, 1886; Suppl. Synopsis of Q'land Flora and Classified Index, 1886; Second supplement, ditto, 1888; Botany of the Bellenden Ker Expedition, 1889; A classified Index of the Indigenous and Naturalised Plants of Queensland, 1889;

Third Suppl. Syn. Q'land Flora, 1890; Addenda to Third Suppl., 1890; Contributions to the Queensland Flora, Dept. Agric. Bull. 4, 1890; Bull. 7, 1891; Bull. 9, 1891; Bull. 13, 1891, Bull. 18, 1892; Lithograms of the Ferns of Queensland, 1892; Bull. 20 (Botany Bull. 6) Contrib. Q'land Flora, 1893; Companion for the Queensland Student of Plant Life, 1893; Second Edition, 1897; Bull. 21 (Bot. Bull. 7), 1893; Botany Abridged, etc., 1894; Bot. Bull. 8, 1893; Bot. Bull. 9, 1894; Bot. Bull. 10, 1895; Additions to Flora of New Guinea, 1895; Bot. Bull. 11, 1895; Peculiarities of the Queensland Flora. Bot. Bull. 12, 1895, pp. 11-26; Bot. Bull. 13, 1896; Additions to the New Guinea Flora, 1896 (April and Oct.); Bot. Bull. 14, 1896; Bot. Bull. 15, 1898; Bot. Bull. 16, 1903; Bot. Bull. 17, 1913; Weeds and suspected poisonous plants of Queensland, 1906; The Queensland Flora (6 parts), 1899-1902; Comprehensive Catalogue of the Queensland Plants, 1912; Official Guide to the Queensland Museum of Economic Botany, 1891 (Govt. Printer, Brisbane).

Queensland Agricultural Journal:—

Contributions to the Flora of Queensland and New Guinea, Vol. 1, onwards (1897-1915); Plants reputed to be poisonous to Stock (*Colostemma luteum*, etc.), 1, 1897, 328; A neglected natural product (The ear fungus—a Chinese soup plant) 2, 1898, 40; Plants reputed poisonous to stock (Prickly lettuce, *Lactuca scariola*) 2, 40; ditto (Order Cycadaceæ) 2, 131; Edible fruits indigenous to Queensland, No. 1. Davidson plum.—No. 2. Endeavour River Pear. 2, 471; Indigenous rubber plant (*Excaecaria dallachyana*) 3, 1898, 284; Plants reputed poisonous to stock (Noogoora Burr, *Xanthium strumarium*) 3, 356; ditto (Redhead or milky cotton bush *Asclepias curassavica*) 3, 437; ditto (Hedge nettle *Stachys arcensis*) 4, 1899, 49; ditto (*Pratia erecta*) 4, 285; ditto (Arsenic plant *Hibbertia bennettii*) 4, 465; Economic Botany (The Kei Apple *Aberia caffra*) 4, 468; Plants reputed poisonous to Stock (Scarlet blood-root, *Haemodorum coccineum*) 5, 1899, 41-2; ditto (Wallflower poison-bush, *Gastrolobium grandiflorum*) 5, 287; ditto (the physic nut, *Jatropha cueca*) 6, 1900, 382-3; ditto (Leichhardt's Leguminous Ironbark,

Erythrophloeum labouchei) 7, 1900, 153; Noxious weeds (yellow water lily, *Nymphaea flava*) 7, 154; ditto (climbing buckwheat, *Polygonum convolvulus*) 7, 441; An abnormal growth in a papaw fruit 7, 442; Plants reputed poisonous to stock (*Sarcostemma australe*) 7, 259; ditto (*Gomphocarpus brasiliensis*) 7, 348; A New Guinea food plant 7, 442; Noxious weeds (Chinese burr, *Triumfetta rhomboidea*) 8, 1901, 111; Stink grass of Brazil (*Melinis minutiflora*) 9, 1901, 215; On the so called African Wonder-grass 21, 1908, 8.

Ann. Rep. Brit. New Guinea.

Contributions to the Flora of New Guinea, 1897-8 (1898), 137; Contributions to the Flora of New Guinea, 1899-1900 (1901), p. 133; Account of a New Guinea food plant, p. 134; Contributions to the Flora of Brit. New Guinea, 1900-1 (1902), 142; Names of easily recognised plants observed by Lord Lamington's party during New Guinea trip in Lord Lamington's Report of a visit to Brit. New Guinea—Parliamentary paper, June, 1898, p. 27.

Report by the Government Botanist on Botanical specimens collected by Mr. A. Meston on or about the Bellenden Ker Range, in report by Mr. Meston on the expedition to the Bellenden Ker—Parliamentary paper, March, 1904, p. 9.*

Proc. Linn. Soc. N.S. Wales (1st Series):—

A general account of the Flora of tropical Queensland, II, 276; On the Ferns of Queensland, III, 118; On some of the introduced plants of Queensland, IV, 26; On a new species of fern, *Asplenium prenticei*, IV, 36; Medicinal plants of Queensland, V, 1; On Queensland Ferns with a description of two new species, V, 29; On a new species of *Nepenthes*, V, 185; On the Flora of Stradbroke Island, etc., VI, 139.

Proc. Roy. Soc. Tasmania.

Our Grasses (Queensland), 1875 (1876), 127; A few remarks on the distribution and growth of Queensland plants, 1878, 51.

* I am indebted to Mr. C. T. White for many of the above references to Mr. Bailey's papers.

Miscellaneous.

Queensland Blight Fungi, Notes and Exhibit at Fruit-growers' Conference. Wellington, New Zealand, May, 1896, 8 pages; Handbook of the Queensland Ferns, Brisbane, 1874; The Fern World of Australia, with names of the Queensland species, etc., Brisbane, 1881; The Flora of Queensland. Colonial and Indian Exhibition, London, 1886; a few Queensland grasses, etc.; Queensland woods, etc.; a sketch of the Economic Plants of Queensland;—Queensland Commission—Colonial and Indian Exhibition, London, 1886; 2nd Ed., Melbourne Exhibition, 1888; 3rd Edit., Greater Britain Exhibition, London, 1899.

Rep. Austr. Assoc. Adv. Science.

A review of the Fungus blights which have been observed to injure living vegetation in the Colony of Queensland, IV, 1892 (1893), p. 388; Peculiarities of the Phanerogamic Flora of Q'land, VI, 1895, p. 389; A few words about the flora of the islands of Torres Straits, etc., VII, 1898, p. 423.

F. M. Bailey and P. R. Gordon—

Plants poisonous to stock—Govt. Printer, Brisbane, 1887.

F. M. Bailey and K. T. Staiger—

An illustrated Monograph of the Grasses of Queensland—Brisbane, 1879.

F. M. Bailey and J. E. Tenison-Woods—

A census of the Flora of Brisbane, P.L.S., N.S.W., Ser. 1., IV, 137; On some of the Fungi of N.S.W. and Queensland, *l.c.*, V, 50.

C. W. DEVIS, M.A.

Mr. Charles Walter Devis or DeVis (born 9th May, 1829; died 30th April, 1915—aged 86 years) was a scientific worker who, like Mr. Bailey, was especially identified with the founding and development of this Royal Society. He was a member of its first Council and eventually became

President. He was also a very important contributor to our Proceedings, as can be seen by a glance at the list of his published work.

He was a son of James Devis, of Birmingham, and a relative of the well known portrait painters, Arthur and Arthur William Devis, father and son, who flourished in the 18th and 19th centuries. His early education was received at Edward VI's Grammar School, Birmingham, whence he proceeded to Magdalen College, Cambridge, graduating B.A. He did not take the degree of M.A. until many years afterwards. He entered the Church of England and was ordained, becoming rector of Brecon, in Somersetshire. Later, his enthusiasm for natural history led him to accept the position of Curator of the Queen's Park Museum, Rockvale, Manchester, and while there he actively interested himself in Anthropology, becoming a vice-president of the newly formed Anthropological Society. It was about this time that his earliest papers, of which I have a record, were published (1865-1870).

In June, 1870, he left for Australia, arriving in Rockhampton in November of that year, and eventually settling at Black Gin Creek, near that City, and, later, in the Clermont district. Subsequently he revisited England. On his return to Rockhampton he became the librarian of its School of Arts. During this time he contributed a number of articles on the local bird-life and geology to the *Queenslander* under the pen-name of "Thickthorn."

In January, 1882, he came to Brisbane to take up the Curatorship, afterwards designated Directorship, of the Queensland Museum in succession—after a long interregnum—to Dr. W. A. Haswell, now Professor of Biology in Sydney University. This position he occupied for nearly twenty-three years, retiring on account of age in 1905, though his services were retained as a consulting specialist until three years before his death.

In estimating the value of Mr. DeVis' work at the Museum, one must take into consideration the smallness of the staff and of the annual vote for the upkeep of the institution at the time. He did a great deal of classifica-

tion work, added very considerably to the collections, and built up a fine library. He also did much to explore and make known the post-pliocene bone deposits of this and other States.

One feature of the mineral collection, as arranged by him, deserves mention, viz. : the arrangement of the ores and their country rocks according to their local occurrence. This collection was duplicated and then forwarded to the Indian and Colonial Exhibition in London and served as an advertisement of the mineral resources of Queensland. He also arranged the magnificent collection of specimens relating to the natives of British New Guinea, got together and forwarded by Sir William MacGregor while administrator of the territory.

Owing to extreme congestion, it was found necessary to remove the Museum from William St. (Public Library Building) to its present position (Exhibition Building, Bowen Park), Mr. DeVis superintending the removal and rehabilitation.

It was during his tenure of office that the publication of the Annals of the Queensland Museum was commenced.

As already mentioned, he was a member of our Council from 1884 until 1894, vice-president in 1884-5 and 1886-7, becoming President in 1888-9. In 1882 he was elected a corresponding member of the Linnean Society of N.S.W. ; in 1888 a vice-president of the Australasian Association for the Advancement of Science at its first meeting in Sydney, while in 1893 he became president of section D (Biology) at the Adelaide meeting. He was also a member of the " Vernacular Names for Australian Birds " Committee, assisting in the drafting of the final report. He was also a member of the committee for the scientific exploration of the islets of the Great Barrier Reef, but owing to lack of funds the Committee lapsed. In 1900 he was elected an Honorary Member of the Royal Geographical Society of Australasia, Queensland Branch ; and in 1901 was appointed a vice-president of the Australian Ornithologists' Union. He was also a member of the British Ornithologists' Union.

He was one of the local commissioners to the International Exhibition held in Melbourne in 1888, as well as to Indian and Colonial Exhibition in London in 1886.

In regard to Mr. DeVis' scientific work, it may be mentioned that about forty papers were published by him in the Proceedings of this Society, between 1884 and 1894. Whilst Sir William MacGregor was Administrator of British New Guinea, Mr. DeVis furnished him with eight reports on the avian and reptilian fauna and anthropology, based on collections made under the auspices of the Lieutenant Governor. These were printed in the latter's Annual Reports for the Territory, 1884-1894, and have, in some instances, been reprinted by the Colonial Office and the British Ornithologists' Union.

He was an active Corresponding Member of the Linnean Society of N.S.W. and published nearly forty papers in its Proceedings.

As one might have expected, the Annals of the Queensland Museum contain many contributions from his pen.

At the time of his death, Mr. DeVis was engaged upon a comparative vocabulary of the Australian race, a compilation drawn from numerous sources. Mr. Tryon informs me that he believes that the manuscript has, in compliance with Mr. DeVis' request, been handed over to the Queensland Department for the Protection of Aborigines.

Mr. DeVis' reputation as a scientific investigator rests chiefly on his work on the vertebrate fossils of Australian post-tertiary deposits. He, however, carried out a great deal of systematic work on recent mammals, birds, reptiles and fish, and besides was also interested in Anthropology, and published a few small papers on Papuan ethnology.

The following is a list of Mr. DeVis' published papers:—

Ornithological Notes from Manchester. *Zoologist* 23, 1865, pp. 9596-7; Notes on the Myology of *Viverra civetta*, *Journal of Anatomy and Physiology*, 2, 1868, pp. 207-217; Elasticity of Animal type, *Anthropol. Soc. Mem.* 3, 1870, pp. 81-105. These three were published prior to his arrival in Australia.

Proc. Roy. Soc., Queensland.

The Moa (*Dinornis*) in Australia I. (1) 1884, 23 ; On *Ceratodus*, post-pliocene I, (1), 40 ; On new Australian lizards I, (2), 1884, 53 ; On a new form of the genus *Therappon* I, (2), 56 ; On new Queensland lizards I, (2), 77 ; On new species of Australian lizards I, (2), 97 ; On a new species of *Hoplocephalus* I, (2), 100 ; Notes I, (2)—On an anomalous snake, p. 58, a possible source of isinglass, p. 58 ; nest of *Philemon corniculatus*, p. 58, deglutition in the freshwater snake, p. 82, *Perameles bougainvillii*, p. 101 ; On apparently new species of *Halmaturus* I, (3), 1884, 107 ; On new species of *Hyla* I, (3), 128 ; Descriptions of new snakes with a synopsis of the genus *Hoplocephalus* I, (3), 138 ; On new fish from Moreton Bay I, (3), 144 ; Notes on the fauna of the Gulf of Carpentaria I, (3), 154 ; A conspect of the genus *Heteropus* I, (4), 1885, 166 ; Notes on a whale *Ziphius layardi* recently stranded near Southport I, 4, p. 174 ; On bones and teeth of a large extinct lizard II, (1), 1885, 25 ; Description of a species of *Eleotris* from Rockhampton II, (1), 32 ; On an extinct monotreme, *Ornithorhynchus agilis* II, (1), 35 ; On a lizard and three species of *Salarias* II, (1), 56 ; Notice of a fish apparently undescribed II, (2), 1886, 144 ; On a fossil saurian II, (2), 181 ; Notice of a probable new species of *Dendrolagus* III, 1887, 11 ; A post-pliocene artiodactyle III, 42 ; On a femur probably of *Thylacoleo* III, 122 ; Notes (various) III, 31, 142 ; On an extinct Mammal of a genus apparently new (*Owenia*) IV, 1887, 99 ; On a third species of the Australian tree kangaroo IV, 132 ; On *Diprotodon minor* V, (2), 1888, 38 ; On the genera *Nothotherium* and *Zygomaturus* V, (3), 111 ; Australian Ancestry of the Crowned Pigeon of New Guinea V, (4), 127 ; On an extinct genus of mammals V, (5), 1889, 158 ; On a naked-eyed skink apparently new V, (5), 160 ; *Colluricincla sibila*, n. sp. V, (5), 161 ; Additions to the list of fossil birds VI, (1), 1889, 55 ; On *Megalania* and its allies VI, 93 ; On the Phalangistidæ of the post-tertiary period on Queensland VI, 105 ; Exhibit of fossil bones VI, 126 ; On a bone of an extinct eagle VI, 161 ; Description of new birds from Herberton VI, (5), 242 ; A further account of *Prionodura newtoniana* VI, (5), 245 ; A new *Acanthiza* from Herberton VI, (5),

248 ; List of birds, lizards and snakes collected at Cambridge Gulf (by Saville Kent) VI, (5), 236 ; Descriptions of two new vertebrates in Mr. Saville Kent's collection VI, (5), 237 ; The Ribbon fish VIII, (4), 1892, 109 ; The lesser Chelonians of the Nototherian drifts X, 1894, 123 ; On the mandible of *Zygomaturus* XI, (1), 1895, 5.

Annals of the Queensland Museum :—

Zoology of British New Guinea—vertebrate, 2, 1892 ; The extinct freshwater turtles of Queensland, 3, 1897 ; Occasional notes :—A Papuan Kite : A further trace of an extinct lizard : Bones and diet of *Thylacoleo* : Description of a *Charmosinopsis* ; A new species of hairy-nosed wombat, 5, 1900, 16 pp. ; A contribution to the knowledge of the extinct avifauna of Australia, 6 (date ?), 3 ; Fossil vertebrates from New Guinea 6, 26 ; Papuan charms 6, 32 ; Bats, 6, 36 ; Ornithological (Notes) 6, 41 ; Reptilia—A new genus of lizards, etc. 6, 46 ; Fossils from the Gulf watershed 7, 1907, 3 ; an eccentric rat, 7, 8 ; A New Guinea tree rat 7, 10 ; A Papuan relic 7, 12 ; On some Mesozoic Fossils, 10, 1911, 1 ; Annelid Trails, 10, 12 ; *Palæolestes gorei*, n. sp., an extinct bird, 10, 15 ; Cestraciontidæ, 10, 18 ; A wild dog from British New Guinea 10, 19 ; Description of Snakes apparently new, 10, 21 ; A second species of *Enoplosus*, 10, 29 ; A fisherman's spider, 19, 167.

The Linnean Society of N.S. Wales. Series 1.

Descriptions of three new fishes of Queensland VII, 318 ; Description of a species of squill from Moreton Bay VII, 321 ; Descriptions of some new Queensland fishes VII, 367 ; Description of two new birds of Queensland VII, 561 ; Description of a new *Belideus* from Northern Queensland VII, 619 ; Description of two new Queensland fishes VII, 620 ; On the remains of an extinct marsupial VIII, 11 ; On tooth-marked bones of extinct marsupials VIII, 187 ; On *Brachalletes palmeri* an extinct marsupial VIII, 190 ; Notes on the lower jaw of *Palorchestes azael* VIII, 221 ; Descriptions of new genera and species of Australian fishes VIII, 283 ; Myology of *Chlamydosaurus Kingii* VIII, 300 ; On a fossil Calvaria VIII, 392 ; On a

fossil humerus VIII, 404 ; Fishes from the South Sea Islands VIII, 445 ; On some new Batrachians from Queensland IX, 65 ; New Australian fishes in the Queensland Museum, part I, IX, 389 ; Part II, IX, 453 ; Part III, IX, 537 ; Part IV, IX, 685 ; Part V, IX, 869.

The Linnean Society of N.S. Wales. Series 2.

On certain Geckos in the Queensland Museum I, 1886, 168 ; On new and rare vertebrates from the Herbert River, N.Q. I, 1129 ; A contribution to the herpetology of Queensland II, 1887, 811 ; On a supposed new species of *Nototherium* II, 1065 ; On an extinct genus of Marsupials allied to *Hypsiprymnodon* III, 1888, 5 ; A glimpse of the post-tertiary avifauna of Queensland III, 1277 ; Description of two lizards of genera new to Australian herpetology IV, 1889, 1034 ; Reptiles from New Guinea V, 1890, 497 ; On the trail of an extinct bird VI, 1891, 117-122 ; Note on an extinct eagle VI, 123-5 ; In confirmation of the genus *Owenia* so-called VI, 159 ; The incisors of *Sceparnodon* VI, 258 ; Remarks on the post-tertiary *Phascolomyidæ* VI, 235 ; Residue of the extinct birds of Queensland as yet detected VI, 437-456 ; Note on the upper incisor of *Phascolonus* VIII, 1893, 11 ; A Thylacine of the earlier Nototherian period in Queensland VIII, 443 ; A review of the fossil jaws of the *Macropodidæ* in the Queensland Museum X, 1895, 75 ; Description of a Flycatcher, presumably new X, 171.

New Zealand Journal of Science.

The Moa in Australia (2), 1, 1891, pp. 97-101.

Annual Report on British New Guinea.

Report on Reptiles of B.N. Guinea, 1888-9, p. 62 ; Report on Birds, 1888-9, p. 57 ; Report on Zoology, 1889-90, p. 107 ; Report on the Zoological Gleanings of the Administration during the year 1890-1 (1892), p. 93 ; Report on Ornithological specimens collected in Brit. New Guinea, 1893-4, p. 99* ; Report on Ethnological specimens, etc.,

* Also in Blue Book, 1894, p. 1, *vide* Zoological Record, 1894. Aves, p. 6.

1893-4, p. 98 ; Report on a recent Anthropological collections, New Guinea, 1895-6, p. 91 ; Report on the Birds of New Guinea, 1896-7, Appendix AA., p. 81.

Proc. Q'land Branch, Roy. Geogr. Soc. Austr.

On the word " Kangaroo " X, 1894-5, p. 35.

Miscellaneous.

Zoology of Bellenden-Ker as ascertained by the late expedition under Mr. A. Meston, in report of the Govt. Scientific Expedition to Bellenden-Ker Range, etc., Govt. Printer, Brisbane, 1889. Reptiles of New Guinea, in J. P. Thomson's British New Guinea, 1892 (Brisbane), p. 273.

Report of the Australasian Association for the Advancement of Science.

Presidential Address—" Life " V, 1893 (1894), p. 104.

The Ibis.

Report on birds from New Guinea (Appendix to Ann. Report Brit. New Guinea, 1889) reprinted in *Ibis*, 1891, p. 25 ; Thirty-six new or little known birds from British New Guinea, 1897, p. 371 ; Description of a new Paradise bird from British New Guinea, 1897, p. 250.

Proc. Roy. Soc. Victoria.

Remarks on a fossil implement and bones of an extinct Kangaroo XII (N.S.), 1899, p. 81 ; On some remains of marsupials from Lake Colongulac, Victoria, XII, 107.

CHARLES WILLIAM COSTIN.

The late Mr. Charles William Costin, Clerk of Parliament and of the Legislative Council, died from pneumonia on 13th September, 1915, at the age of 55. He was a member of the Royal Society for a number of years, but resigned towards the end of 1914. Though not a contributor to the Proceedings, he took a keen interest in the work of the Society. For a time he followed journalism, but eventually he was appointed to the *Hansard* staff. From 1884 to 1896 he was third Clerk of the Legislative Council, and in 1896 he was made Clerk Assistant and Usher of the Black

Rod. The latter post he held till 1908. He was a member of various other societies and was actively interested in all public matters.

I think that this is an appropriate occasion to refer to the loss to science caused by the death of Dr. T. S. Hall, M.A., D.Sc., Lecturer in Biology in the University of Melbourne, and a prominent member of the Royal Society of Victoria. He ranked as a world-wide authority on the Graptolites and by his death Australia has lost one of her foremost palæontologists.

It is our privilege to congratulate three of our corresponding members on winning laurels in 1915—Professor T. W. E. David, C.M.G., B.A., D.Sc., F.R.S., of Sydney University, on his being awarded the Wollaston Medal of the Geological Society of London in recognition of his work on Antarctic and Australian geology; Mr. J. H. Maiden, Director of the Botanic Gardens, Sydney, firstly on his election as a Fellow of the Royal Society (London), and secondly on his gaining the Linnean Medal of the Linnean Society of London for his valuable work on Australian botany; and also Prof. J. A. Pollock, D.Sc., of Sydney University, on his election as a Fellow of the Royal Society (London).

One of our members, H. C. Richards, lecturer in geology in the University of Queensland, was awarded the degree of D.Sc., by the Melbourne University for his thesis on the volcanic rocks of South Eastern Queensland, which has just been published by this Society. His investigation has extended over several years and has added considerably to our knowledge of the geology of this State.

Walter and Eliza Hall Fellowships.

The trustees of the Walter and Eliza Hall Trust have established certain fellowships in the University of Queensland and these, it is hoped, will be the means of enabling research work of a high order to be carried out in this State. They will be an enduring monument to the names of the two generous donors who have bequeathed their wealth in such a way as to benefit educational and other institutions in Eastern Australia. It is to be hoped that

the example set may lead others in our State to render similar service. Our University has so far received comparatively little in the way of private endowments.

The trustees have founded fellowships in engineering, economic biology and pure chemistry, and a school of applied chemistry, the appointments being made by the Senate of our University subject to the consent of the Trustees of the fund.

Mr. L. S. Bagster, B.Sc., a member of this Society, has been appointed to control the School of Applied Chemistry which will be a branch of the department of Chemistry. He has spent some time in Europe and America gaining experience in applied chemical science. His enquiries abroad have led him to believe that the methods of training as applied chemists adopted by the American Universities and Technical Institutes are more suitable for Australian conditions than those of the English and German institutions. The American schools aim at producing an individual who can respond to the demands of any industry which may need his assistance, rather than one who has been trained for work in one or two industries only. Such a man should not only be a chemist but also an engineer and a man possessing a knowledge of business principles, though of course one could not expect him to be an expert in all these directions. The Senate of the Queensland University propose to include in the curriculum for the degree of Bachelor of Applied Science, full courses in pure chemistry, a special course in the principles of engineering, and a special course in the general principles upon which industrial processes are based, rather than specialised courses in any specific process such as the chemistry of brewing, dyeing, tanning, etc. A graduate from the school should be able, not only to decide upon the possibilities of any suggested scheme, but also to discover and initiate for himself. He should be able, as well, to plan and equip the necessary plant.

Such a school, which is the first of its kind in Australia, should be of material benefit to the community in furthering our industrial development.*

* I am indebted to Mr. Bagster for the above details regarding the School of Applied Chemistry.

The fellowship in pure chemistry has been awarded to Dr. H. G. Denham, one of our former members, while that in economic biology has been allotted to me. It is my intention to continue my work on Australian parasitology, giving more especial attention to the parasitic organisms affecting stock and other domesticated animals in Queensland.

The fellowship in engineering is granted to a graduate in Engineering in our University, who must, during the first two years of its tenure, travel abroad and carry out work either in technical manufacturing works or engineering research laboratories, or else in connection with special engineering enterprise; while during his third year he must assist in teaching and demonstrating in the Engineering school of the University.

The Commonwealth Government and Applied Science.

The Commonwealth Government has interested itself in industrial and scientific research and is now considering, in conjunction with the State Government, the appointment of a highly trained entomologist who shall be specially qualified to deal with the insect pests of the sugar cane. This is a matter of importance to Queensland. It has also assisted several workers who are investigating the problem of worm nodules in Australian cattle.

Moreover the Prime Minister now proposes to establish a *Commonwealth Bureau of Science and Industry*. An advisory committee, consisting of scientific and business men, has been formed to assist the Government in formulating a scheme and has recommended that the functions of the Institute should be, amongst other things, "to consider and initiate scientific researches in connection with, or for the promotion of, primary or secondary industries in the Commonwealth"; "the establishment of national laboratories"; . . . "the immediate utilisation of existing institutions, whether Federal or State, for the purposes of industrial scientific research"; . . . "the establishment and award of industrial research studentships and fellowships . . ."; "to draw attention to any new industries which might be profitably established in the Commonwealth" . . . ; "the co-ordination and

direction of scientific investigation and of research and experimental work with a view to the prevention of undesirable overlapping of effort" . . . "to recommend grants by the Commonwealth Government in aid of pure scientific research in existing institutions"; etc. It is also recommended that the Institute should be controlled by a small directorate consisting of a capable business man and two highly qualified scientists.

Amongst the problems calling for early attention are many of a chemical nature, while a few are biological, e.g., the control of the sheep fly pest, the eradication of prickly pear, and the re-establishment of saltbushes and allied fodder plants.

The National Park.

Towards the end of 1915, the Government of this State, to its credit, proclaimed as a national park a large area, comprising about 47,000 acres, situated in south-eastern Queensland, contiguous with New South Wales and including the scenic Lamington Plateau. In order that this fine tract of mountainous country, which is about 60 miles from Brisbane, might be more than a mere reserve, the Queensland branch of the Royal Geographical Society initiated a movement to stimulate public interest in the matter and the co-operation of the Royal Society and of other bodies was sought.

Representatives met in conference and agreed that joint action should be taken and, as a result, a public meeting was called in order to elect members of a delegation (including a nominee of our Society), to interview the Hon. the Minister for Lands and offer its services in an advisory capacity on matters connected with the control and development of the Park.

With reference to scientific work within the State, other than that connected with our Society, I might mention that the Queensland Museum is still continuing its good work. Last year volume 4 of its Memoirs was published and volume 5 is expected within the next few weeks.

The Geological Survey is now publishing not only routine and economic work, such as mining reports, but also purely scientific work.

A recent memoir, which was issued at the end of 1915, contains a report on our Mesozoic flora by our Hon. Secretary, Mr. Walkom, who is still engaged in its study; whilst one just issued contains Mr. R. J. Tillyard's account of the Mesozoic and Tertiary insect remains discovered by the Government Geologist, Mr. Dunstan.

The members of the staff of the Australian Institute of Tropical Medicine, Townsville, North Queensland, are continuing their investigations in regard to disease, parasites, mosquitoes, biting flies, etc., a number of reports having appeared in various publications during the year.

Before concluding this, the first portion of my address, I think it appropriate that I should refer to recent work regarding two biological problems of outstanding importance to this State, viz., the eradication of prickly pear and the control of the parasite, *Onchocerca gibsoni*, Cleland and Johnston, which produces "worm-nodules" or "worm-nests" (worm fibromata) in such a large percentage of our cattle and thereby causes great loss to the meat producing industry. As you are aware, I have been actively interested in both of these matters.

THE ERADICATION OF PRICKLY PEAR.

The various species of prickly pear, *Opuntia* spp., cover huge tracts of territory in this State as well as in New South Wales. The most important, because the most abundant, is the common pest pear *Opuntia inermis* var., and its more spiny variety (or perhaps related species) which we may term the Burnett Prickly Pear, as it is particularly prevalent in certain portions of the valley of that river, though it occurs also elsewhere in this State. Probably the most widely distributed species in Australia is *O. monacantha*.

Some years ago the Queensland Government established an experimental station at Dulacca, in the heart of one of the infested districts and placed it under the control of one of our members, Dr. Jean White-Haney,

who has been steadily experimenting with a view to determining the most efficient method of destroying the pest by chemical means. In estimating the question of efficiency it has been necessary to take into consideration various factors such as the cost of labour and material ; the method of application of the poisons, whether as infectious in a liquid or solid form or as sprays ; the time of the year ; the effect of rainfall just prior to or just after treatment ; the advantage (if any) of chopping down the pear in order to facilitate the action of the poison, etc. The record of the work done has been published in the Annual Reports of the Department of Public Lands for 1912, 1913 and 1914, and one is now in course of preparation for 1915.

The object aimed at is the complete destruction of the plant, not merely the death of the above-ground portion of it, as the "bulb" is apt to retain its vitality. The chief result of the work has been the discovery that solutions of arsenic pentoxide are much more efficient as a prickly pear poison, than any other known chemicals, and no doubt when a supply of this compound becomes available it will supersede the well known "Brünnich preparation," consisting of arsenic trioxide and caustic soda, which is at present in common use for this purpose.

Her work is summarised in the Annual Report of the Department of Public Lands 1914 (1915), p. 80, and may be briefly summed up as follows :—Arsenic pentoxide is the most effective poison yet used, whether employed in the form of a spray, solid injection or liquid injection, whilst the best result obtained by using gaseous specifics, is produced by the vapours of arsenic trichloride. It was also found that summer and early autumn are the best seasons for applying poisons in any of the forms mentioned, and, moreover, the success of the operation is largely dependent on the fall of rain just before or just after poisoning, probably more especially the former.

We congratulate Dr. White-Haney on her success.

It will be remembered that the Government commissioned Mr. Henry Tryon, Government Entomologist, and myself to visit various countries where prickly pear occurred either indigenously or as naturalised weeds in

order to ascertain, amongst other things, whether there existed in those regions any natural enemies, either plant or animal, which were holding the cacti in check and which might be safely introduced into Queensland with a view to controlling the spread of prickly pear here without themselves becoming a danger to other plant or animal life in this State. As a result of our inquiry it was found that there occurred in certain countries, *e.g.*, Ceylon, India, United States and Argentina, formidable enemies capable of retarding the spread of, and in some cases actually exterminating, certain species of Cactaceæ, and that many of these were restricted in their dietary to this family of plants, sometimes even to one or two species of *Opuntia*.

An account of the work of these organisms is contained in our report*, but I intend in this brief survey, to refer only to such as were brought, or sent, by us to Australia.

The parasitic fungus *Glæosporium lunatum*, E. & E., which under certain conditions of climate causes a "shot hole" effect but which in moist warm weather produces a widespread rotting or "black rot" of the young cladodia or "joints," was introduced in the form of cultures, but the attempt to establish it in our State was unsuccessful.

The insect enemies introduced comprised two forms of a wild cochineal, *Coccus indicus*, Green, from India and Ceylon, *C. confusus* var. *capensis*, Green, from Cape Colony and a moth, *Zophodia cactorum*, Berg., from Argentina. The last named failed to establish itself as the larvae which reached Brisbane died before pupating.

The wild cochineal insects, especially the more destructive species, *C. indicus*, have become well established, the latter having been liberated in the vicinity of Bowen and Charters Towers in Northern Queensland, where *Opuntia monacantha* is prevalent†. It is gratifying to

* T. H. Johnston and H. Tryon. Report of the Prickly Pear Traveling Commission, Nov. 1912—April 1914. Govt. Printer, Brisbane, 1914.

† J. White-Haney *l.c.*, 1914 (1915), p. 82. See also article "Destruction of Prickly Pear by the Cochineal Insect," Q'land Agri. Jour. 4, 1915, p. 323.

know that this parasite is accomplishing in those parts of the State all that was claimed for it*. We stated† that it had controlled the growth of *O. monacantha* in India and Ceylon to such an extent as to have practically exterminated it, and would no doubt do the same in Queensland; but that it had not attacked, either naturally or under experimental conditions, the species (*O. dillenii*) now prevalent in certain parts of those countries‡ and would not be likely to attack our common pest pear or the Burnett prickly pear. That our views were correct, has since been proved§.

It may be of interest to members of this Society to know that the wild cochineal insects *Coccus indicus*, left by the Commission whilst in South Africa, have become established there and are destroying *O. monacantha* just as they are doing in Queensland, but do not apply themselves to the commonest pest pear of the Cape Province.||

The introduction of a number of other more or less destructive insect enemies of prickly pear was recommended, but this has not, as yet, been authorised.

The Commission also considered that exhaustive experiments should be carried out to test the value of our naturalised *Opuntias* as material for supplementing the various stock fodders now in use, which have a higher nutritive ratio.

The Department of Agriculture has initiated tests in this direction, the work being under the control of one of our members, Mr. F. Smith, B.Sc., of the Agricultural Chemist's Branch.

* Johnston and Tryon, *l.c.*, 1914, p. 17.

† *l.c.*, p. 3, 14, sqq.

‡ Johnston and Tryon, *l.c.*, p. 6, 7, 17. See also abstract from Ann. Rep. Director Agric., Ceylon, for 1914, in *Tropical Agriculturist*, Ceylon, Sept., 1915, and in *Q'land Agri. Jour.*, 4, 1915, p. 323.

§ Dr. J. White-Haney, *l.c.*, 1913 (1914), p. 73; 1914 (1915), p. 82.

|| Johnston and Tryon, *l.c.*, p. 34.

Warren, *S. African Agr. Jour.*, 7, 1914, pp 387-391; and abstract in *Review of Applied Entomology*, Ser. A., 2, (7), July, 1914, p. 440; also later references by Mr. Lounsbury and others.

WORM-NESTS IN CATTLE.

In 1911 I read before this Society* a summary of the information available regarding Onchocerciasis in cattle. Since then, a few important papers have been published relating to this condition in Australian oxen.

Mr. C. J. Pound† (1911) failed to find larvae in the circulating blood by day or by night, and his attempts at direct infection were unsuccessful. He found the adult parasite in a sheep.

In 1912, my former colleague, Dr. J. B. Cleland‡ discovered the presence of the parasite in nodules in calves which had been born and reared on Milson Island in the Hawkesbury River, N.S.W., not far from Sydney, this showing that "it is therefore practically certain that infection occurred on the island itself and, further, it is obvious that the source of infection must have been some of the older cows or other cattle with which the island was originally stocked" §. He discovered the possibilities of various insects acting as transmitting agents and inclined strongly to the view that, whilst mosquitoes, tabanids, sand flies, etc., could not be absolutely excluded, yet it was quite likely that true cattle-lice (*Haematopinus* spp.) or *Stomoxys calcitrans*, particularly the latter, is the vector. He also reviewed the various possible modes of transmission of the filarial embryos (p. 140).

S. G. Thorn in 1912|| mentioned that he had failed to infect various freshwater organisms with *Onchocerca* larvae.

* T. H. Johnston. "On the Occurrence of Worm Nodules in Cattle—a summary." P.R.S., Queensland, 23, 1911, pp. 207-231.

† C. J. Pound in Ann. Rep. Dep. Agr. 1910-11 (1911), p. 67.

‡ J. B. Cleland. "Some Notes and Suggestions in connection with the Etiology of Bovine Onchocerciasis." Austr. Med. Gazette, 1912, p. 4; and "Observations on the Mode of Dissemination of *Onchocerca gibsoni*." in second report Govt. Bureau of Microbiology, Sydney, 1912, pp. 138-141, prefaced by "Remarks on the problem of the dissemination of *Onchocerca*," by Dr. F. Tidswell, *l.c.*, pp. 137-8.

§ Dr. Tidswell (*l.c.*, p. 137) has shown that the original stock had not been exposed to infection from other sources for a period of five years, 1906-1911.

|| Rep. Govt. Bacteriologist—Dept. Agr. Stock. Ann. Rep., 1911-12 (1912), p. 88.

Prof. J. Gilruth and Dr. G. Sweet*, as a result of experiment, were led to state (p. 29) that "one may infer that neither direct contact nor apparently the intermediation of *Hæmotapinus vituli* or *H. eurysternus* . . . can act as a means of transmission" of the parasite; and believed the intermediate host to be a fly. They brought forward evidence which appeared to support the view that the *Onchocerca* was introduced into Australia long ago in Indian oxen. They mentioned that it is still met with in cross-bred descendents of Brahma cattle in the Northern Territory and that the nodules occur in Javanese bovines (p. 25). The probability of infection taking place during the first few years of the calf's life was restated, mention being made of the facts that there is little, if any, reinfection afterwards and that there is a tendency for the nodules to diminish in size and eventually disappear.

Dr. A. Breinl† published in 1913 an account of part of the anatomy of the parasite and of experiments to determine the life history. He endeavoured to determine whether the larvæ could escape from the capsule surrounding the parent and penetrate the skin of the host and found them in scrapings of the surface in five out of nearly one hundred experiments, the positive results being obtained on hot, rainy days. He, however, states that "the finding of *Onchocerca* larvæ on the outer skin over nodules is of too rare occurrence to be taken into consideration, and may only represent a pathological curiosity, especially as the larvæ belong morphologically to the group which seem to require an insect as intermediary host similar to *Filaria bancrofti* and not to the group of *Filaria medinensis* which are able to live and move in water."

He was unable to infect the stable fly *Stomoxys calcitrans*, various mosquitoes, and the Australian leech *Hirudo*

* J. A. Gilruth and G. Sweet. Further observations on *Onchocerca gibsoni*, the cause of the worm nodules in cattle. P.R.S., Vict., 25, 1912, pp. 23-30.

† Investigations into the Morphology and life history of *Onchocerca gibsoni*. Rep. Austr. Instit. Trop. Medicine for 1911 (April, 1913), pp. 5-17.

medicinalis (i.e., *Limnodynella australis*) as well as the common *Cyclops* (*C. pallidus*, Breinl) of the swamps near Townsville.*

Dr. J. B. Cleland† has continued his investigations into the life history of the parasite, his results being published in 1914. He gives a detailed account of a large number of experiments. The conclusions at which he arrived were that various Muscid flies and mosquitoes could ingest the embryos of *Onchocerca* when given access to a recently cut nodule; and that in the case of *Stomoxys calcitrans* these embryos so ingested, were able to remain alive and active within the fly for about three days, whereas in *Musca domestica* and *Musca vetustissima* they were not found alive in the alimentary canal 24 hours after ingestion. He discovered just below the skin of the belly of a calf, a thickened area containing numerous embryos, at a distance from the surface which was often less than the length of the proboscis of *Stomoxys*. He also found in five other animals, embryos in subcutaneous tissues at a distance from the nearest worm-nodule.

His finding of a group of parasites, both males and females, loosely coiled near the hip joint and also a young worm partly imbedded in a lymphatic gland led him to suggest that perhaps an early stage in the life history may be passed within such a gland, from which the parasite eventually may escape into some other tissue. He also discovered *Onchocerca* nodules in a sheep on Milson Island, Hawkesbury River, N.S.W.

* On p. 16 of his paper, Dr. Breinl mentions having failed to find microfilariae during a careful examination of the intestinal contents of about sixty Tabanid flies collected from a locality where nodules were common. It might be pointed out that the larvae, if present, would more probably be in some other part of the body, e.g., muscles or proboscis, as they would soon penetrate the intestinal wall as other filarial embryos do.

† J. B. Cleland. Further Investigations into the etiology of worm nests in Cattle due to *Onchocerca gibsoni*. Bulletin Commonwealth of Australia, Dept. Trade and Customs, 1914—also published under the same title in the Third Report Govt. Bureau of Microbiology, N.S.W. 1912 (1914), pp. 135-153.

Dr. Nicoll* of the Australian Institute of Tropical Medicine, Townsville, carried out a series of experiments which showed that the embryos do escape through the capsule of the nodule into the adjacent tissues and can eventually reach the surface of the skin, usually in small numbers but sometimes in greater quantity. He believes that a biting or blood-sucking insect is much more likely to be the transmitting agent than any aquatic organism.

McEachran and Hill† have given attention to this problem in the Northern Territory and as a result of their investigations, recorded that practically every bovine there, no matter of what breed, except the buffalo, was parasitised by *Onchocerca*. They experimented with various arthropods, e.g. Tabanidæ, Muscidæ, midges, mosquitoes, lice, and a tick, and came to the conclusion that apparently "the intermediary host is not a biting fly or flying insect," and moreover that lice may also be excluded.

During last year (1915) Dr. G. Sweet‡ published the results of her investigations in other parts of the world, and in her summary (p. 30, *sqq.*) has given a list of the species of *Onchocerca* and allied parasites occurring in various countries in the connective tissues and aortic walls of species of oxen, buffaloes, etc. She also recorded the presence of a new species, *O. indica*, Sweet, from Indian cattle, closely allied to the Australian *Onchocerca*, whose original home appears to have been the Malay Peninsula where it occurs in *Bos indicus*. It is found in this host in Siam and Java also, and, in the latter country, occurs in the common ox, *Bos taurus*, as well.

* W. Nicoll. "On the migration of the larvæ of *Onchocerca gibsoni* through the capsule of the worm nodule." *Ann. Trop. Med. and Parasitology*, 8, 1914, pp. 609-621—Summarised in his paper "Remarks on the Worm Parasites of Tropical Queensland" *Med. Jour. Austr.*, Sept., 12, 1914.

† J. F. McEachran and G. F. Hill. Investigations into the cause of Worm-nodules (*Onchocerca gibsoni*) in Cattle at Darwin, Northern Territory, Australia. *Bulletin of Dept. Trade and Customs, Commonwealth of Australia*, 1915.

‡ G. Sweet. Investigations into the occurrence of *Onchocerciasis* in cattle and associated animals in countries other than Australia. *Bull. Dept. Trade and Customs, Commonw. Austr.*, 1915.

From the summary that I have given, it will be seen that the life history of *O. gibsoni* is still unknown and there is little, as yet, to indicate in what direction we should look for the transmitting agent. Probability still favours a biting fly, as I pointed out in 1911, though McEachran and Hill's evidence is opposed to such a view.

The most important additions to our knowledge in this connection are (1) the presence of embryos just below the skin (Cleland); and (2) the fact that they can and do escape through the skin when the latter is intact (Nicoll).

In Breinl's experiments there was a possibility of injury to the overlying skin being caused by scraping and thus allowing the embryos to escape.

Until we know the transmitting agent we cannot hope to control the parasite.

In concluding this portion of my address, I take the opportunity to express my appreciation of the work done by our Hon. Secretary and Editor, Mr. A. B. Walkom, B.Sc. The thanks of the Society are due to him for efficient services ungrudgingly rendered, and also to our Hon. Librarian, Mr. C. D. Gillies, B.Sc., who has devoted a great deal of time to the work of our Society.

A CENSUS OF THE ENDOPARASITES RECORDED AS OCCURRING IN QUEENSLAND, ARRANGED UNDER THEIR HOSTS.

BY T. HARVEY JOHNSTON, M.A., D.Sc., F.L.S.

Walter and Eliza Hall Fellow in Economic Biology in
the University of Queensland.

(Read before the Royal Society of Queensland, 27th March,
1916).

This paper is offered as the second and more specialised portion of my presidential address (1916*b*). It is an attempt to bring together, for the first time, a list of all the internal parasites recorded definitely from Queensland, whether protozoon or helminth*. All records which are not explicit are omitted, *e.g.*, those made by Kreffft in 1871, who mentioned that the forms recorded by him, except a few which were more or less localised, were collected in New South Wales or Queensland.

With the exception of Wolffhügel's† catalogue of the parasites of Argentina and Hall's‡ list of those occurring

*I have also included members of those genera of Arthropoda which are generally grouped amongst the helminths, *e.g.*, the Linguatulida and the larvae of the botflies, *Oestrus*, *Gastrophilus*, etc. There are, however, many other internal parasites belonging to the phylum, as for example, Copepods and Isopods infesting the gills and buccal cavity of our marine fishes, *Sacculina* in crabs (Port Curtis), Copepods in the mantle cavity of certain Gastropods, *Ascidicola* sp. in the pharynx of *Cynthia praeputialis*, *Unionicola* sp. (a mite) in the gills of our freshwater mussels, etc.

†K. Wolffhügel. Los Zooparasitos de los animales domesticos en la Republica Argentina. Rev. Centr. Estud. Agronom. y. Veterin. 1910-11, Buenos Aires.

‡M. Hall. The parasitic fauna of Colorado. Colorado College Publications, Science Series, xii., No. 10, 1912, pp. 329-384.

in Colorado. I do not know of any attempt to list the recorded protozoan as well as helminth endoparasitic fauna of any country. Queensland occupies a large tract of country, larger than many of the European countries taken together, and possesses a vast fauna on land and in its waters, the greater part of which is as yet unsearched for entozoa. This is particularly the case with regard to our fish, reptiles and invertebrates. Even the domesticated animals have not yet been systematically examined. In spite of these facts, the entozoa of Queensland and New South Wales have received much more attention than those of the other Australian States.

In 1909, Dr. G. Sweet published her census of the endoparasites of the native fauna and domesticated animals in Australia (1908), but the protozoa, of which very few were then known, were not included. The number of hosts in Queensland from which worms were definitely there recorded, is considerably less than 40—nearer 30, and of these about one-third were birds in which Dr. T. L. Bancroft (1890*a*) found filariæ. Since that time, several workers have been engaged in the work and the number of Queensland hosts from which parasites are recorded, is now about 180. From many of them, however, only hæmoprotozoa have been as yet reported. This list comprises about 30 mammals, nearly 90 birds, nearly 30 reptiles, 6 frogs, 18 fish, and about a dozen arthropods. Our molluscs have not yet been searched.

Dr. Sweet's list contains the names of about 80 native and about 15 introduced hosts in Australia recorded as harbouring endoparasites. This is mentioned merely to emphasise the advance which has been made in the past seven years, the chief workers in Queensland parasitology being W. Nicoll, A. Breinl, S. J. Johnston, J. B. Cleland and T. H. Johnston, the two last-named being indebted especially to Dr. T. L. Bancroft for abundant material, much of which still awaits investigation.

A list of the parasites recorded from man and the domesticated animals in Australia was published some years ago (Johnston, 1910*b*). I have also given a census

of Australian avian* and reptilian entozoa in 1910 and 1911, respectively, and of the parasites from marsupials and monotremes in 1909 (1909e) and 1911 (1911a). In other papers (Johnston, 1909e, 1910d; Johnston and Cleland, 1912a; Cleland and Johnston, 1912d), there have been collected a large number of records, particularly those relating to the entozoa of man.

The Australian hæmatozoa, especially those of birds and reptiles, have received considerable attention from Cleland and myself (Cleland and Johnston, 1912b, etc.), though other workers, particularly Breinl (1913), have also interested themselves. S. J. Johnston and W. Nicoll have added greatly to our knowledge of the trematode fauna of Eastern Australia, and have worked on material from North Queensland. I have concerned myself with the Cestodes especially and to a less extent with the Nematoda. The lastnamed group has been studied also by Dr. G. Sweet.

MAMMALIA.

a denotes a protozoon; *b*, a trematode; *c*, a cestode; *d*, a nematode including echinorhynch; *e*, an arthropod.

PRIMATES.

HOMO SAPIENS L. (Man).

Amongst the *Chlamydozoa*, if the "cell inclusions" be Protozoon parasites, are the organisms causing *chickenpox*, *varicella*, *vaccinia* (Guarnieri's bodies, *Cytoryctes vacciniæ*); *variola*, *smallpox* (*Cytoryctes variolæ*, Guarn.); *scarlet fever* (*Cyclasterion scarlatinalis*, Mallory, or *Cytoryctes scarlatinæ*, Siegel—Mallory's bodies). *trachoma* (Prowazek's bodies); *cancer* (the parasitic nature of which is still a debatable matter). *dengue*—apparently a mosquito-borne disease, and probably due to an ultra-microscopic protozoon. *measles*, *whooping cough*, *cerebrospinal meningitis* and *mumps* which are perhaps caused by unknown protozoa.

*A later list of entozoa recorded from Australian birds was published in *The Emu*, Oct., 1912 (Johnston, 1912c.)

No attempt has been made to collect references to the occurrence of these diseases in Queensland, though in Johnston, 1909c, those relating to dengue and smallpox are quoted, whilst Cleland (1913) has given an account of the occurrence of whooping cough, measles and scarlet fever—also (1914c) of dengue in Australia; and Breinl (1913e) (dengue and smallpox)—see also Moore, 1914; O'Brien, 1908; Turner, 1890; Davidson and Scott, A. Med. Gaz., 1911.*

Amongst the *Proflagellata* (*Spirochætida*) there may be mentioned

Treponema pallidum, Schaud (syphilis).

Treponema pertenue, Castell (yaws)—Torres Straits chiefly. Brienl, 1915; Elkington, 1912.

Many of the earlier references will be found in Johnston, 1909c.

The disease of *ulcerating granuloma* (*granuloma pudendi* or *granuloma inguinale*) occurs amongst the aboriginal population in the North (O'Brien, 1908; Jackson, 1911; McLean, 1911; Elkington, 1912; Brienl and Priestley, 1916b). Its causative organism may be *Spirochæta aboriginalis*, Cleland, or it may (more probably) be caused by *Leishmania* sp. †, which is found infecting some of the cells.

Amongst the Sarcodina, the only one recorded is *Entamoeba histolytica*, Sch., which causes amœbic dysentery and tropical liver abscess.

For references see Johnston 1909c; O'Brien (A. Med. Gaz., 18, 1899). It is endemic in New Guinea (Breinl 1913e, Moore, 1914), Thursday Island and other islets in Torres Straits (Elkington, 1911, 1912, 1912b; Breinl, 1911, 1915, 1913e). *Entamoeba coli*, Loesch, is no doubt common, but I do not know of any record of its presence in this State.

*H. L. Cumpston, The History of Smallpox in Australia. Govt. Printer, Melbourne, 1914.

†Cleland, Trans. Austr. Inter. Med. Congr., ix., 1911 (1913), 1, pp. 522-4; Strangman, *Id.*, pp. 518-522; Carter, Lancet, 15th Oct., 1910, p. 1128. See also Castellani and Chalmers, Man. Trop. Med., Ed. 2, 1913, p. 1571; Strangman, A. Med. Gaz., 1911, p. 76; p. 446; Breinl and Priestley, 1916b.

All three forms of malaria are known from Queensland, viz., tertian or benign tertian (*Plasmodium vivax*, Gr. and Fel.), quartan (*P. malaricæ*, Lav.), and intermittent or malignant tertian fever (*P. falciparum*, Lemaire). The last has been introduced, chiefly by miners, from New Guinea, where it is endemic (Breinl; Elkington; Booth-Clarkson; Moore, 1914*).

For references see Johnston, 1909c; Cleland, 1914c; Turner, 1890; Breinl, 1912, 1913e, 1915; O'Brien, 1908; Butler, 1912; Elkington, 1910, 1912, 1912c; Breinl and Priestley, 1916a.

All three types occur in districts of North Queensland, some of them being now endemic (e.g., *P. vivax*—in Cairns [Moore, 1914], and Port Douglas.†).

O'Brien (1908), states that the type is almost always tertian, and only occasionally is quartan or malignant malaria met with in Northern Queensland.

No trematode parasites have been recorded as far as I know, though a number of cases of Schisto-omiasis occurred in Queensland, amongst men who had become infected by *Schistosomum hæmatobium*, Bilh., during the South African (Boer) War.

Two Cestodes have been reported.

Tænia saginata, G., Justn., 1910b; 1910f (Brisbane), Nicoll, 1914d (N.Q.)—apparently uncommon in this State.

Echinococcus granulosus, B. (the hydatid stage, more commonly known as *Echinococcus hominis* or *E. veterinorum*, R.). For references see Johnston, 1909c; rare in N.Q. (Nicoll, 1914d);

*R. F. Jones gave an account of the "Diseases of British New Guinea" (Tr. Soc. Trop. Med. Hyg., January, 1911; Abstr. in A. Med. Gaz., June, 1911, p. 356). Amongst those met with were malaria, both simple tertian and æstivo-autumnal; amœbic dysentery and liver abscess; *Filaria bancrofti*; ulcerating granuloma; and dengue (imported); while Ankylostomiasis was encountered only in that part which was then known as German New Guinea.

†See Brisbane *Courier* of May 27, 1916, p. 6, regarding the presence of Malaria in Cairns and Port Douglas (Q.) and Overland Corner (S. Australia).

Turner, 1890; Cleland, 1912*b*; Elkington, 1912*c*; Cameron, Turner and Gibson (A.M.G., 34, 1913, p. 436).

Many nematodes have been recorded from man in Queensland.

Ascaris lumbricoides, L. Flynn, 1901; Jnstn., 1910*b* (Brisbane); Nicoll, 1914*d*, N.Q.—uncommon.

Oxyuris vermicularis, Linn., Jnstn., 1910*b*; 1910*f* (Brisbane); Nicoll, 1914*d* (N.Q.)

Trichinella spiralis, Owen., Halford, 1898.

Trichuris trichiura, L. (*Trichocephalus dispar*, Rud.), Hogg, 1889*a*; Bacot, 1892 (N.Q.); Bancroft, 1893*c* (Brisbane); Lawes, 1895; Jnstn., 1909*c*, 1910*b*; J. and C., 1912*a*; Nicoll, 1914*d*.

Strongyloides intestinalis, Bavay (*Rhabdonema stercoralis*, Bav.); Ashworth, 1896; J. and C., 1912*a*; Breinl, 1913*d*; Nicoll, 1914*d* (N.Q.).

*Ancylostoma** *duodenale*, Dub. (*Ancylostoma*, *Ankylostoma*)—the commoner hook worm.

For summary of references see Jnstn., 1909*c*, and Jnstn. and Clel, 1912*a*; Hogg, 1889*b*, *c* (Goodna); Bacot, 1892 (N.Q.); Gibson, 1892 (Maryborough), 1895; Gibson and Turner, 1892 (N.Q.); T. L. Bancroft, 1893*c*, 1893*d*, 1902; Turner, 1895 (Brisbane) 1896, 1909; Love, 1895; Ashworth, 1895, 1896; Lawes, 1895; Hardie, 1897 (Cairns); O'Doherty, 1898; Hamilton-Kenny, 1906 (Gympie); Macdonald, 1908 (N.Q.); O'Brien, 1908 (N.Q.); Salter, 1909 (Brisbane); Leiper, 1908; Halford, Gibson, Robertson, 1909; Breinl, 1913*e*, 1913*f*, 1913*d* (N.Q.); Macdonald (in Breinl, 1913*e*)—Gulf Country; Nicoll, 1914*d* (N.Q.); Breinl, 1911, 1915; Ham, 1909; Booth-Clarkson, 1913; Salter, 1911; Croll, 1911; Elkington, 1910, 1911, 1911*b*, 1912, 1912*c*; W. Macdonald, 1911; Cameron, 1913.

*This spelling of the name has been recently (1916) adopted by the International Commission on Zoological Nomenclature.

Necator americanus, Stiles (a hook worm). Leiper, 1908, from Bancroft; Breinl, 1913*d*, 1915 (N.Q. and New Guinea); Nicoll, 1914*d* (N.Q.); W. Macdonald, 1911.

Filaria bancrofti, Cobbold, the larva of which inhabits the blood, and is known as *Microfilaria nocturna*, Manson, or *M. sanguinis hominis*, Lewis.

For summary see Johnston, 1909*c* and Jnstn. and Clel., 1912*a*; Cobbold, 1876*a*, 1876*b*, 1877, 1879*a*, 1879*b*; J. Bancroft, 1876, 1878, 1879, 1882*a*, 1882*b*, 1889, 1892; Love, 1889; Turner, 1890; Hoggan, 1892; Jackson, 1893; T. L. Bancroft, 1893*d*, 1898, 1899*a*, 1899*b* and 1903*a*, 1900, 1901; P. Bancroft, 1893, 1908, 1910; Flynn, 1903; Sawkins, 1903; Macdonald, 1905; O'Brien, 1908; Jackson, 1908, 1910; Maclean, 1908, 1909, 1910; Salter, 1908; Breinl, 1913*b*, 1913*d*, 1913*e*; Jackson, 1913; Nicoll, 1914*d*; Nisbet, 1915; Booth-Clarkson, 1913; Harris and Elkington, 1912; Croll, 1911; Bancroft, 1912; Butler, 1912; Elkington, 1912; 1912*b*, 1912*c*; Breinl, 1911, 1915; Ham, 1909.

The participation of Australian troops in the Great War will almost certainly lead to the introduction, if not the establishing, of certain parasitic diseases from other lands. We know that many men have returned from New Guinea stricken with various forms of malaria*.

Giardia (*Lambliæ*) *intestinalis* has caused severe diarrhœa both in Flanders and Gallipoli (Porter, Proc. Linn. Soc. Lond., 2nd March, 1916, No. 317). Amœbic dysentery (due to *Entamœba histolytica*) occurred at the latter locality. Cameron (1916) has recorded its presence in a returned Queensland soldier.

In Egypt there is an abundant human helminth fauna, and it is possible that such trematodes as *Schistosomum*, *Heterophyes* and *Paragonimus* may be introduced to Australia. Leiper has recently investigated the life history† of *Schistosomum hæmatobium*, Bilh., and has

*Breinl and Priestley, 1916*a*.

†R. T. Leiper. Report on the Results of the Bilharzia Mission in Egypt, 1915. Jour. R.A. Medical Corps, July and Aug., 1915. Abstract in *Nature*, 13 January, 1916, p. 551.

proved that several species of a freshwater mollusc, *Planorbis* sp., can act as intermediate hosts. Species of this genus are common in our water supply and in ponds, and no doubt could serve as a host just as some other species of freshwater gastropods have become the intermediate hosts of the liver fluke, *Fasciola hepatica*, in Australia.

One need only mention that Ankylostomes are particularly abundant in Egypt. They are widely spread amongst the inhabitants of our own coastal districts.

Given certain conditions, there is danger that some of these parasites may become endemic.

MACACUS CYNOMOLGUS, Linn (macaque monkey—introduced).

I have identified both *Trichuris trichiura* and *Oesophagostoma apiostomum*, Will., amongst material collected in Queensland.

UNGULATA.

EQUUS CABALLUS, L. (Horse)—introduced.

c. *Anoplocephala perfoliata*, G., Jnstn., 1910b.

d. *Ascaris equorum*, G. (*A. megalcephala*, Cloq.), Jnstn., 1910b.

Oxyuris equi, Schr. (*O. curvula*, R.), Jnstn. 1916c.

Spiroptera (= *Acuaria*) *megastoma*, R., Tucker, 1914, N.Q ; Jnstn., 1914c (Burnett).

Habronema microstoma, Schn. Jnstn., 1916c.

Strongylus equinus, Mül. (*Strongylus armatus*), Cory, 1913, 1914 ; Jnstn., 1916c.

Cylicostomum tetracanthum, Mehl., Cory, 1913, 1914 ; Jnstn., 1916c.

e *Gastrophilus nasalis*, L., Tryon, 1908, 1910, 1912 ; Jarvis, 1913 (S.E.Q.).

SUS SCROFA, L. (pig)—introduced.

d. *Ascaris suum*, G., Jnstn., 1916c.

Stephanurus dentatus, Dies. (syn. *Sclerostoma pingucicola*, Verrill)—kidney worm—Bancroft, 1893a, c ; Dodd, 1909 ; Jnstn., 1910b., 1912b ; Cory, 1914.

BOS TAURUS, dom. (ox)—introduced.

- a. "Sarcosporidiosis" Dodd, 1909 (= *Sarcocystis tenella*, Bl.)

Babesia bovis (generally known as *Piroplasma bigeminum*, Kilb. and Smith)—redwater parasite—Pound, 1895-1915; Fuller, 1896, 1899; Gordon, 1898-1903; Hunt, 1897-9; Hunt and Collins, 1896-7; Tidswell, 1899, 1900; Dodd, 1908, 1909, 1910; Richards, 1898; Greig Smith, 1899; Gilruth, 1912; Wynne, 1896; Thorn, 1912; Cory, 1912, 1913; Tucker, 1914; Wallace, 1908; Ramm, 1911; Barnes, 1896; Gordon and Pound, 1897.

Dr. Dodd (1910d) thought that there was a second parasite (? *Piroplasma mutans*) in Queensland cattle, but Thorn (1912) does not agree with him. Cory (1913) also suspected the presence of a second organism resembling *P. bigeminum*.

Anaplasma marginale, Theiler? Gilruth, Sweet and Dodd, 1911.

- b. *Paramphistoma cervi* (*Amphistomum conicum*), Cobb, 1891 (N.Q.); Jnstn., 1910b; Tryon, 1915 (Brisbane).

Fasciola hepatica, Abildg. Jnstn., 1910b, 1912b; Cory, 1912 (S.Q.).

- c. *Tænia*, sp., Pound, 1899. (Probably = *Moniezia expansa*).

Moniezia expansa, R., Jnstn., 1910b.

Moniezia planissima, St. and Has. Jnstn., 1916c.

Echinococcus granulosus, Gm. (hydatid), Pound, 1899; Jnstn., 1910b.

Cysticercus bovis. This has not been recorded, but its presence may be inferred from the occurrence, though uncommon, of *Tænia saginata* in Queensland; Cory, 1912 (S.Q.).

- d. *Dictyocaulus viviparus*, Bl. (syn. *Strongylus micrurus*, Mehlis). Cory, 1910a, 1912, records the presence of "lung worm" in calves.

- Hæmonchus contortus*, R. (stomach worm); Barnes, 1898; Dodd, 1908, 1909.
- Trichostrongylus extenuatus*, Raill. (syn. *Strongylus gracilis*, McFadyen, nec Leuckt), Dodd, 1909.
- Ostertagia circumcincta*, Stadelm (syn. *Strongylus cervinicornis*, McFad.), Dodd, 1909.
- Oesophagostoma radiatum*, Rud., Jnstn., 1910*b*, 1916*c*. (Brisbane).
- Oesoph.* *columbianum*, Curtice. Bancroft, 1893; Barnes, 1898. Should have been recorded as *Oes. radiatum* (*Oes. inflatum*, Schn.)
- Trichuris ovis*, Abildg. (syn. *Trichocephalus affinis*), Dodd, 1909; Jnstn., 1910*b*.
- Onchocerca gibsoni*, Clel. and Jnstn (the cause of worm nodules in Queensland cattle). For literature, see Jnstn., 1911*b*; Gibson, 1892; Bancroft, 1893*a*; Barnard and Park, 1894; Park, 1893; Pound, 1909; Tryon, 1910*a*, 1910*b*, 1911; Dodd, 1910; Cleland and Johnston, 1910*a*, 1910*b*, 1910*c*, 1910*h*, 1910*g*, 1911*a*, 1911*b*; Jnstn. and Clel., 1910*a*; Jnstn, 1911*b*, 1911*d*, 1916*b*; Robinson, 1910, 1911; Hancock, 1910; Macfadden, 1911; Leiper, 1911*a*, *b*; Gilruth, 1912; Gilruth and Sweet, 1911, 1912*a*, *b*; Breinl, 1913*a*; Nicoll, 1911, 1914*c*; Cleland, 1912, 1914*a*, 1914*b*; Thorn, 1912; Tryon, 1914; Pound, 1911; Nicoll, 1915*b*.*
- e. Hypoderma bovis*, L. (Warble), Tryon, 1912; 1915; McGown, 1915; Pound, 1915 (in imported cattle).
- OVIS ARIES, L. (sheep)—introduced.
- b. Fasciola hepatica*, Abildg. (liver fluke), Jnstn., 1910*b*, 1912*b*.

*In a recent paper (1916*b*) in which I gave a summary of recent work relating to this parasite, I omitted any reference to Dr. Nicoll's last paper (1915*b*), as I was not aware of it until lately. He has published an account of his efforts to find worms and larvae in ten calves under a year old, in which he could not detect "worm nests" whilst the animals were alive. His findings were all negative though the parasites were searched for in a most careful manner.

- c. *Moniezia expansa*, R., Jnstn., 1916c.
Echinococcus granulosus, Gm. (hydatid), Jnstn., 1910b.
Tænia hydatigena, Pall.—larva (*Cysticercus tenuicollis*, Dies.), Jnstn., 1916c.
- d. *Hæmonchus contortus*, R. (stomach worm), Barnes, 1898 ; Dodd, 1908, 1909 ; Cory, 1914 ; Brown, 1913.
 There are many references to "stomach worms"
 —Cory, Tucker, Brown.
Trichostrongylus extenuatus, Raill. (syn. *Strongylus gracilis*, McFadyen), Dodd, 1909.
Ostertagia circumcincta, Stadelm. (syn. *Strongylus cervinicornis*, McFadyen), Dodd, 1909.
Dictyocaulus filaria, Rud. (lung-worm), Jnstn., 1910b.
Oesophagostoma columbianum, Curtice ; Barnes, 1898 ; Jnstn., 1910b.
Trichuris ovis, Abildg. ; Jnstn, 1910b ; 1916c (Burpengary, per H. Tryon—collected by W. G. Brown).
Onchocerca gibsoni, C. and J., Pound, 1911.
Oestrus ovis, L.—sheep bot. Tryon, 1907, 1914, 1915 ; Jarvis, 1913 (S.Q.) ; Brown, 1913, 1914.

CAPRA HIRCUS, L. (goat)—introduced.

Echinococcus granulosus, Gm. (hydatid), Jnstn., 1910f.

CARNIVORA.

CANIS FAMILIARIS, L.—dog—introduced.

- c. *Dipylidium caninum*, L., Jnstn., 1912b (Brisbane), 1913 (N.Q.) ; Nicoll, 1914d (N.Q.).
Echinococcus granulosus, Gmel. (generally known as *Tænia echinococcus*, Sieb.) The presence of the adult stage of this parasite in dogs may be safely inferred from the occurrence of the hydatid stage in various animals in this State.
Tænia hydatigena, Pall. (syn. *T. marginata*, Batsch—its presence in dogs may be inferred from the occurrence of *Cysticercus tenuicollis*, Dies.
- d. *Toxascaris* (= *Toxocara*) *canis*, Werner. Jnstn., 1912b (Brisbane) ; Nicoll, 1914d (Ascarids—N.Q.)

Ancylostoma caninum, Ercol (hookworm), Bancroft, 1901a; Jnstn., 1912b (Brisbane); Breinl, 1913d; Nicoll, 1914d (N.Q.)

Dirofilaria immitis, Leidy (heart worm), Bancroft, 1889, 1893 (Brisbane); Breinl, 1913d; Nicoll, 1899, 1893c, 1901a, 1903b (Brisbane); Breinl, 1913d; Nicoll, 1914d (N.Q.); Tucker, 1912 (N.Q.).

FELIS CATUS, dom. (cat)—introduced.

c. *Dibothriocephalus felis*, Cr., Jnstn., 1912b (S.Q.), 1913 (N.Q.).

Tænia tæniæformis, Bl. (generally known as *T. crassicollis*, R.), Jnstn., 1912b.

Dipylidium caninum, L., Jnstn, 1912b (S.Q.); Nicoll, 1914d (N.Q.).

d *Belascaris felis*, G. (syn. *Asc. mystax*, R.), Jnstn, 1912b.

Ancylostoma caninum, Erc., Jnstn. 1912b (S.Q.); Breinl, 1913d (N.Q.).

RODENTIA.

MUS MUSCULUS, L. (mouse)—introduced.

c. *Tænia tæniæformis*, Bl., in its cystic stage (*Cysticercus fasciolaris*), Jnstn., 1916c.

d. *Oxyuris obvelata*, Brems., Jnstn., 1912b.

Capillaria hepatica, Raill. (syn. *Trichosoma hepaticum*), Jnstn., 1912b.

Spiroptera (= *Acuaria*) *obtusa*, R., Jnstn., 1912b.

EPIMYS NORVEGICUS, Erxl. (syn. *Mus decumanus*, Pall—the brown rat)—introduced.

a *Trypanosoma lewisi*, Kent., Pound, 1907 (Brisbane).

c *Hymenolepis diminuta*, R, Jnstn, 1912b (Brisbane), 1913 (N Q)

Tænia tæniæformis, Bl, in its cystic stage (*Cysticercus fasciolaris*), Jnstn, 1912b (Brisbane).

d *Heterakis spumosa*, Schn., Jnstn., 1912b.

Oxyuris obvelata, Brems., Jnstn., 1912b.

Spiroptera obtusa, R., Jnstn., 1912b.

Capillaria hepatica, Raill., Jnstn., 1912b.

Trichodes crassicanda, Bell. Jnstn., 1912b.

Gigantorhynchus moniliformis, Br., Jnstn., 1913 (N.Q.).

EPIMYS RATTUS, L., including var. **ALEXANDRINUS** (house rat)—introduced.

a *Trypanosoma lewisi*, Kent., Jnstn., 1916c (Brisbane).

c *Hymenolepis diminuta*, R., Jnstn., 1912b.

Tænia tæniæformis, Bl. (*Cysticercus fasciolaris*, R.)—
Jnstn., 1912b (Brisbane).

d *Heterakis spumosa*, Schn., Jnstn., 1912b.

Oxyuris obvelata, Brems., Jnstn., 1912b.

Capillaria hepatica, Raill., Bancroft, 1893 (as
Trichocephalus hepaticus, Bancr.); Jnstn., 1912b
(Brisbane).

Spiroptera obtusa, R., Jnstn., 1912b.

Gigantorhynchus moniliformis, Br., Jnstn., 1912b
(Brisbane).

RATS (unspecified).

a *Trypanosoma lewisi*, Kent., Bancroft, 1888 (Brisbane
—as *Hæmatomonas* sp.), Breinl, 1913c (N.Q.)

Coccidium sp. from rat's liver, Bancroft, 1891. (=ova
of *Capillaria hepaticum*, Raill., a nematode).

d *Gigantorhynchus moniliformis*, Br., Nicoll, 1914d (N.Q.)

CHIROPTERA.

PTEROPUS GOULDI, Peters. (Gould's flying fox).

a *Trypanosoma pteropi*, Breinl, 1913c (N.Q.)

Plasmodium pteropi, Breinl, 1913c (N.Q.).

PTEROPUS POLIOCEPHALUS, Temm.

c *Hymenolepis* sp. Jnstn., 1916c (Caloundra).

d *Filaria* sp., in body cavity. Jnstn., 1916c (Brisbane).

SIRENIA.

DUGONG DUGON, Mull. (syn. **HALICORE DUGONG**)—dugong.

b *Opisthotrema pulmonale*, Linstow, 1904 (Torres Straits).

Rhabdiopæus taylora, S. J. Jnstn., 1913 (N.Q.)

MARSUPIALIA.

MACROPUS GIGANTEUS, Zimm. (syn. *M. major*, Shaw)—
kangaroo.

d Filaria websteri, Cobb., Jnstn, 1912*b*; T. L. Bancroft,
1889 (as *Filaria* sp.).

MACROPUS DORSALIS, Gray.

c Echinococcus granulosus, Gm. (hydatid), T. L.
Bancroft, 1890.

d Filaria websteri, Cobbold, Jnstn., 1912*b*.

MACROPUS PARRYI, Bennett.

a Coccidium (Eimeria) sp., Jnstn., 1910*f*.

d Filaria websteri, Cobb, Jnstn., 1912*b*.

MACROPUS DERBYANUS, Gray.

c Moniezia festiva, Rud., Cobbold, 1879 (from Dr. J.
Bancroft's collection, and presumably from
Queensland).

=HALMATURUS sp. (=MACROPUS sp.).

c Tænia mastersii, Kreffft, 1871.

KANGAROO (probably=*M. giganteus*).

d Filaria websteri, Cobbold, 1879; Bancroft, 1893*c*.

WALLABIES.

c ? Bothriocephalus marginatus, Kreffft, 1871.

Tænia fimbriata, Kreffft, 1871, nec. Diesing=
T. Kreffftii, Jnstn., 1909*e*, and is probably a
Cittotænia.

DENDROLAGUS BENNETTIANUS, De Vis, a tree kangaroo.

d Filaria sp., Jnstn., 1910*e*; 1911*a* (N.Q.).

ONYCHOGALE FRENATA, Gould; a nail-tailed wallaby.

c Cittotænia bancrofti, Jnstn., 1912*b*.

PHASCOLARCTUS CINEREUS, Goldf.—native bear.

c Bertielia obesa, Zsch., 1898, 1899. Cobbold's *Tænia*
geophiloides, 1879—a nomen nudum—is the same.

TRICHOSURUS VULPECULA, Kerr—common opossum.

d Filaria dentifera, Linstow, 1898 (Burnett).

Filaria trichosuri, Breinl, 1913*d*. (N.Q.).

PERAMELES OBESULA, Shaw—bandicoot.

- c* *Linstowia semoni*, Zsch., 1898, 1899 (Burnett).
d *Echinonema cinctum*, Linst., 1898 (Burnett).
Gigantorhynchus semoni, Linst., 1898 (Burnett).

MONOTREMATA.

TACHYGLOSSUS ACULEATUS, Shaw (syn. *Echidna hystrix*, Home)—the echidna or ant-eater.

- c* *Linstowia echidnæ*, Thomp., Zschokke, 1898, 1899.
 I have received specimens from the Upper Burnett (Dr. T. L. Bancroft). Cobbold's *Tænia phoptica* (1879)—a nomen nudum—belongs to the same species.

Cittotænia tachyglossi, Jnstn., 1913 (N.Q.).

Cittotænia sp., Nicoll, 1914*d* (N.Q.).

AVES.

CASUARIIFORMES sp.

DROMÆUS NOVÆHOLLANDIÆ, Lath (The emu).

- c* *Davainea australis*, Kr., Johnston, 1916*c* (Eidsvold).

GALLIFORMES.

CATHETURUS LATHAMI, Gray (The brush turkey).

- a* *Hæmoproteus* sp.* Cleland and Johnston, 1911*c* (S.Q.); Cleland, 1915*b*. (S.Q.).
d *Heterakis bancrofti*, Jnstn, 1912*b*. (S.Q.).
Heterakis catheturinus, Jnstn., 1912*b* (S.Q.)
Echinorhynchus (*Gigantorhynchus*) sp., Jnstn., 1912*c* (S.Q.).

GALLUS DOMESTICUS (the domestic fowl)—introduced.

- a* *Spiroschaudinnia* (*Spirochæta*, *Treponema*) *gallinarum*, March—organism of fowl tick-fever. Dodd, 1909.

*Generally recorded as *Halteridium* but *Hæmoproteus* appears to be the correct name. Minchin (Intro. Study Protozoa, 1912), however prefers the former.

- c Hymenolepis carioca*, Mag., Jnstn., 1912*b* (Brisbane).
Amœbotœnia cuneata, Linst., Jnstn., 1912*b* (Brisbane).
Davainea cesticillus, Molin., Jnstn, 1912*b* (Brisbane).
Davainea tetragona, Molin*, Sweet, 1910 (Rockhampton);
 Jnstn., 1912*b* (Brisbane).
- d Ascaridia perspicilla* (syn. *Heterakis inflexa*, R.),
 Jnstn., 1912*b* (Brisbane); Nicoll, 1914*d* (N.Q.);
 Tryon, 1915; Jnstn., 1912*b* (Brisbane).
Heterakis vesicularis (syn. *H. papillosa*, Bl.), Jnstn.,
 1912*b* (Brisbane); Nicoll, 1914*d* (N.Q.)
Oxyspirura parvovum, Sweet, 1910 (Rockhampton,
 Cairns); Breinl, 1913*d* (N.Q.); Nicoll, 1914*d* (N.Q.)
Oxyspirura mansonii, Cobbold. Tryon, 1908 (N.Q.);
 Dodd, 1909 (N.Q.)—probably the same as the
 preceding species.

COLUMBIFORMES.

LAMPOTRERON SUPERBA, Temm. (purple-breasted fruit pigeon).

- a Hæmoproteus columbæ*, C. and S., Breinl, 1913*c* (N.Q.)

RALLIFORMES.

PORPHYRIO MELANONOTUS, Temm. (bald coot).

- b Echinostoma hilliferum*, Nicoll, 1914*b* (N.Q.)

CHARADRIIFORMES.

LOBIVANELLUS LOBATUS, Vieill. (Spurwing plover).

- b Echinostoma ignavum*, Nicoll, 1914*b* (N.Q.)
Hæmatotrepheus consimilis, Nicoll, 1914*b* (N.Q.)
Notocotylus attenuatus, Rud., Nicoll, 1914*b* (N.Q.)
c Gyrocœlia sp., Jnstn., 1914*a* (N.Q.)

NUMENIUS CYANOPUS, Vieill (sea curlew).

- b Echinostoma* (*Acanthochasmus*) sp., Jnstn., 1912*c*
 (Gladstone).
d Echinorhynchus sp., Jnstn., 1912*c* (Gladstone), 1914*a*
 (N.Q.)

*Attention is drawn to a misprint in Johnston, 1910*g*, p. 117, where should read that *Davainea* sp. Bradshaw is *D. tetragona*, Molin.

GALLINAGO AUSTRALIS, Lath. (snipe).

c Aploparaksis australis, Jnsth., 1913 (N.Q.)

BURHINUS GRALLARIUS, Lath. (stone plover ; land curlew).

b Platynotrema biliosum, Nicoll, 1914*b* (N.Q.).

Platynotrema jecoris, Nicoll, 1914*b* (N.Q.).

Notocotylus attenuatus, Rud., Nicoll, 1914*b* (N.Q.)

GRUIFORMES.

ANTIGONE AUSTRALASIANA, Gould (native companion).

b Allopyge antigones, S. J. Jnsth., 1913 (N.Q.).

Echinostoma australasianum, Nicoll, 1914*a* (N.Q.)

IBIDIFORMES.

IBIS MOLUCCA, Cuv. (white ibis).

b Echinostoma sp., Jnsth., 1912*c* (Eidsvold)=*Patagifer bilobus*, R., Jnsth., 1916*c*.

Platynotrema biliosum, Nicoll, 1914*b* (N.Q.).

CARPHIBIS SPINICOLLIS, Reichb. (straw-necked ibis).

b Echinostoma acuticauda, Nicoll, 1914*b* (N.Q.)

Patagifer bilobus, R., Nicoll, 1914*b* (N.Q.).

PLEGADIS FALCINELLUS, Linn. (glassy ibis).

b Patagifer bilobus, R., Nicoll, 1914*b* (N.Q.).

PLATALEA REGIA, Gould (blackbilled spoonbill).

b Orchipetum sufflavum, Nicoll, 1914*b* (N.Q.)

Patagifer bilobus, R., S. J. Jnsth., 1913 (N.Q.)

c Cyclochida omalancristrota, Wed., Jnsth., 1913 (N.Q.).

PLATIBIS FLAVIPES, Gould (yellow-billed spoonbill).

c Hymenolepis ibidis, Jnsth., 1913 (N.Q.).

CICONIIFORMES.

XENORHYNCHUS ASIATICUS, Lath. (jabiru ; Australian stork).

b Chaunocephalus ferox, Rud., Nicoll, 1914*b*. (N.Q.)

ARDEIFORMES.

HERIODAS TIMORIENSIS, Less. (white egret).

b Echinostoma sp., Jnsth., 1912*c*. (S.Q.).

c Anomotœnia asymmetrica, Jnsth., 1913 (N.Q.)

Bancroftiella glandularis, Fuhr., Jnsth., 1913 (N.Q.)

NOTOPHOYX NOVÆHOLLANDIÆ, Lath. (white-fronted heron).

a Trypanosoma notophoyxis, Breinl, 1913c (N.Q.).

Hæmoproteus danilewskyi, Gr. and Fel., Breinl, 1913c (N.Q.)

c Bancroftiella glandularis, Fuhrm, Jnstn., 1913 (N.Q.); 1914a (N.Q.).

NYCTICORAX CALEDONICUS, Gmel. (night heron).

b Clinostomum hornum, Nicoll, 1914b (N.Q.).

c Bancroftiella ardeæ, Jnstn., 1913 (N.Q.).

BOTAURUS PÆCILOPTILUS, Wagl. (bittern).

b Clinostomum hornum, Nicoll, 1914b (N.Q.).

ANSERIFORMES.

CHENOPSIS ATRATA, Lath. (black swan).

a ? Plasmodium (Proteosoma) biziuræ*, Gilr. and Sweet. Cleland, 1915 (Burnett R.).

b Echinostoma revolutum, R., Nicoll, 1914b (N.Q.).

Notocotylus attenuatus, R., Nicoll, 1914b (N.Q.).

ANSERANAS SEMIPALMATA, Lath. (pied goose).

b Typhlocælium reticulare, S. J. Jnstn, 1913 (N.Q.)

Echinostoma revolutum, R., Nicoll, 1914b (N.Q.).

Notocotylus attenuatus, R., Nicoll, 1914b (N.Q.).

c Hymenolepis megalops, Nitzsch., Jnstn., 1913 (N.Q.).

Hymenolepis terræreginæ, Jnstn, 1913 (N.Q.)

NETTOPUS PULCHELLUS, Gould (green gooseteal).

b Echinostoma revolutum, R., Nicoll, 1914b (N.Q.).

Notocotylus attenuatus, R., Nicoll, 1914b (N.Q.).

DENDROCYGNA ARCUATA, Horsf. (whistling duck).

c Diploposthe lævis, Bl., Jnstn., 1913 (N.Q.).

ANAS SUPERCILIOSA, Gmel. (black duck).

b Echinostoma sp. (= *E. revolutum*), Jnstn., 1912b (S.Q.)

Echinostoma revolutum, R., S. J. Jnstn., 1913 (N.Q.);

Nicoll, 1914b (N.Q.).

Notocotylus attenuatus, R., Nicoll, 1914b (N.Q.).

*Minchin (An Introd. to the Study of Protozoa, 1912, p. 358) regards the correct generic name to be *Plasmodium*, whilst Doflern (Léhrb. Protozoenk, 1911, p. 771) retains *Proteosoma*.

c *Diorchis flavescens*, Krft., Jnstn., 1912*b* (S.Q.); 1913 (N.Q.).

Hymenolepis megalops N., Jnstn, 1912*b* (S.Q.).

AYTHYA AUSTRALIS, Eyton (Widgeon, white-eyed duck).

c *Diploposthe lævis*, Bl., Jnstn., 1912*b* (S.Q.)

PELICANIFORMES (STEGANOPODES).

PHALACROCORAX SULCIROSTRIS, Brandt (little black cormorant).

d *Ascaris spiculigera*, R., Jnstn., 1912*b* (S.Q.).

Filaria sp., Jnstn., 1912*b* (S.Q.); Cleland, 1915 (S.Q.).

PLOTUS NOVÆHOLLANDIÆ, Gould (snake bird, darter).

d *Ascaris spiculigera*, R., Jnstn., 1912*b* (S.Q.).

Filaria sp., Jnstn., 1912*b* (S.Q.); Cleland, 1915*b* (S.Q.).

FREGATA AQUILA, L. (frigate bird).

c *Tetrabothrius* sp., Jnstn., 1912*c* (Masthead I.).

ACCIPITRIFORMES.

ASTUR NOVÆHOLLANDIÆ, Gm. (white goshawk).

d *Gigantorhynchus asturinus*, Jnstn., 1912*b* (N.Q.).

ACCIPITER CIRRHOCEPHALUS, Vieill (sparrow hawk).

c *Anomotœnia accipitris*, Jnstn., 1913 (N.Q.)

d *Filaria* sp., Clel and Jnstn, 1911*c* (S.Q.).

HALIASTUR GIRRENERA, Vieill. (white-headed sea-eagle).

a *Trypanosoma avium majus*, Dainl. Breinl, 1913*c* (N.Q.)

Hæmoproteus danilewskyi, G. and F., Breinl, 1913*c* (N.Q.).

FALCO HYPOLEUCUS, Gould (grey falcon).

a *Trypanosoma avium*, Dainl., Breinl, 1913*c* (N.Q.).

Proteosoma præcox, G. and F., Breinl, 1913*c* (N.Q.).

HIERACIDEA BERIGORA, V. and A. (striped brown hawk).

b *Opisthorchis obsequens*, Nicoll, 1914*b* (N.Q.).

HIERACIDEA ORIENTALIS, Schl. (brown hawk*).

b *Opisthorchis obsequens*, Nicoll, 1914*b* (N.Q.).

Echinochasmus prosthovitelatus, Nicoll, 1914*b* (N.Q.).

*Nicoll, 1914*d*, mentions the occurrence of eye worms in the brown hawk and in the wedgetailed eagle (= *Uroæetus audax*) in N.Q.

STRIGIFORMES.

NINOX BOOBOOK, Lath. (boobook owl).

a Trypanosoma sp., Breinl, 1913c (N.Q.).

Hæmoproteus noctuæ, Sch., Breinl., 1913c (N.Q.).

Hæmoproteus (*Halteridium*) sp., Clel. and Jnstn., 1911c, (S.Q.); Clel., 1915b (S.Q.); apparently the same as the preceding.

b Strigea promiscua, Nicoll, 1914a (N.Q.).

d Echinorhynchus sp., Jnstn., 1912c, (S.Q.).

NINOX MACULATA, V. and H. (spotted owl).

b Hemistomum brachyurum, Nicoll, 1914a (N.Q.).

Strigea promiscua, Nicoll, 1914a (N.Q.).

NINOX STRENUA, Gould (powerful owl).

a Hæmoproteus sp., Cleland, 1915b (S.Q.).

PSITTACIFORMES.

TRICHOGLOSSUS NOVÆHOLLANDIÆ, Gm. (bluebellied lorikeet, Blue Mountains parroquet).

c Moniezia trichoglossi, Linstow, 1888 (Cape York); Jnstn., 1912c (N.Q.); 1913 (N.Q.).

d Filaria sp., Bancroft, 1889; 1893c (S.Q.).

GLOSSOPSITTACUS PUSILLUS, Shaw (small green leek; little lorikeet).

d Filaria sp., Clel. and Jnstn., 1911c (Gladstone, Burnett).

CACATUA GALERITA, Lath. (white cockatoo; sulphur-crested cockatoo).

c Davainea cacatuina, Jnstn., 1913 (N.Q.).

PLATYCERCUS EXIMIUS, Shaw (rosella parroquet).

c Dilepis bancrofti, Jnstn., 1912d (S.Q.).

CORACIIFORMES.

PODARGUS STRIGOIDES, Lath. (mopoke).

a Leucocytozoon sp., Cleland, 1915b (S.Q.).

b Strigea flosculus, Nicoll, 1914a (N.Q.).

d Filaria sp., Bancroft, 1889; Clel. and Jnstn., 1911c; Clel., 1915b (S.Q.).

NIGHTJAR, probably *P. STRIGOIDES*.

d. Echinostoma elongatum, Nicoll, 1914a (N.Q.).

ÆGOTHELES NOVÆHOLLANDIÆ, Lath. A nightjar.

d. Filaria sp. (microfilaria). Jnstn., 1916c (Eidsvold).

EURYSTOMUS PACIFICUS, Lath. (Dollar bird, Roller).

d Filaria sp., Bancroft, 1889; Clel. and Jnstn., 1911c; Clel., 1915b (S.Q.).

Echinorhynchus sp., Jnstn., 1912c (S.Q.).

DACELO LEACHII, V. and H. (Leach's Kookooburra).

d Filaria daceilonis, Breinl, 1913d (N.Q.). This parasite belongs to the genus *Ceratospira* = [*C. daceilonis* (Breinl), Jnstn., 1916].

MEROPS ORNATUS, Lath. (bee eater).

a Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.).

CUCULIFORMES (COCCYGES).

EUDYNAMIS CYNAOCEPHALA, Lath. (a cuckoo).

a Hæmoproteus danilewskyi, G. and F., Breinl, 1913c (N.Q.).

CENTROPUS PHASIANUS, Lath. (Coucal, pheasant cuckoo).

b Echinostoma emollitum, Nicoll, 1914b (N.Q.).

PASSERIFORMES.

PITTA STREPITANS, Temm (noisy Pitta).

d Microfilaria sp., Breinl, 1913d (N.Q.).

MICRÆCA FASCINANS, Lath (brown flycatcher).

a Trypanosoma anellobiæ, Clel. and Jnstn, 1911e (S.Q.).

It probably belongs to a different species.

Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.)

b Echinostoma sp., Jnstn., 1912c. (S.Q.).

MYIAGRA RUBECULA, Lath. (leadon flycatcher).

d Filaria sp., Bancroft, 1889 (S.Q.).

CORACINA ROBUSTA, Lath. (blue jay; cuckoo shrike).

d Filaria sp. Jnstn., 1912c (Burnett R.)

PSOPHODES CREPITANS, Lath. (coachwhip).

d Filaria sp., Clel. and Jnstn., 1911c (S.Q.).

POMATOSTOMUS FRIVOLUS, Lath (babbler, twelve apostles).

d Filaria sp., Bancroft, 1889 (S.Q.).

MEGALURUS GRAMINEUS, Gould (grass bird).

a Hæmoproteus danilewskyi, G. and F., Breinl, 1913c
(N.Q.).

ARTAMUS LEUCOGASTER, Val. (white-breasted wood swallow).

d Filaria sp., Clel. and Jnstn., 1911c (S.Q.).

ARTAMUS TENEBROSUS, Lath. (brown wood swallow).

d Filaria sp., Clel. and Jnstn., 1911c (S.Q.).

GRALLINA PICATA, Lath. (peewit).

a Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.).

d Echinorhynchus sp., Jnstn., 1912c, 1914 (N.Q.).

GYMNORHINA TIBICEN, Lath. (magpie).

d Filaria spp., Bancroft, 1889 (S.Q.).

Filaria clelandi, Jnstn., 1912b. (S.Q.).

CRACTICUS NIGRIGULARIS, Gould (black-throated butcher
bird).

d Filaria sp., Clel. and Jnstn., 1911c (Gladstone).

CRACTICUS DESTRUCTOR, Temm. (the butcher bird).

a Hæmoproteus danilewskyi, G. and F., Breinl, 1913c
(N.Q.).

d Filaria sp., Bancroft, 1889 (S.Q.).

PACHYCEPHALA RUFIVENTRIS, Lath. (rufous-breasted
thickhead).

c Sphærouterina punctata, Jnstn., 1914c (S.Q.).

ZOSTEROPS CAERULESCENS, Lath. (silver-eye).

a Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.).

PARDALOTUS MELANOCEPHALUS, Gould (black headed
pardalote).

a Hæmoproteus sp., Clel. and Jnstn., 1911c; Clel., 1915b
(S.Q.).

**Leucocytozoon anellobiæ*, Jnstn., Clel. and Jnstn., 1911c (S.Q.).

* *Trypanosoma anellobiæ*, Clel. and Jnstn., 1911c (S.Q.).

d *Microfilaria* sp., Clel. and Jnstn., 1911c (S.Q.).

PLECTORHAMPHUS LANCEOLATUS, Gould (striped honey-eater).

d *Filaria* sp., Clel. and Jnstn., 1911c (S.Q.).

MYZOMELA SANGUINEOLENTA, Lath. (blood-bird).

a *Trypanosoma* sp., probably *Tr. anellobiæ*; Clel. 1915b (S.Q.).

Hæmoproteus sp., Clel. and Jnstn., 1911c; Clel., 1915b (S.Q.).

Leucocytozoon anellobiæ, Jnstn., Clel. and Jnstn., 1911c; Clel., 1915b (S.Q.).

d *Filaria* sp., Clel. and Jnstn., 1911c; Clel., 1915b (S.Q.).

CONOPOPHILA ALBIGULARIS, Gould (white-throated honey-eater).

c *Davainea conopophilæ*, Jnstn., 1913 (N.Q.).

STIGMATOPS OCULARIS, Gould (a brown honey-eater).

d *Filaria* sp., Clel. and Jnstn., 1911c (Gladstone).

PTILOTIS FUSCA, Gould (a brown honey-eater).

a *Hæmoproteus* sp., Clel. and Jnstn., 1911c (S.Q.).

Trypanosoma anellobiæ, Clel. and Jnstn., 1911c (S.Q.).

*Two fairly distinct types of trypanosomes have been recorded by Dr. Cleland and myself (1911c) from Queensland birds viz., a broad type occurring in *Micræca* and *Pardalotus* and a narrower one found especially in the Meliphagidæ (honey-eaters), though in this family both are sometimes met with. Intermediate forms have been seen by us. Danilewsky found the same differences elsewhere in regard to his *Tryp. avium* with which Dr. Breinl (1915) has since identified some parasites from Northern Queensland birds. Though we included all our Trypanosomes from birds under the name *T. anellobiæ*, it is quite likely that there may be slight morphological or physiological differences of specific value. The same remark holds good regarding *Leucocytozoon anellobiæ*, which we have recorded from a considerable number of Queensland birds. It should be mentioned that Dr. Cleland believes that this last named parasite is an intracorpuseular phase of a trypanosome ("Australian Hæmatozoa," Med. Jour. Austr., 1914, 1, p. 240).

Leucocytozoon anellobiæ, Jnstn., Clel. and Jnstn., 1911c
(S.Q.).

d Filaria sp., Clel. and Jnstn., 1911c (S.Q.).

MYZANTHA GARRULA, Lath. (soldier bird; noisy minah).

a Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.).

Leucocytozoon anellobiæ, Jnstn., Clel. and Jnstn., 1911c
(S.Q.).

d Filaria sp., Bancroft, 1889; Clel. and Jnstn., 1911c
(S.Q.).

ANELLOBIA CHRYSOPTERA, Lath. (brush wattle bird)

a Trypanosoma anellobiæ, Clel. and Jnstn., 1911c, 1912a
(S.Q.).

Hæmoproteus danilewskyi, Breinl, 1913c (N.Q.).

Leucocytozoon anellobiæ, Jnstn., 1912c, Clel. and
Jnstn., 1911c (S.Q.).

d Filaria sp., Bancroft, 1889; Jnstn., 1910g; Clel. and
Jnstn., 1910d, 1912c (S.Q.).

ANELLOBIA LUNULATA, Gould.

The parasites listed by Bancroft (1890a), and by me
(1910g) under this host belong to the preceding
host species.

ENTOMYZA CYANOTIS, Lath. (blue-faced honey-eater).

a Trypanosoma anellobiæ, Clel. and Jnstn., 1911c (S.Q.)

Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.).

Leucocytozoon anellobiæ, Jnstn., Clel. and Jnstn.,
1911c (S.Q.).

c Davainea conopophilæ, Jnstn., 1913 (N.Q.).

d Filaria sp., Bancroft, 1889 (S.Q.); Clel. and Jnstn.,
1911c (Gladstone, Burnett R.).

TROPIDORHYNCHUS CORNICULATUS, Lath. (friar bird),

a Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.).
leatherhead).

Leucocytozoon sp., Breinl, 1913c (N.Q.) is probably
L. anellobiæ—Jnstn., 1916.

PHILEMON CITREIGULARIS, Gould (yellow-throated friar
bird).

c Davainea conopophilæ, Jnstn., 1913 (N.Q.).

d Filaria sp., Jnstn., 1912b (S.Q.).

ORIOLOUS SAGITTARIUS, Lath. (the oriole).

- a Trypanosoma anellobiæ*, Clel. and Jnstn., 1911c (S.Q.).
Leucocytozoon anellobiæ, Jnstn., Clel. and Jnstn.,
 1911c (S.Q.).

Hæmoproteus sp., Clel. and Jnstn., 1911c (S.Q.).

- d Filaria* sp., Bancroft, 1889a, Clel. and Jnstn., 1911c
 (S.Q.).

SPHECOTHERES MAXILLARIS, Lath. (tig bird).

- a Leucocytozoon anellobiæ*, Jnstn., Clel. and Jnstn.,
 1911c (S.Q.).

c Davainea sphecotheridis, Jnstn., 1914 (N.Q., Burnett R.).

CHIBIA (DICRURA) BRACTEATA, Gould.

- a Hæmoproteus danilewskyi*, G. and F., Breinl, 1913c
 (N.Q.).

b Lepoderma nisbetii, Nicoll, 1914a (N.Q.).

Prosthogonimus vitellatus, Nicoll, 1914a (N.Q.).

- d Filaria* sp., Bancroft, 1889 (S.Q.).

CHLAMYDODERA ORIENTALIS, Gould (Queensland bower
bird).

- a Trypanosoma chlamydoderæ*, Breinl, 1913c (N.Q.).

Hæmoproteus danilewskyi, G. and F., Breinl, 1913c
 (N.Q.).

SERICULUS CHRYSOCEPHALUS, Lewin (regent bird).

- d Filaria* sp., Bancroft, 1890a (S.Q.).

CRASPEDOPHORA ALBERTI, Elliot (Cape York rifle bird)

- c Biuterina clavulus*, Linstow, 1888 (Cape York).

***CORVUS CORONOIDES**, V. and H.

- d Filaria* sp., Clel. and Jnstn., 1911c (S.Q.).

***CORONE AUSTRALIS**, Gould.

- d Filaria* sp., Bancroft, 1889 (S.Q.).

STREPERA GRACULINA, White (pied Crowshrike; crow
magpie).

- d Filaria* sp., Bancroft, 1889 (S.Q.).

STRUTHIDEA CINEREA, Gould (grey jumper; happy family).

- d Filaria* sp., Clel. and Jnstn., 1911c (S.Q.).

*See "Emu," xii., July, 1912, p. 44, regarding the confusion in the nomenclature of these two birds, as to which is the crow and which the raven.

CORCORAX MELANORHAMPHUS, Vieill. (chough; mutton bird).

a ? *Trypanosoma* sp., Clel. and Jnstn., 1911c (S.Q.).

Leucocytozoon anellobiæ, Jnstn., Clel. and Jnstn.,
1911c (S.Q.).

d *Filaria* sp., Clel. and Jnstn., 1911c (S.Q.).

REPTILIA.

CHELONIA.

CHELODINA LONGICOLLIS, Shaw (long-necked tortoise).

a *Trypanosoma chelodina*, Johnson, J. and C., 1911a
(Burnett); Breinl, 1913c (N.Q.).

Hæmogregarina clelandi, Jnstn*, Jnstn. and Clel.,
1911a; C. and J., 1912a (Burnett); Breinl, 1913c
(N.Q.).

CHELODINA EXPANSA, Gray (lagoon tortoise).

a *Hæmogregarines*, Plimmer, 1915 (Q.)—almost certainly
= *H. clelandi*, Jnstn.

EMYDURA KREFFTII, Gray (Kreffft's tortoise).

a *Trypanosoma chelodina*, Johnson, J. and C., 1911a
(S.Q.)

Hæmogregarina clelandi, Jnstn., J. and C., 1911a
(S.Q.).

EMYDURA LATISTERNUM, Gray.

b *Aptorchis æqualis*, Nicoll, 1914a (N.Q.).

EMYDURA MACQUARLÆ, Gray.

a *Trypanosoma chelodina*, Jnstn., 1911f (S.Q.).

Hæmogregarina clelandi, Jnstn., Jnstn., 1911f (S.Q.)

Hæmocystidium chelodinae, J. and C., Jnstn., 1911f
(S.Q.).

These three Hæmoprotozoa were listed under

Emydura Krefftii by Johnston and Cleland, 1910c;
C. and J., 1912a.

ELSEYA DENTATA, Gray.

b *Amphistoma* sp., Krefft, 1871 (N.Q.).

d *Ascaris* sp., Krefft, 1871 (N.Q.).

* *Hæmoqr. dentata*. Lewis (Bull. North Territory, 8, 1913, p. 34). from
Elseya dentata, from Darwin, is probably a synonym.

CHELONIA MYDAS, Linn. (green turtle).

- b Amphistoma scleroporum*, Crepi., Jnstn., 1911f (Masthead I.).
Octangium sagitta, Looss., Jnstn., 1911f (Masthead I.); S. J. Jnstn. 1913 (N.Q.).
Polyangium linguatula, S. J. Jnstn., 1913 (N.Q.).
Diaschistorchis pandus, Braun., S. J. Jnstn., 1913 (N.Q.).

LACERTILIA.

VARANUS VARIUS, Shaw (lace lizard, monitor, common tree "goanna.")

- a Hæmogregarina* varanicola*, J. and C., 1911a (S.Q.); C. and J., 1912a (S.Q.); Breinl, 1913c (N.Q.).
b Sparganum sp., Jnstn., 1911f (S.Q.); Nicoli, 1914d (N.Q.).
Acanthotænia tidswelli, Jnstn., 1913 (N.Q.).
Acanthotænia sp. (plerocercoid), Jnstn., 1914 (N.Q.).
Bothridium parvum, Jnstn., 1913 (N.Q.).
d Physaloptera varani? Jnstn., 1916 (S.Q.).

VARANUS BELLII, D. and B. (perhaps only a well-marked variety of the last-named monitor).

- a Hæmogregarina varanicola*, J. and C., Jnstn., 1912b (S.Q.).
c Acanthotænia tidswelli, Jnstn., 1912b (S.Q.).
d Physaloptera varani? Jnstn., 1912b (S.Q.).

VARANUS GOULDII, Gray (Gould's monitor: sand "goanna").

- a Hæmogregarina gouldii*, J. and C., 1911a (S.Q.).
c Acanthotænia tidswelli, Jnstn., 1911f (S.Q.).
Sparganum sp., Jnstn., 1911f (S.Q.).
d Physaloptera varani? St., Jnstn., 1911f (S.Q.).

PHYSIGNATHUS LESUEURII, Gray (water lizard, water dragon).

- d Filaria physignathi*, Jnstn., 1912b; J. and C., 1911a (S.Q.).

CHLAMYDOSAURUS KINGII, Gray (frilled lizard).

- c Sparganum* sp., Jnstn., 1914 (N.Q.); 1916a (S.Q.).
d Filaria chlamydosauri, Breinl, 1913d (N.Q.).

* The hæmogregarines of lizards and snakes are often placed under the subgenus (or genu.) *Karyolysus*

LYGOSOMA (HINULIA) TÆNIOLATUM, White (a skink).

a *Trypanosoma* sp., J. and C., 1911a (S.Q.)

Hæmogregarina sp., J. and C., 1911a (S.Q.).

TILQUA SCINCOIDES, White (blue-tongued lizard).

b *Mesocœlium microon*, Nicoll, 1914a (N.Q.).

Tetracotyle tiliquæ, Nicoll, 1914a (N.Q.).

d lung nematodes--described and figured by Breinl, 1913d (N.Q.). I have met with the same species in this host in Sydney district (N.S. Wales), and in the vicinity of Brisbane. The parasite was not named by Dr. Breinl, who, however, drew attention to certain anatomical peculiarities of the nematode, and thought that it belonged to a new genus. As a result of an examination of my specimens, I agree with him. It is proposed to name the parasite *Pneumonema tiliquæ* n. gen., n. sp. I hope to be able to definitely classify it later.

OEDURA TRYONI, DE VIS (Tryon's gecko).

a *Hæmogregarina* sp., Jnstn., 1911f (Burnett R.).

Hæmocystidium sp., Jnstn. 1911f (Burnett R.).

LIALIS BURTONII, Gray (Burton's slow worm).

c *Acanthotænia striata*, Jnstn., 1914 (N.Q.).

DELMA FRAZERI, Gray (Frazer's slow worm).

b *Eurytrema crucifer*, Nicoll, 1914a (N.Q.).

OPHIDIA.

PYTHON AMETHYSTINUS, Schn. (Northern Queensland carpet snake).

a *Hæmogregarina amethystina*, Jnstn., 1909b, 1910a (Port Curtis).

= *H. pythonis*, Bill., Jnstn., 1911f.

PYTHON SPILOTES var. VARIEGATUS, Gray (the common carpet snake).

a *Hæmogregarina shattocki*, Lamb., Jnstn., 1909d, 1910a (Brisbane); J and C., 1911a; C. and J., 1912a (Burnett); = *H. pythonis*, Billet -Jnstn., 1911f.

b *Dolichopera parvula*, Nicoll, 1914a (N.Q.).

c *Sparganum* sp., Jnstn., 1911f. (S.Q.).

Acanthotænia sp., Jnstn., 1914 (N.Q.).

d *Ascaris* sp., Jnstn., 1911f (S.Q.).

- ASPIDIOTES RAMSAYI**, Macleay (a western python).
c Ophiotænia longmani, Jnstn., 1916*a* (W.Q.).
d Ascaris sp., Jnstn., 1916*a* (W.Q.).
e Porocephalus sp., Jnstn., 1916*a* (W.Q.).
- DENDROPHIS PUNCTULATUS**, Gray (green tree-snake).
*a Hæmogregarina dendrophidis**, J. and C., 1910*c*;
 C. and J., 1912*a* (S.Q.).
c Sparganum sp., Jnstn., 1911*f* (S.Q.).
- DIPSADOMORPHUS FUSCUS**, Gray (brown tree-snake).
a Hæmogregarina sp., Breinl, 1913*c* (N.Q.).
d Agamonema sp., (larval-encysted)—Brisbane, (Coll.
 H. A. Longman), Jnstn., 1916*c*.
Echinorhynchus sp. (larval-encysted)—Brisbane (Coll.
 H. A. Longman), Jnstn., 1916*c*.
- FURINA OCCIPITALIS**, D. and B. (ringed snake).
d Diaphanocephalus sp., Jnstn., 1911*f* (S.Q.).
- DIEMENIA TEXTILIS**, D. and B. (brown snake).
a Trypanosoma sp., Tyrie and Love, 1906 (N.Q.).
c Sparganum sp., Jnstn., 1913 (N.Q.).
d Echinorhynchus sp., Jnstn., 1916—larvæ forms in
 peritoneum and mesenteries (Brisbane).
- PSEUDECHIS AUSTRALIS**, Gray (a black snake).
a Hæmogregarina bancrofti, J. and C., 1911*a*; C. and J.,
 1912*a* (S.Q.).
c Sparganum sp., Jnstn., 1911*f* (S.Q.).
Acanthotænia gallardi, Jnstn., 1911*f*; 1912*b* (S.Q.).
- PSEUDECHIS MORETONENSIS**, De Vis (orange-bellied brown
 snake).
a Hæmogregarina bancrofti, J. and C., 1911*a* (S.Q.).

AMPHIBIA.

- HYLA CÆRULEA**, White (the common green frog).
a Hæmogregarina (Lankesterella) hylæ, C. and J., Clel.,
 1915*a* (Burnett R.)—very common in Brisbane
 district (Jnstn., 1916).
Balantidium, sp.—apparently uncommon (Brisbane).

* *Hæm. calligasger*, Lewis, *l.c.*, p. 34, from *Dendrophis calligasger* (a misprint for *calligaster*) from the Northern Territory is apparently a synonym; whilst his *H. darwinensis* from *Pseudechis darwinensis* (p. 34), looks like *H. pseudechis*, Jnstn. P.L.S., N.S.W., 34, 1909, p. 406.

- Nyctotherus* spp.—common (Brisbane).
Opalina spp.—common (Brisbane).
Amœba sp., aff. *A. limax* (Brisbane).
Trichomastix sp. (Brisbane).
- b *Mesocœlium microon*, Nicoll, 1914a (N.Q.).
Mesocœlium mesembrinum, S.J.J., Jnstn., 1916c
 (Brisbane).
Dolichosaccus ischyryus, S.J.J., Jnstn., 1914b (Brisbane).
Diplodiscus megalochrus, S.J.J., Jnstn., 1916c
 (Brisbane). Now recorded from this host for
 the first time.
- c *Sparganum* spp. (at least two types), Jnstn., 1911f
 (Burnett R.); 1912b (S.Q.).
- d *Agamonema* sp., Jnstn., 1914c (Brisbane).
Rhabdonema sp. (lung worm), Jnstn., 1916c (Brisbane).
Echinorhynchus hylæ, Jnstn., 1914c (Brisbane).

HYLA GRACILENTA, Peters.

- b *Mesocœlium microon*, Nicoll, 1914a (N.Q.).

HYLA LESUEURII, D. and B.

- a *Trypanosoma* sp., Bancroft in Clel. and Jnstn., 1910c
 (Brisbane).

HYLA NASUTA, Gray.

- a *Trypanosoma* sp., Bancroft, 1891, and in Clel. and
 Jnstn., 1910c (Brisbane).

LYMNODYNASTES TASMANIENSIS, Gunther.

- a *Trypanosoma rotatorium*, Mayer, Clel. and Jnstn.,
 1910c; 1912a (S.Q.).

I now consider that [this species should be separated from the European one, and suggest that it be associated with the name of my former colleague in parasitological work, Dr. J. B. Cleland = *Trypanosoma clelandi*, Jnstn., nom. nov.

LYMNODYNASTES ORNATUS, Gray (?).

- a *Trypanosoma rotatorium*, Mayer, C. and J., 1910c;
 1912a (S.Q.) = *Tryp. clelandi*, Jnstn., 1916 (see
 above).

PISCES.

ELASMOBRANCHII.

DASYBATIS KUHLLI, M. and H. (spotted ray).

- b* *Petalodistomum polycladum*, S. J. Jnstn., 1913 (N.Q.).
Petalodistomum cymatodes, S. J. Jnstn., 1913 (N.Q.).

TELEOSTEI.

COPIDOGLANIS (TANDANUS) TANDANUS, Mitchell (fresh-water catfish).

- a* *Trypanosoma bancroftii*, J. and C., 1910*b*; C. and J., 1912*a* (S.Q.)
b *Isoparorchis* sp., Jnstn., 1914*b* (Condamine R.).

I have since received many specimens taken from the swim bladder of this host from the Burnett River (Eidsvold), and the Dee River, by Dr. T. L. Bancroft.

ANGUILLA MAURITANA, Bennett (marbled eel).

- a* *Trypanosoma anquillicola*, J. and C., 1910*b*; C. and J., 1912*a* (Burnett R.).

ANGUILLA REINHARDTI, Steind (long finned eel).

- a* *Trypanosoma anquillicola*, J. and C., 1910*b*; C. and J., 1912*a* (S.Q.).

EELS.—Nicoll, 1914*d* mentions the occurrence of *Filaria* in the body cavity (N.Q.).

MURÆNESOX CINEREUS, Forsk. (Pike eel).

- b* *Ectenurus angusticanda*, Nicoll, 1915*a* (N.Q.).

SAURIDA UNDOSQUAMIS, Richdsn. (the grinner, lizard fish).

- Tetrarhynchus* (larval) from mesentery, Jnstn., 1916 (Moreton Bay).

SERIOLA LALANDI, Cuv. and Val.—according to Mr. Ogilby, the fish referred to should be called *S. grandis*, Cast.—king fish).

- c* *Tetrarhynchus* (*Anthocephalus*) sp., Jnstn., 1914*a* (N.Q.); 1916*c* (Masthead I.)
d *Filaria*, Nicoll, 1914*d* (N.Q.).

CARANX NOBILIS, Macleay (= *C. georgianus*, C. and V., according to Mr. J. D. Ogilby—white trevally).

- Bucephalopsis exilis*, Nicoll, 1915*a* (N.Q.).

POMADASIS HASTA, Bloch (Javelin fish).

- b* *Aphnidiogenes barbarus*, Nicoll, 1915*a* (N.Q.).
Genolopa trifolifer, Nicoll, 1915*a* (N.Q.).
Genolopa cacuminata, Nicoll, 1915*a* (N.Q.).
Sterrhurus brevicirrus, Nicoll, 1915*a* (N.Q.).

SPARUS BERDA Forsk (syn. *Chrysophrys hasta* Bl., a sea bream).

- c* *Tetrarhynchus* (*Anthocephalus*) sp., Jnstn., 1914*a* (N.Q.).

SPARUS AUSTRALIS, Gunther (black bream).

- b* *Coitocæcum gymnophallum*, Nicoll, 1915*a* (N.Q.).
Xenopera insolita, Nicoll, 1915*a* (N.Q.).
d *Echinorhynch*:—Nicoll, 1914*d* (N.Q.).
Filaria sp., peritoneum, Jnstn., 1916 (Moreton Bay).

TACHYSURUS sp. (pilot fish).

- b* *Gyliauchen tarachodes*, Nicoll, 1915*a* (N.Q.).

SPHÆROIDES LUNARIS, Schn. (a toadfish).

- b* *Opistholebes amplicælus*, Nicoll, 1915*a* (N.Q.).

SPHÆROIDES MULTISTRIATUS, Richdsn. (spotted toadfish).

- b* *Maculifer subæquiporus*, Nicoll, 1915*a* (N.Q.).

TETRAODON HISPIDUM var. (spotted toadfish).

- b* *Steringotrema pulchrum*, S. J. Jnstn., 1913 (N.Q.).

TETRAODON HISPIDUM, L.

- b* *Steringotrema pulchrum*, S. J. Jnstn., 1913 (N.Q.).

TOADFISHES.

Nicoll (1914*d*) refers to the presence of filariæ in the body cavity (N.Q.).

DIPNOI.

CERATODUS (NEOCERATODUS) FORSTERI, Krefft. (Ceratodus, Queensland lung fish, Burnett River salmon).

- b* *Amphistoma* sp., Jnstn., 1912*b* (Burnett R.).
d *Amblyonema terdentatum*, Linstow, 1898; Jnstn., 1912*b* (Burnett R.).

Ascaris sp., Krefft., 1871, is almost certainly the same as the preceding species.

ARTHROPODA.

ARACHNIDA (ACARIDA)

ARGAS PERSICUS Wald. (Syn. A. AMERICANA Pack.)—(the fowl tick).

- a. *Spirochaete (Spiroschaudinna) gallinarum* the parasite of fowl tick-fever. Dodd 1909 (N.Q.)—(see also under "Fowl" (GALLUS DOMESTICUS).)

BOOPHILUS AUSTRALIS, Fuller (the cattle tick)

- a *Babesia bigeminum*, K. and S., the correct name is probably *B. bovis*, though the organism is generally known in Queensland as *Piroplasma bigeminum*, the cattle tick-fever parasite. For general references to this hæmatozoon, see under "Ox."

BOOPHILUS ANNULATUS var., MICROPLUS, Canestr. (cattle tick).

- a *Babesia bigeminum*, Kilb. and Smith; Gilruth, 1912 (Qld.).

APONOMMA TRIMACULATUM, Lucas.

- a *Hæmogregarina varanicola*, J. and C., in intestine, and probably transmitted by this tick; Breinl, 1913c (N.Q.).

APONOMMA spp.

The various hæmatozoa of lizards and snakes are no doubt transmitted mainly by species of *Aponomma*, which are common on these hosts in this State, and are found occasionally on mammals.

INSECTA.

ORTHOPTERA.

PERIPLANETA AMERICANA, L. (the introduced house cockroach).

- d *Oxyuris* sp., Jnstn., 1916c (Brisbane).

PERIPLANETA AUSTRALASÆ, Fabr. (house cockroach).

- a *Nyctotherus* sp., found by Mr. C. D. Gillies and myself (Brisbane).

- d *Oxyuris* sp., Jnstn., 1916c (Brisbane).

COLEOPTERA.

CACACHROA DECORTICATA, Macleay (a cane beetle).

- d *Thelastomum alatum*, Jnstn., 1914c (Cairns)

APHANIPTERA

The presence of the cysticeroid stage of *Dipylidium caninum* L. (a tapeworm, which infests cats and dogs in Queensland) in the cat flea and dog flea (*Ctenocephalus felis* and *C. canis* respectively), may be inferred. Likewise also the cysticeroid of *Hymenolepis diminuta* of rats, in *Ceratophyllus fasciatus*, one of the rat fleas. The lastnamed ectozoon is also known to be the chief transmitter of *Trypanosoma lewisi*, which is a blood parasite of local rats.

DIPTERA.

MUSCA DOMESTICA L. (common house fly).

a *Leptomonas* (*Herpetomonas*) *muscæ-domesticæ*, Burnett, Jnstn., 1916c (Brisbane, also in Sydney, N.S.W.).

d *Habronema muscæ*, Carter; Jnstn., 1912b (Brisbane).

MUSCA VETUSTISSIMA, Walker (cattle fly).

d *Habronema muscæ*, Carter? Jnstn., 1912b (S.Q.).

Habronema sp., Tryon, 1914, the same as the preceding.

CALLIPHORA OCEANICÆ, Desv. (a common blow fly).

a *Leptomonas* (*Herpetomonas*) *muscæ-domesticæ*, Burnett, Jnstn., 1916c (Brisbane).

According to Dr. Cleland (Trans. Int. Med. Congr. Austr. 1913, p. 566), the correct name of the blow-fly known here as *C. oceanica* is *Anastellorhina augur* Fabr.

CALLIPHORA VILLOSA, Desv. (a blow-fly).

a *Leptomonas* (*Herpetomonas*) *muscæ-domesticæ*, Burnett, Jnstn., 1916c (Brisbane).

According to Dr. Cleland (*l.c.*, p. 550), the blow-fly identified as *C. villosa* is really *Pollenia stygia*, Fabr.

CULEX FATIGANS, Wied. (syn *C. skusii*, Giles), common house mosquito.

The organism of *dengue* is transmitted by this mosquito.

Dirofilaria immitis, Leidy (heart worm of the dog).*

Bancroft, 1893, 1898, 1900, 1901a, 1903a, 1903b.

*Dr. G. Sweet (1908, p. 485), has misquoted Bancroft, 1901a, in reference to *Anopheles maculipennis* as the intermediate host of *Dirofilaria immitis* in Queensland. Bancroft states definitely (p. 43, 1901), that this mosquito does not occur in Australia (1903, p. 251).

Filaria bancrofti, Cobbold (human), Bancroft, 1903a.
 CULEX CILIARIS, Skuse, nec Linn = *C. fatigans*.

Filaria bancrofti, Cobb., Bancroft, 1898, 1899a, 1899b.
 CULICELSA ANNULIROSTRIS, Skuse.

Filaria bancrofti, Cobbold, Bancroft, 1899a.
 SCUTOMYIA NOTOSCRIPTA, Skuse.

Filaria bancrofti, Cobb., Bancroft, 1899a. O'Brien (1908) believes this mosquito to be the carrier of dengue in North Queensland.

CULICELSA VIGILAX, Skuse—the black bush mosquito.
Filaria bancrofti, Cobb., Bancroft, 1898.

As far as I am aware, no work other than that of Dr. T. L. Bancroft has been published regarding the transmission of parasites by mosquitoes in Australia. Human malaria is transmitted by Anophelines; Castellani and Chalmers (Man. Trop. Med., p. 854), mention, however, but on what authority I do not know, that *Nyssorhynchus* (= *Anopheles*) *annulipes*, Walker, is known to be a carrier in Australia. This mosquito which occurs in Australia* has been proved by Kinoshita† to be a transmitter in Formosa.

*T. L. Bancroft. List of the mosquitoes of Queensland. Ann. Queensland Museum, No. 8, 1908; J. B. Cleland. List of the mosquitoes recorded in Australia. Rep. Bur. Microbiol., N.S.W. (1910-11), 2, 1912, pp. 143-5, and in Trans. Intercol. Med. Congr. Austr. 9 (1), 1911 (1913), pp. 553-5; F. Taylor. Descriptions of mosquitoes collected in the Northern Territory during the expeditions of 1911. Bull. North Territory, No. 1a, 1912, pp. 25-34; A. Breinl, 1912, p. 18, 23; L. Cooling, Report on mosquito work in Brisbane, in Rep. Commiss. Public Health, Queensland, 1914, pp. 56-64; E. Ferguson. Notes on mosquitoes, Ann. Rep. Govt. Bur. Microbiology, N.S.W., 4, 1915, p. 238.

A. Breinl and M. J. Holmes in their "Medical Report on the data collected during a journey through some districts of the Northern Territory" (Bull. North. Terr., No. 15, Dec., 1915) state that "the mosquito which in all probability carries the malarial parasite in N.T. is *Nyssorhynchus annulipes*. . ." (p. 5).

Since writing the above I have come across a reference by Breinl (1915) who in writing of this mosquito calls it the carrier of malaria. This statement is not based on experiment, but only on general grounds. As far as I am aware no species of mosquito has yet been proved to be a carrier of any form of malaria parasite, *Plasmodium*, *Proteosoma*, *Hæmoproteus*, etc., in Australia.

†Kinoshita. Arch. F. Schiffs, u. Tropenbyg, 10, p. 708. This reference, as well as some that follow, have been kindly supplied by Mr. F. H. Taylor, of the Tropical Institute, Townsville.

MOSQUITOES.

Bird malaria, *Plasmodium (Proteosoma)* spp. is transmitted elsewhere, as far as known, by species of culicine mosquitoes (Minchin. Int. Study Protozoa, 1912, p. 358), including *Stegomyia fasciata* (p. 364) (= *S. calopus*), which is common in Eastern Queensland.

In reference to *Halteridum (Hæmoproteus)*, which is so common in Queensland birds, Minchin states (*l.c.*, p. 357), that the invertebrate host, so far as known, is a Hippoboscid fly, but as these are very uncommon on our native birds, especially the passerines, one is led to believe that in Australia, at least, some other group of Diptera must act as transmitters, *e.g.*, some mosquito, probably a Culicine.

In regard to the reptilian *Hæmocystium* parasites, the carrier in the case of the tortoises is no doubt a fresh-water leech, some of which occur ectoparasitically on Queensland species of *Chelodina* and *Emydura*, whilst in the case of lizards it may be a mosquito, or perhaps a tick.

Dr. Bancroft did good work in tracing the life history of the filarial worm, with which his father's name is associated (*F. bancrofti*, Cobbold). Theobald has given a formidable list of mosquitoes both Culicine and Anopheline which can act as transmitters. (Castellani and Chalmers *Man. Trop. Med.*, p. 666, 1126). Amongst them are some occurring in Queensland, *e.g.*, *Tæniorhynchus (Mansonia, Mansonoides)*, *uniformis*, Theob.; *Anopheles annulipes*, etc. Perhaps *Stegomyia calopus (S. fasciata)* may also do so,* since *S. pseudoscutellaris*, Theob., is a transmitter in Fiji† and probably also in New Guinea, where it occurs too (Brienl, 1915).

Dirofilaria immitis is carried by *Anopheles* sp. in Europe (Manson, *Trop. Diseases*, p. 564). Bancroft has found that at least one Culicine species, *C. fatigans (C. skusii)* can transmit it in Queensland.

We do not yet know the carriers (probably mosquitoes) of the various species of filarial worms so commonly parasitic in Queensland birds, and to a much less extent, in marsupials.

*Theobald. *Monogr. Culicidæ of the World*, 1, p. 293, quotes this as a host.

†Bahr. *Filariasis, etc.*, in Fiji.

Stegomyia fasciata (syn. *S. calopus*) is perhaps a transmitter of dengue (Manson. Edit. 5, 1914, p. 272).

HEMIPTERA.

Amongst the Hemiptera, the rat louse, *Hæmatopinus* (*Polyplax*) *spinulosus*, is known* to be a carrier of *Trypanosoma lewisi*, Kent, which parasitises the blood of rats in Australia and elsewhere.

MOLLUSCA.

Amongst the molluscs, various developmental stages of Trematodes and Cestodes must occur, but their presence has not been reported.

ANNULATA.

Leeches, no doubt, serve as intermediate hosts of the Trypanosomes, Hæmogregarines and Hæmocystidium occurring in fresh water tortoises and the trypanosomes of our eels, catfishes and frogs.

Hæmogregarina (*Lankesterella*) *hylæ* of the green frog, *Hyla cærulea*, is probably transmitted by a freshwater leech during the aquatic stage of the host.

Entomostraca certainly serve as the intermediate host of many of the Cestodes infesting our birds. No doubt some of the Oligochætes do also.

Various Nematomorpha frequent our fresh waters, but none have been described either in the parasitic or in the free living stage except *Parachordodes annulatus*, Linstow, 1906. I have mentioned the presence of *Gordius* sp. (free form) at Montville (T.H.J., P.R.S., Q. 27 (2), 1915, p. iv. Tryon, 1911, p. 73; 1912, p.100, has also referred to its occurrence in several localities (Eudlo, Beaudesert, Rockhampton).

I desire to express my thanks to Messrs. Longman and Ogilby†, of the Queensland Museum, for assistance in regard to the names of some of the hosts.

*E. Rodenwaldt. *Trypanosoma lewisi* in *Hæmatopinus spinulosus*, Centr. Bakt., 1, Orig., 52, 1909, p. 30-42.

†J. D. Ogilby. The Commercial Fishes and Fisheries of Queensland. An essay. Govt. Printer, Brisbane, 1916.

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This list contains only such papers as refer to the presence of entozoa in this State.

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 1896 A case of Ankylostomiasis complicated by the presence of another small worm. *Ibid*, 15, 1896, p. 482-5.

W. BACOT.

- 1892 Cases of earth-eating in North Queensland. A. Med. Gaz., 11, 1892, p. 430.

J. BANCROFT.

- 1876 Letter in Cobbold. 1876.
 1878 Cases of filarious disease. Trans. Path. Soc. Lond., 29, 1878, p. 407-17.
 1879^a Letters to Cobbold in Cobbold, 1879^a, 1879^b.
 1879^b New cases of filarious disease. Lancet, 1, 1879, p. 698.
 1880 Further notes on a case of leprosy associated with *Filaria*. Lancet, 1, 1880, p. 285-6.
 1882^a Austr. Med. Gaz., 1882, p. 170.
 1882^b *Ibid*, 1882, p. 361.
 1885 *Scleroderma* in relation to *Filaria sanguinis hominis*. Lancet, 1, 1885, p. 380.
 1889 On *Filaria*. Trans. Intercol. Med. Congr. Austr., 2, 1889, p. 49-54—abstracted in Medical News, Philad., 56, 1890, p. 656.
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T. L. BANCROFT.

- 1888 Note on *Hæmatomonas* in rats' blood. Proc. Roy. Soc. Q., 5, 1888, p. 31-2.
 1889 On Filarie of birds. *Ib.*, 6 (1) 1889, p. 58-62.
 1890 *Echinococcus* in the lung of a wallaby. *Ib.*, 7, 1890, p. 31.
 1891 (Exhibits). *Ib.*, 8, 1890 1, p. xiii, xiv.
 1893^a Notes on some diseases of stock in Queensland in Rep. Chief Insp. Stock Dept. Agric., Q'land, 1892 (1893). Appendix 4. And abstract in Vet. Jour. and Ann. Comp. Path. Lond., 37, 1894, pp. 327-330; and as "worm diseases in sheep and oxen in Queensland," Vet. Mag., Philad., 1, (3), 1894, p. 220-1.
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 1893 Entozoa parasites. A. Med. Gaz., 12, 1893, p. 258-60.
 1893^d Discussion on Jackson's paper (1893), p. 262.
 1898 Metamorphosis of *Filaria sanguinis hominis*. A. Med. Gaz., 17, 1898, p. 271.

*The literature prior to 1909 dealing with the occurrence of hydatids in Queensland is referred to in Johnston 1909^c and 1910^d.

- 1899a On the Metamorphosis of the young form of *Filaria bancrofti*, Cobbold, in the body of *Culex ciliaris*, etc., P.R.S., N.S.W., 33, 1899, p. 48-62.
- 1899b Filarial Metamorphosis in the mosquito. *Ibid*, 18, 1899, p. 120.
- 1899c Same as 1899b. *Ibid*, 2, 1899, p. 91-4. This paper has been abstracted in Med. Record, N. York, 57, 1900, p. 248; in Arch. d. Med. Nav., Paris, 77, 1902, p. 145-7.
- 1900 Part of 1899b. Jour. Trop. Med., Lond., 2, 1899-1900, p. 149-153.
- 1901a Preliminary note on the intermediary host of *Filaria immitis*, P.R.S., N.S.W., 35, 1901, p. 41-6.
- 1901b Ditto in Jour. Trop. Med. Lond., 4, 1901, p. 347-9.
- 1902 On the probable way by which the young *Ankylostoma duodenale* enters the human subject. A. Med. Gaz., 21, 1902, p. 66—abstracted as "Uncinariosis" in Jour. Amer. Med. Assoc., Chicago, 38, 1902, p. 973.
- 1903a Notes on *Filaria* and mosquitoes. A. Med. Gaz., 22, 1903, p. 251-2.
- 1903b On some further observations on the life history of *Filaria immitis*, P.R.S., N.S.W., 37, 1903, p. 254-7.
- 1912 On a proposed technique for the prevention of dengue fever and filariasis. A. Med. Gaz., 31, 1912, p. 80-1.
See also P. Bancroft, E. S. Jackson and T. L. Bancroft.

P. BANCROFT.

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- 1908 (Discussion on Jackson, 1908). *Ibid*, 1893.
- 1910 Notes on filaria in Queensland. *Ibid*, 1910, p. 233-4.

P. BANCROFT, E. S. JACKSON, T. L. BANCROFT.

- 1894 Notes on the increase of white corpuscles in filarial blood. A. Med. Gaz., 1894, p. 6.

C. BARNARD and A. PARK.

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- 1898a A new cattle disease. *Ibid*, 47, 1898, p. 485-6.
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W. G. BROWN.

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- 1913a The stomach worm in sheep. Q. Agr. Jour., 30, 1913, p. 157-9.
- 1913b The sheep botfly. Q.A.J., 31, 1913, p. 356-7.
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- 1915 The stomach worm in sheep. Q.A.J. (n.s.), 4, 1915, p. 11-15; 71-3; 162-3.

A. BREINL.

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- 1912 Report on Health and Disease in the Northern Territory. Bull. Northern Terr., 1a, July, 1912 (Melbourne).

- 1913a Investigation into the morphology and life history of *Onchocerca gibsoni*, etc. Rep. Austr. Inst. Trop. Medicine for 1911 (April, 1913), p. 5-17.
- 1913b On human filariasis in Queensland and the morphology of *Microfilaria bancrofti*. *Ibid.*, p. 18-23.
- 1913c Parasitic protozoa encountered in the blood of Australian Native Animals. *Ibid.*, p. 30-38.
- 1913d Nematodes observed in North Queensland. *Ibid.*, p. 39-46.
- 1913e The object and scope of Tropical Medicine in Australia. Trans. Intercul. Med. Congr. Austr., 9, 1911 (1913), I., p. 524-532.
- 1913f Ankylostomiasis. *Ibid.*, 9, 1911 (1913), I., p. 536-541.
- 1915 The distribution and spread of diseases in the East. Med. Jour. Austr., 2, 1915, p. 547-52.

A. BREINL & H. PRIESTLEY.

- 1916a Malaria contracted in New Guinea by Members of the Expeditionary Force and its treatment. Med. Jour. Austr., 1, 1916, p. 91-5.
- 1916b Notes on the successful treatment of ulcerative granuloma pudendi by means of tartar emetic, *Ibid.*, p. 237-9.

BOOTH-CLARKSON.

- 1913 Rep. Med. Inspector North Q'land., in Ann. Rep. Comm. Publ. Health, Q'ld., 1912-3 (1913)—Abstr. in A. Med. Gaz., 35, 1913, p. 191.)

A. G. BUTLER.

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D. A. CAMERON.

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C. & J.—Cleland and Johnston *q.v.*

J. B. CLELAND.

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THE ORIGIN OF IRON AND MANGANESE ORE IN BOGS AND STREAMS.

By W. D. FRANCIS.*

(*Read before the Royal Society of Queensland, 1st May, 1916.*)

A. D. Hall† in writing on the origin of iron ore in undrained soils has stated that further investigation is required regarding the respective shares of the iron bacteria of Winogradsky, on the one hand, and the purely chemical actions of solution and reduction by organic matter and carbonic acid followed by redeposition on evaporation, on the other, in its formation.

Ehrenberg showed that bog iron ore investigated by him consisted of the remains of algæ.‡ Although it can be shown that his observations are not universally applicable, it is interesting to notice that Ehrenberg ascribed the origin of the ore to organic agencies. Investigations by the writer show that ferruginous and manganiferous material in bogs and streams at Kin Kin, which is a stage in ore formation, is composed very extensively, if not entirely, of micro-organic material, chiefly bacterial. A few algæ, and less frequently protozoa, are also present. Besides numerous cocci and bacilli, long filaments are abundant, which in many cases composed the greater part of the

* The author in a separate paper records the observation, in the Kin Kin district, of (1) the presence of a red algaoid plant on rocks in streams in scrub country; and (2) the occurrence of a black manganiferous incrustation in similar positions in cleared country. He considers that the black manganiferous incrustations result in some way from the death and decay, or replacement of the red algaoid plant.—Ed.

† A. D. Hall, "The Soil," 1912, p. 286.

‡ "Student's Lyell," 2nd Edn., 1911, pp. 48-49.

material. These filaments are typical bacteria. They vary in size in their natural state from under 1μ to as much as 2.5μ in diameter. Like the cocci and short bacilli, they can be stained with basic aniline dyes such as methylene blue, thionin blue, and basic fuchsin, if the excess of hydrated ferric oxide is first removed by treatment with a series of increasing strengths of dilute hydrochloric acid.

Comparison of unstained and stained preparations indicates that the primary elements of the bacteria are surrounded by a ferruginous sheath which accounts for the comparatively large-sized filaments and their visibility when unstained. Further investigation is required to show the exact number and character of the species represented. A greater or less number of the coccoid and short bacillary forms may prove to be stages in the development or segmentation of the filaments, as similar modifications are known to exist in the bacteria. In fact, numbers of the ferruginous filaments when stained are seen to be segmented into short bacillus-like elements. The long, unbranched filaments, which are the most abundant forms, probably belong to *Leptothrix*. *Crenothrix* also appears to be represented, and some apparently branching forms present probably consist of species of *Cladothrix*. Descriptions and figures of these genera are given by Engler and Prantl*. An interesting account of bacteria allied both chemically and morphologically to those studied by the writer is given by Conn.† The conclusions outlined there are similar to several of those propounded in this paper.

Dr. T. H. Johnston, in the writer's presence, performed an experiment which showed that the iron present in a sample of the ferruginous material was contained in the organisms. He filtered the material and washed the residue with distilled water. The filtrate and wash water together were tested for iron, but that element was found to be absent. As the original sample was found by examination

* "Die natürlichen Pflanzenfamilien, Leipzig, 1900, I., Ia., pp., 35-40.

† Agricultural Bacteriology, Philadelphia, 1901, pp. 62-64.

to be entirely composed of the organisms mentioned above and free from colloidal ferruginous material, it is evident that the organisms contained the iron. This conclusion was made still clearer by passing dilute hydrochloric acid through the residue consisting of the organisms, and then testing the solution with ammonia for iron. The resulting precipitate of hydrated ferric oxide showed that the organisms contained the iron.

When early workers were first acquainted with "iron bacteria" some of them contended that the deposition of ferric hydrate in or upon the organisms was of a mechanical nature; but the views of Winogradsky and others, which regard the process as a physiological one, have been proved, or at least are fairly generally accepted.

The abundance of micro-organisms in ferruginous material in bogs and streams is probably related to the known effect of iron on plant growth, which appears to be stimulated in proportion to the amount of iron present.*

If observations in different parts of the world substantiate it, the organic interpretation of the origin of the ore should be commendable to reason because the accumulations composing the ore would be attributable to the selective and cumulative functions with which organisms are recognised to be endowed.

The writer wishes to acknowledge his obligation to Drs. T. H. Johnston and H. C. Richards, of the Queensland University, for their generous assistance and useful criticisms.

* Peirce, "Plant Physiology," 2nd Edn., 1909, p. 101.

THE SUPPOSED ARTIODACTYLE QUEENSLAND FOSSILS.*

By HEBER A. LONGMAN.

(Read before the Royal Society of Queensland, 1st May, 1916.)

In May, 1886, the late C. W. De Vis read a paper before this Society entitled, "A Post-Pliocene Artiodactyle."† Under the name of *Prochærus celer*, he described certain fossil teeth as Artiodactyle, associating them with the peccaries rather than with the true pigs.

Apart from bones of the dingo and fragmentary remains of a few rodents, found in recent deposits, the palæontological record of Australia so far as land mammals is concerned is confined to Marsupials and Monotremes. Although Owen described in 1882 a Proboscidian Mammal (*Notelephas australis*‡) from the remains of a large tusk said to have been found on the Darling Downs, later comments make it appear most unlikely that the fossil was ever collected in Australia. It is not surprising, therefore, that the affirmation by De Vis of the suilline nature of several teeth aroused considerable interest.

The material consisted of various teeth received from different localities on the Darling Downs, these being unaccompanied by cranial or other bones. The type and associated teeth have been examined, and the writer has come to the following conclusions:—The incisor fossils represent remains from at least two and probably three

* Contribution from the Queensland Museum.

† Pr. Roy. Soc. Q'ld., III, 1887, pp. 42-47, pl. 1.

‡ Phil. Trans. Roy. Soc., 1882, 3, p. 777, pl. 51.

distinct animals which are known marsupials; the molar tooth does not present sufficient evidence to warrant its designation as non-marsupial and it has no affinity with the Papuan pig.

This last point is of particular interest. *Prochærus celer* has apparently been interpreted as evidence of the occurrence in Pleistocene deposits in Queensland of the Papuan *Sus*, and in the Federal Handbook of Australia, published in connection with the visit of the British Association in 1914, the following statement appears on the authority of Prof. David (p. 287). “. . . *Sus papuensis* found its way southward from Papua, as far as Darling Downs, of Queensland.”

Coming to details, it is convenient to deal first with the tooth referred to by De Vis as “a lower incisor, the middle tooth of the left side.” This is undoubtedly a left lower lanial incisor of *Thylacoleo carnifex*, Owen. When *Prochærus celer* was described it is presumed that no lower jaws of *Thylacoleo* with these incisor teeth in position were available in the Queensland Museum collections. Direct comparison with such specimens now establishes identity. It is somewhat surprising, however, that the similarity was not recognised of the supposed new tooth with the incisors figured by Owen and Krefft. Specimens (unnamed) were even illustrated by Mitchell in 1838.* Except that it is in a more advanced state of wear, the tooth described and figured by De Vis very closely corresponds in size, contours and in the extent and deposition of enamel with figures 5, 6 and 7, Plate IX, of Owen's work.†

Six upper incisors are noted by De Vis in his paper, and three of these are figured. Associated with these are eight other specimens, apparently regarded as paratypes. These fourteen incisors exhibit considerable variety, and range from unworn, obviously juvenile, examples, 30 mm. in length, to teeth 58 mm. long. Several of these are identical with the second and third upper incisors in position in the premaxillaries of Nototherian mammals, now in the Queensland Museum, which were secured from fluvial

* Mitchell, Exped. to Aus., II, pl. 32, 1838.

† Fossil Mammals of Australia, 1877.

deposits on the Darling Downs. Some of the specimens accord best with the posterior incisors of *Nototherium mitchelli*; others may be more correctly attributed to the smaller crania described as *Euowenia*.* De Vis attributed certain Queensland Museum Nototherian specimens to Macleay's "*Zygomaturus trilobus*," the status of which is in dispute, but for purposes of this paper it is not necessary here to raise that question. It is sufficient to say that these upper incisors should not be separated from those of our Nototherian Marsupialia.

The tubercles noted in the original description are more or less prominent in the posterior upper incisors of some of these large marsupials. Examples with the teeth *in situ* show that they are decidedly variable. The approximate position of such incisors and their relation to the lower tusks are well illustrated by a profile photograph (Plate 1) in H. H. Scott's Monograph of *Nototherium tasmanicum*.†

The three examples actually figured by De Vis represent very early stages, but there are intermediate specimens through which relationship may be traced to the more mature teeth. The persistent pulp cavity is most prominent in the juvenile, and is less noticeable in older specimens. The describer noted this cavity as "declaring relationship with the progenitors of the hippopotamus." Several of the upper incisors of our Nototherian specimens exhibit a basal pulp cavity, and, as a matter of fact, the feature is by no means rare in marsupial upper incisors and is well marked in both *Phascolomys* and *Phascolarctus*. A non-functional tooth of *Thylacoleo* figured by Owen‡ shows a similar cavity.

The remaining type material consists of a molar tooth described as "a quinque-tuberculate tooth of a bunodont type, composed of four sub-conical cusps separated by crucial sinuses and supplemented by a post-basal talon of similar form." This presents a problem which cannot

* De Vis, Pr. Roy. Soc. Q'ld., IV, 1888 ("Owenia") and Proc. Linn. Soc., N.S.W., VI, (2), 1891, p. 159.

† Tas. Geol. Sur. Rec., No. 4, 1915.

‡ *Loc. cit.*, Pl. VII, fig. 12.

be so clearly resolved. In the first place, the condition of the tooth is so unsatisfactory that some boldness was required to base definite conclusions on it. The tooth has been partly built up, one of the cusps is entirely missing and another is unduly elevated, having been glued into position. This condition is largely shown in the original illustration. It was compared with the last lower molar of Peccary and "less nearly" with the last upper molar of the native pig of Papua. Considered as a posterior molar it has no relationship with the teeth of any known marsupial, but these difficulties almost entirely disappear when it is regarded as a premolar. It certainly shows no sign of the strong transverse ridges which are so typical of the true molar series of our poephagous mammals, such as *Diprotodon*, *Nototherium* and the *Macropodidæ*. On the other hand, the premolar in these mammals departs from the bilophodont pattern and in some species is partially bunodont. Its variability has been the subject of considerable dispute, and it is interesting to remember that De Vis himself figured a premolar, attributed to *Zygomaturus trilobus*,* which is bunodont as regards three of its five cusps. This tooth and the discrepant large premolar of Macleay's type of *Z. trilobus* were commented on by Lydekker,† who considered the possibility of the latter being an abnormality or a deciduous third premolar of *Diprotodon* appearing as a "reversionary instance." When the comparative simplicity of the molar type of *Prochærus celer* is considered in conjunction with the above references, it is by no means probable that it represents a non-marsupial. And it may be definitely stated that this tooth, which was obtained at Sharrow, Darling Downs, has no affinity with the complex molars of the Papuan pig, *Sus papuensis*, Lesson, which is regarded by some authorities as merely a form of the Java species, *S. vittatus*, Muller and Schlegel.‡ Jentink and Miller, however, restrict *S. vittatus* to the Sumatra animal.§

* Pr. Roy. Soc. Q'ld, V, 1888, part 3, pl. 2.

† Ann. Mag. Nat. His. (6) III, 1889, p. 149.

‡ M. Bauschke, Arch. Naturges., Berlin, 1911, Bd. 1, heft 1.

§ Pr. U.S. Nat. Mus., XXX, p. 748, 1906.

In his interpretation of these teeth and the suggested alliance with the Dicotylinae of South America, De Vis was probably influenced by *a priori* considerations, such as the presence of marsupials in both countries and the large number of fossil peccaries and allies described from American deposits.

At present the danger of basing conclusions on isolated teeth is more generally recognised, and the extreme dental variability of the Marsupialia as a whole has been previously emphasised by the writer.* In connection with the utilisation of specimens from different sources, it may be pointed out that so great an authority as Owen included, in addition to lacertilian remains, "a chelonian skull and tail-sheath, and marsupial foot-bones" in his description of *Megalania prisca*.†

It should be added that as the domestic pig has now "run wild" in several places in Queensland, its bones will probably be found from time to time in scrub country.

* Proc. Roy. Soc., Q'ld., XXVI, 1914, p. 36.

† Woodward, Ann. Mag. Nat. His. (6) 1, 1888, p. 88.

FURTHER NOTES REGARDING THE KAIVA KUKU AND SEMESE DANCES OF PAPUA.

By RONALD HAMLYN-HARRIS, D.Sc.

(*Read before the Royal Society of Queensland, 29th May, 1916.*)

Some time ago I contributed a short paper on the ceremonial appurtenances used at Kaiva Kuku and Semese dances in illustration of some material now in the collections of the Queensland Museum,* but on account of the extreme difficulty in ascertaining information regarding these secret and symbolic dances,† I had to confine my remarks to the information which was available at the time. Since then I have been in communication with various correspondents in Papua and have been successful in obtaining a little more information which I here present as a further contribution to a very difficult subject.

Dr. Strong tells me that the ceremonies take place in the coastal villages of the Papuan Gulf from Orokolo on the west to Jokea and Oiyopu (Oiapu) on the east. These are villages speaking closely related languages and forming a clear ethnic group. A similar form of decorative art is found in the villages of Purari further to the west, but in language and customs these are clearly cut off from the Gulf natives proper. Dr. Strong is not sure whether they have true Kaiva Kuku or Semese customs

On the east the decorative art (together with the bow and arrow) was just beginning to enter the Mekeo and coastal Mekeo or Roro villages. Remarkable customs were

* *Memoirs Queensland Museum*, Vol. 2, 1913, p. 9.

† H. H. Romilly, "From my Verandah in N.G.", 1889, p. 88.

also known in the coastal villages of Kevori and Maiva. Traces of the decorative art are also found in the Aipiana and Siria, Yule Island, as well as the two villages of Kevin and Mowa and perhaps others. It has been pointed out by Chalmers,* amongst others, that the Kaiva Kuku ceremonies are essentially tabu.

The men, *i.e.*, chiefs of the various sections of the village decide that the coconuts shall not be eaten until a certain time, *e.g.*, in preparation for a feast. The "expert" in the matter of coconut growing dresses up in one of the Kaiva Kuku masks and parades the village and erects a few stacks with portions of coconut shells or other odds and ends suspended from them, *e.g.*, grass streamers and boards with markings on them.† Gardens in like manner may be tabooed; a breach of the tabu renders the culprit liable to punishment by the appropriate "expert," who keeps a watch and deals out punishment, dressed up in a mask and disguised with a species of grass dress. Probably the real force of the tabu depends on magic, since it is generally sufficient from the native point of view to get sand out of a footprint, etc., for a native sorcerer to be able to cause all sorts of trouble to the man who made the foot-print. Dr. Strong further confirms the statement that the masks are kept jealously guarded‡ from women. Though of recent years there has been no difficulty in obtaining masks, the natives showed the most intense anxiety that the women should not be allowed to see them.

The Semese§ ceremonies occur occasionally and are essentially initiation ceremonies for the youths although they are different from the ordinary initiation ceremonies.

When the ceremonial paraphernalia is being prepared an enclosure is made a short way out of the village for the purpose.

* Chalmers, *Pioneering in New Guinea* (1885-1887).

† With reference to "experts" who from the native point of view preside over the various departments of native life, consult C. C. Seligman, "The Melanesians of British New Guinea," 1910, p. 299.

‡ Haddon, A.C., "Descriptive Art of B. New Guinea," pp. 105-107."

§ Chalmers and Gill, *Work and Adventure in N.G.*, 1885, p. 138.

I am indebted to Mr. E. R. Stanley, Govt. Geologist of Papua, for his kind permission to use the three photographs here reproduced and for the details which enable me to illustrate them.

Plate 1 illustrates varieties of the Semese (Sivesi) masks used in the Kaiva Kuku ceremonies at Koraita, near Kerema, Gulf Division, and the large type of symmetrical work seen in this illustration has only been met with in the Vailala and Kerema villages. They vary in height from 6 to 25 feet or more*; the longer varieties being held in the vertical position by means of light rope stays. There is a common method of ornamentation—the upper portion being more or less consistent, the lower variable. Sometimes the decoration consists of heptad figures or circles, usually five stringers top and bottom adjoining circles. The whole periphery of the broad portion of the mask is decorated either with cockatoo feathers or lorikeet coloured plumage; just within the periphery the mask is coloured with a serrated decoration common to all masks of the Semese. The large pole above the apex and the broad portion of the mask are coloured alternately in broad black, red and yellow bands, except that sometimes white is substituted for the yellow. At the bottom of the mask is a rami-like contrivance or pubic covering consisting of plaited and unplaited banana stem fibre.

Immediately above the rami and distributed laterally are two projections meant to resemble ears, decorated consistently with serrations. On occasions these ears are made to resemble those of the ceremonial pig. On the same horizontal plane and at right angles to the ears is another projection resembling the mouth of the crocodile and rarely the pig. It consists of an upper and lower jaw studded with prepared spines from the sago or coconut timbers. The mouth is always gaping and the eyes of the native dancing with the mask are situated about this point so that he can see where he is going.

The masks are prepared in a secluded spot out of sight of young boys and women folk. It is generally understood

* T. F. Bevan, *Toil, Travel and Discovery in B.N.G.*, 1890, p. 145.

that if women were to look upon any of the Semese they are expected to die. The frame work consists entirely of lohia-cane bent and shaped approximating the finished articles. A fabric prepared from the ilimo (paper grass trees) is then dried and stretched across the entire surface and the two sides of the frame. Small dry, stringy-like pieces of creeper are then sewn into the fabric imitating the design described above and shown in the picture. When this is completed the peripheral feathers are added and a chief and colour-man finish the mask off with various colours.

The Semese ceremony lasts from about 14 to 20 days during which period the visitors and performers partake of much food in the form of pig, taro, sago, sweet potatoes, betel-nut, etc. The persons carrying the masks trot about the village for periods of an hour or so and then rest for half an hour. The final performance of the Semese is when all the performers trot about very rapidly round every house or any object which during the last year or so has been responsible for the death of one of their own members, or anything that the native mind considers to be unclean or evil; by this means they collect all the evil spirits and dump the masks in a heap and burn them up and, metaphorically, the evil spirits with them. After a period of eighteen months or two years they commence to re-build the masks for the same purpose.

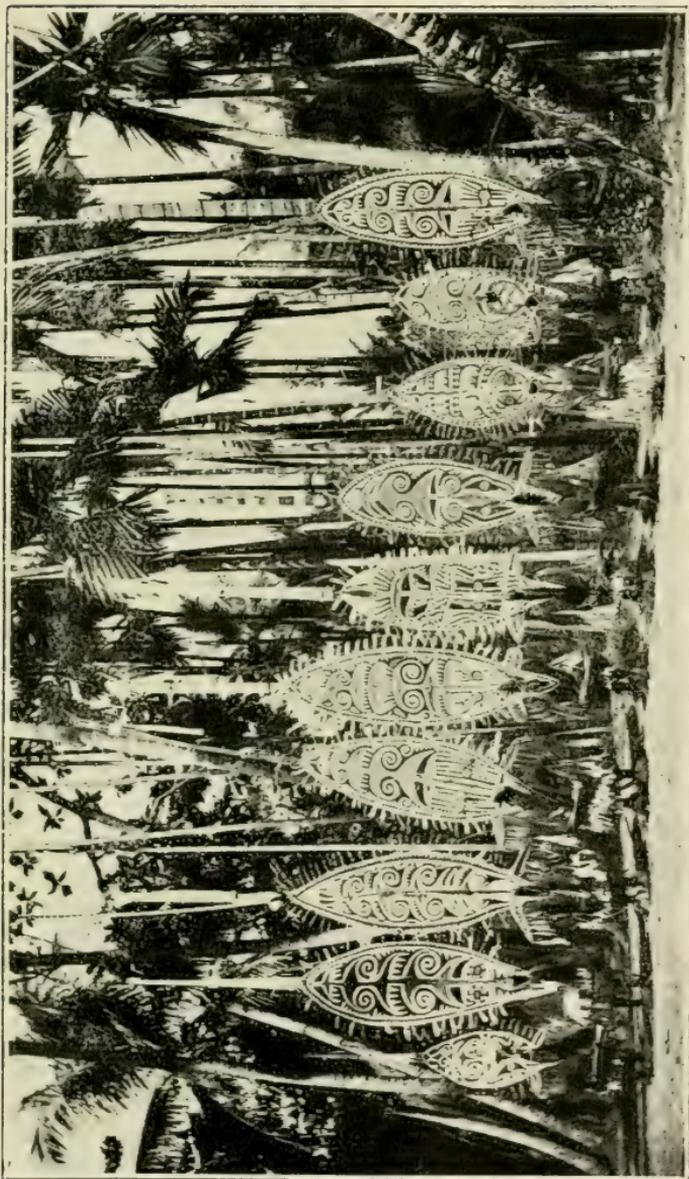
At certain intervals in the Semese ceremonies the women take part and only at this period are they allowed to look upon the large masks. The women wear masks of entirely a different nature, being only two or three feet high and consisting largely of feathers from the eokateo and Bird of Paradise. These masks are mitre-shaped with an internal decoration similar to the large masks. This ceremony is illustrated in plate 2. The movements are also different, the women, who wear large rami, dance gracefully in a circle swinging the rami with each movement. This part of the ceremony lasts about five hours and takes place every other day during the Semese ceremony.

Plate 3 gives us a closer view of the Semese masks and their mouth-pieces.

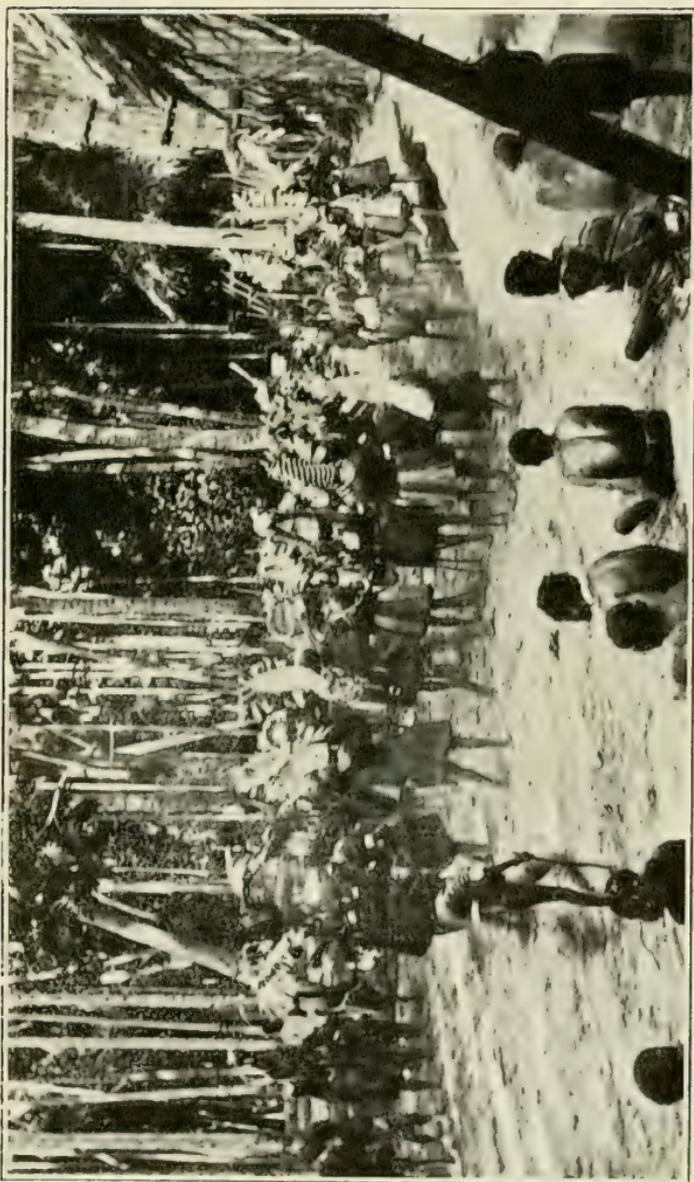
The Kaiva Kuku ceremony involves the above but the Kaiva Kuku masks are much smaller and imitate birds, pigs, crocodiles, fish, etc., and even human beings.

Although this information has been gleaned from most reliable sources, the original Kaiva Kuku ceremonies are nevertheless rapt in mystery. Until quite recently it would have been impossible, except at very great risk, to even obtain a photograph of the masks, much less the dances themselves. The ceremonies were always held most secretly, and nothing of what transpired was allowed to leak out; that fearful ordeals were enacted and the cruellest of practices indulged in seems to be certain, but whether the sufferers were always the victims of tabu or revenge does not transpire. From what I gathered in conversation with Mr. G. S. MacDonell (late of Oroko) I should almost be inclined to give to the Kaiva Kuku "inner" ceremonies a phallic significance of indirect importance; it seems to me as if certain definite ceremonials had been practised as a matter of course, and from what we know of the Melanesians generally such interpretation is not to be excluded without further investigation. Only with very much persuasion can the Papuans of this district be induced to throw any light upon this subject, the secrets of which they still guard with characteristic cuteness.*

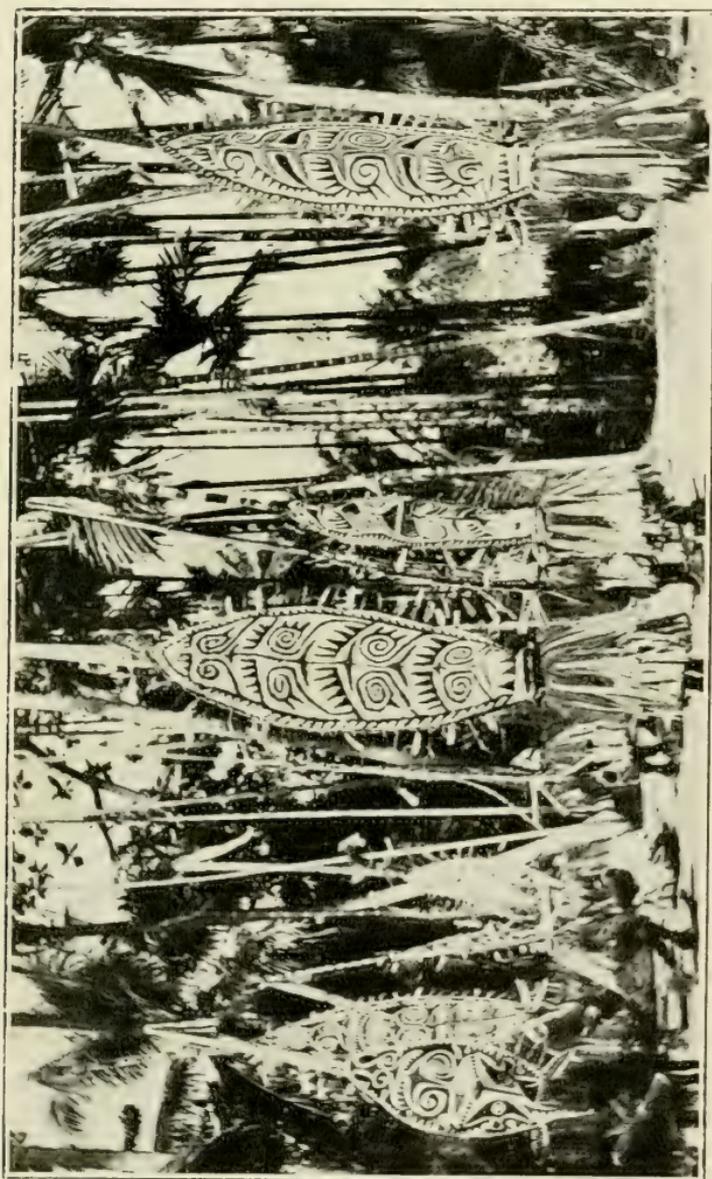
* Rev. T. Holmes. Initiation ceremonies of the Natives of the Papuan Gulf. *Jour. Anth. Inst.*, Vol. 32, 1902.



SEMESE DANCE. Koraita Village, Kerema, Gulf Division of Papua.



A Stage in the SEMESE CEREMONY—in which women take part and wear only small masks.
Koraita Village, Kerema, Gulf Division.



A Closer View of SEMESE MASKS showing the mouth parts. Koraita Village, Kerema, Gulf Division.

(Communicated by T. H. Johnston, M.A., D.Sc.)

SOME PRELIMINARY NOTES ON THE HABITS
OF THE DAWSON RIVER BARRAMUNDI,
SCLEROPAGES LEICHHARDTII.

BY T. L. BANCROFT, M.B. (Edin.)

(Read before the Royal Society of Queensland, 29th May, 1916).

I have long been anxious to ascertain the method of spawning of the Barramundi. Nearly three years ago Mr. Harry Pearce captured some Barramundi in a net of six-inch mesh, on the Dee River, a tributary of the Dawson. These, when examined in August, 1914, were found to contain very advanced roe; there were about fifty eggs in the mass, the diameter of the ovum being about 8 mm. September and October being the spawning season of the fishes of the Burnett, and the ova of the Barramundi having been noted in an advanced stage in August, lent support to the likelihood of September being the most suitable time to make an investigation of the kind. I therefore spent a brief holiday on the Dawson River in the latter part of September, 1915.

We proceeded first to Mostowie, on the Dawson, the property of Mr. F. M. Bell, but the river at this point is too deep and too wide (over a hundred yards) for the purpose, though large Barramundi were seen swimming about on the surface; with a boat this might be a good spot to study the fish.

Whilst at Mostowie, Mr. A. J. Cook informed me that, twenty years ago, Mr. Homer, of Barfield Station, whilst dragging a net in the river had pointed out to him, tiny fish swimming into the mouths of large Barramundi. This is interesting and important, for it points to the probability of the Barramundi carrying its developing ova in the mouth.

We next proceeded to Gyranda, ten miles further on, belonging to Mr. H. D. Tidswell. Here there is a narrow strip of water, ten to fifteen yards wide and about half-a-mile long, connecting two large lagoons extending for miles. The width of the river in these lagoons varies from 40 to 60 yards. We set our net in a suitable place, and left it all night. On dragging it out we were astonished at the number and size of the salmon-catfish. There were 32 of these, from 2 to 10lbs. in weight, besides bony-bream, silver-perch, jewfish, eels and tortoises, but only two Barramundi. We tried again several times, but always with similar results—numerous catfish and tortoises, but few Barramundi. We tried dynamiting alongside timber at the water's edge, but secured only gobies and bony-bream by this means.

The mouths of the Barramundi, whether netted or caught with a hook were found empty of spawn as might have been expected.

We noticed that although the stomach of the Barramundi is comparatively small and mostly contained insects, yet the fish ate bony-bream. For some time after a dynamite charge had been fired, Barramundi would frequent the spot and feed upon the small bream that had been killed or wounded, and we netted two fish at a spot where a plug had been fired, whose stomachs contained parts of bony-bream. We also observed that the latter species was the best bait for taking the fish on a hook.

The smallest Barramundi caught was twelve inches in length. Mr. Tidswell has observed very small ones on the surface at a narrow, shallow spot on the river at Gyranda on very hot days in summer time, and believes that they might be taken with a small hook. He also stated that the Barramundi bite better in the hotter weather. Upon our arrival at Gyranda the weather was warm, and we caught several on a line, but a cold snap came, after which we did not succeed in catching any more. Owing to the bony nature of the mouth and tongue, it is an unsatisfactory fish to catch on a line, the hook rarely penetrating past the barb. If the fish is given the slightest slack, he will turn over and detach the hook; the only

way is to pull in as fast as possible. I had already observed the same difficulty on the Gregory River when fishing for the Northern Barramundi, *Scleropages jardinii*, having noticed the fish open its mouth and reject the bait. On the Gregory, I succeeded in catching a few with night lines, the fish being invariably hooked in the stomach.

There are no water weeds rooting at the bottom in the Dawson River, though in places there is *Azolla* on the surface. The river is deep from the bank, rarely being less than six feet in depth even in a dry time.

THE ENDOPARASITES OF THE DINGO, *CANIS DINGO*, BLUMB.

BY T. HARVEY JOHNSTON, M.A., D.Sc.
Walter and Eliza Hall Fellow in Economic Biology,
University, Brisbane.

(Read before the Royal Society of Queensland, 31st July, 1916).

For many years I have endeavoured to obtain from various districts in New South Wales and Queensland endoparasitic material from the warrigal or dingo, my main object being to ascertain whether the adult hydatid tapeworm occurs in this host. The question as to whether the dingo is indigenous to Australia or has been introduced by man, or has gained entrance by means of former land connections prior to the advent of man in our continent, is of considerable interest, but need not be dwelt upon here. Mr. R. Etheridge, Curator of the Australian Museum, Sydney, has recently published a review of the matter (1916). It is worthy of note that the animal does not occur, and apparently has not occurred, in Tasmania, and that remains of a species of *Canis* have been found in post-pliocene deposits at least in New South Wales. One cannot help believing that our wild dog is not a member of our indigenous fauna, but is an invader from the adjacent lands lying to the north.

One difficulty has been to obtain material from pure dingoes since many of the animals are hybrids between *C. dingo* and the domestic dog. Some little time ago Dr. T. L. Bancroft forwarded me some parasites from a dingo shot near Eidsvold, Burnett River.

There are already two species of entozoa recorded from this host, viz., the hydatid and a pentastome, *Linguatula dingophila*, Johnson.

The Hydatid.

Echinococcus granulosus, B., more commonly known as *Tænia echinococcus*, Sieb., was stated by Lendenfeld* (1886) to infest it. This author referred to the common occurrence of the cystic or hydatid stage in human beings in the dry inland districts of Australia where dingoes were plentiful and the water supply scanty, both man and beast depending on water holes whose contents were frequently contaminated. He regarded the dingo as the agent responsible for infecting such water supply, and thus the chief transmitter as far as man was concerned. He examined many dingoes, and in 80 per cent. of those searched, found from one to five cestodes which he regarded as *T. echinococcus* in spite of the fact that they were much longer than the latter, often reaching to 10 or even 30 mm. in length. He mentioned that the hydatid tapeworm† occurred commonly in the domestic dog in the mountainous region of Eastern Australia. Lendenfeld has certainly confused two or more species, as *Echinococcus granulosus* is a very small cestode, the longest that I have from the domestic dog (from New South Wales and South Australia), reaching only 2.5 mm., the average being about 2 mm. Dr. Angas Johnson did not find the species in the one dingo examined by him, nor was I successful when searching the Eidsvold material.

The chief transmitting agent of the hydatid is undoubtedly the domestic dog, but I think that dingoes also harbour the cestode and contribute to its dissemination amongst Australian cattle, sheep, marsupials, etc.

As regards the species which Lendenfeld actually found, I would suggest that it was either a new species,

*I am indebted to Dr. S. J. Johnston and Miss Marie Erhard, of Sydney University, for forwarding a copy of this paper to me from Sydney, as it was not available in Brisbane.

†The prevalence of hydatids in man and the dog in Australia, especially in the south-eastern corner, had previously been emphasised by Dr. D. Thomas, P.R.S., Lond., 38, 1885, p. 444-57; *Ibid.*, p. 457-8 (in 40 per cent. of the dogs examined by him, and in 50 per cent. of those examined from Melbourne); "Hydatid Disease with special reference to its prevalence in Australia," Adelaide, 1884; Trans. Roy. Soc., S. Austr., 4, 1880-1; *Ibid.*, 6, 1883; etc.

or more probably, that it was one of the several cestodes known to parasitise the domestic dog in Eastern Australia. The most likely species would be *Dipylidium caninum*, or perhaps *Tænia pisiformis* (*T. serrata*). One probably should not take too literally his statement as to the agreement of the dingo tapeworm with the hydatid. Again, the latter helminth, when present in a canine, generally occurs in considerable numbers owing to its mode of development from the cystic stage.

Linguatula dingophila, Johnson.

This parasite, a female, was found and described by Dr. A. Johnson (1910) in the nasal cavity of a pure-bred dingo in South Australia. A figure showing the external characters was given by him, but no information was supplied regarding the anatomy. A comparison of this helminth and *L. rhinaria* (= *L. serrata*) was given in a tabulated form (p. 249), but the only differences of any importance in my opinion are those relating to the sizes of the adults and of the eggs, and the form of the posterior end of the animals. The length of *L. serrata* is given as 8 to 13 cm. : *L. dingophila*, 3.1 cm., i.e., only about one-third as long. The egg of the latter is stated to be .05 mm. by .025 mm., whilst that of the former is .09 by .07 mm. I suspect that the former egg measurements are incorrect.

The posterior region of a fully adult female, *L. serrata*, is much more elongate than in *L. dingophila*, but I believe the latter name to be based merely on a specimen of *L. serrata*, which had not attained full size. Dr. Cleland and I (1910) found that the larval stage of the latter (often called *Pentastomum denticulatum* in this condition) occurs not uncommonly in the mesenteric glands of cattle in Sydney slaughter-yards and in the Illawarra district (N.S.W.) Dr. Ralph (1865) found it in Victoria as long ago as 1865. The parasite almost certainly occurs in Queensland too, but has not been definitely recorded as yet. These facts are evidence of the presence of the adult in the nasal region of dogs in N.S.W. and Victoria at least. I infected the nose of a Sydney dog with some of the larvæ, and later on a few adult female pentastomes were obtained from it (Johnston, 1911, a, b).

I consider that *L. dingophila* should be ranked as a synonym of *L. serrata* until some anatomical differences be noted. The latter is known to infest in its adult condition, not only the dog, but also the wolf and fox, and occasionally the domesticated animals and man.

Dipylidium caninum, L.

Dr. Bancroft's material contained a number of specimens—some being only 20 mm. in length—of this cestode which commonly infests cats and dogs in Australia. It is now recorded for the first time as a parasite of the dingo.

Ancylostoma caninum, Erc.

A few specimens, both male and female, of this species of hookworm were found amongst the Eidsvold material. *A. caninum* has already been recorded by me as occurring in dogs and occasionally in cats in Queensland, and in the former host in several other States of Australia.

Other Parasites.

As Australian sheep harbour the cystic stage, not only of the hydatid cestode, but also of *Tænia hydatigena* (*T. marginata*, *Cysticercus tenuicollis*), a parasite sometimes met with in local dogs, it is not unlikely that the dingo may be parasitised by both of these species in sheep country.

In south-eastern Australia rabbits are often infested with the bladderworm stage of *Tænia pisiformis* (syn. *T. serrata*; *Cysticercus pisiformis*) and *Multiceps serialis* (syn. *Tænia serialis*; *Cænurus serialis*), both of these helminths reaching maturity in dogs. No doubt the dingo becomes infected in Victoria and New South Wales, and perhaps elsewhere, in rabbit-infested districts.

Amongst the nematodes known to parasitise dogs, two are not uncommon in Australia, viz., *Dirofilaria immitis*, Leidy and *Toxocara (Toxascaris) canis*. The former infests the right heart and has been recorded from the coastal regions of Queensland and from Western Australia, while the latter has been reported from most of the States. It is not unlikely that both may be found in the dingo.

There are then three known parasites of *Canis dingo*, viz., *Dipylidium caninum*, *Ancylostoma caninum* and *Linguatula serrata*, all of which are known in Australia as entozoa of the domestic dog. The hydatid most probably occurs, and the presence of several other cestodes and nematodes is not unlikely*.

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T. H. JOHNSTON AND J. B. CLELAND.

1910 A Note on the occurrence of Pentastomes in Australian Cattle. P.R.S., N.S.W., 1910, p. 315-8.

R. V. LENDENFELD.

1886 *Tænia echinococcus*. Zool. Jahrb., 1, 1886, p. 409-410.

T. S. RALPH.

1865 Austr. Med. Jour., 10, 1865, p. 6

*Gilruth, Sweet and Dodd (Parasitology 4, 1911, p. 1) have referred to the presence of bodies resembling *Anaplasma marginale*, Theiler, in the blood of a young dingo, three months old, in the Melbourne Zoological Gardens.

FENESTELLA AND POLYPORA (?) IN SOUTH-EASTERN QUEENSLAND.

BY A. B. WALKOM, B.Sc.

Assistant Lecturer in Geology, the University of Queensland.

(Read before the Royal Society of Queensland, 25th September,
1916).

The present note is written for the purpose of recording the occurrence of *Fenestella* and *Polypora* (?) in a boulder about eight inches in diameter in a conglomerate of Cainozoic age near Richmond Gap (Grady's Gap); and also of calling attention to some of the questions suggested by its occurrence. The boulder consists of an olive-green, somewhat indurated shale, and contains at least two species of bryozoan, and in addition a few fragments of a crinoid stem. One of the bryozoans is certainly identical with *Polypora* (?) *smithii*, Eth. fil., as figured in "Geology and Palæontology of Queensland," plate 9, figs. 1-3, but not with plate 44, figs. 9-10 (it is indeed difficult to reconcile figures 9 and 10 on plate 44 with the description on page 219 and figures 1-3 on plate 9); the other bryozoan is probably *Fenestella fossula*, Lonsd.

The beds in which the boulder occurs, consist of sandstone and conglomerate which undoubtedly appear to be interbedded with one another; Dr. Richards has calculated their thickness at a minimum of 20 feet, and their height above sea level as about 1,000 ft. They dip in a general south-westerly direction at a small angle (about 5°) and outcrop on the road at Lahey's Cutting in portion 58v, Parish of Telemon.

In 1911* Mr. R. A. Wearne recorded the discovery of a specimen of *Fenestella fossula* immediately north-west of Mt. Barney and about 16 or 17 miles west of Richmond Gap; from this specimen he concluded that rocks of Permo-Carboniferous age existed in that district where they were formerly considered Trias-Jura. He refers to the same specimen elsewhere† and comments on the fact that the rocks are quite undisturbed. In this connection it might be pointed out here that the nearest rocks of undoubted Permo-Carboniferous age both in Queensland (Warwick District), and New South Wales (north of Drake and Rivertree) have all suffered a considerable amount of metamorphism.

Mr. Wearne has informed me that he collected the specimen when time did not permit him to make any further investigations as to its source, and he agrees with me that it was probably another such occurrence as the one now recorded.

The nearest outcrop of Permo-Carboniferous rocks to Richmond Gap is about 25 miles away in a south-westerly direction‡. They are excessively folded and faulted and contain indurated clays and shales. These extend southwards past Drake and have been described by Andrew §. At various points in them fossils have been found and these include *Fenestella fossula* and *F. internata*. These rocks extend to the east under the Clarence series, but it is not known how far.

Permo-Carboniferous rocks also occur at Warwick, about 60 miles N. of W. from Richmond Gap, and they are extensively folded and faulted.

Fragments of plant fossils were found in the sandstone associated with the conglomerates, but they were too fragmentary for determination. Dr. Richards has visited the area again, and found further specimens which prove the sandstone to be of Cainozoic Age. The remains he found include dicotyledonous leaves and portions of a fern

*Proc. Roy. Soc., N.S.W., xlv., 1911, p. 142.

†A.A.A.S., xii. (Sydney, 1911), p. 125.

‡See Geological map of N.S.W., 1914.

§Geol. Surv., N.S.W., Mineral Resources No. 12, 1908.

probably identical with *Pteris abbreviata* Deane described from Elsmore, New England District, N.S.W.* Dr. Richards† has placed the conglomerate and sandstone between the middle and upper divisions of the volcanic rocks to which he assigns‡ a (?) middle and (?) upper Cainozoic age respectively.

The source of the boulder containing *Fenestella* and *Polypora* (?), seems almost certainly to be in the Drake District, and we have, therefore, further indication of a south to north drainage in Cainozoic times.

Dr. Richards§ has already shown that the general direction of the drainage when the volcanic rocks were poured out was north and south. Wearne and Woolnough|| on the other hand, suggest that in Cainozoic times the Water Divide was far to the east of its present position, and that there were at least four important streams flowing in a westerly direction.

These two views appear to be in conflict, and of the two, the north and south drainage is based on the more definite evidence. Whether the two can be shown to be in harmony is a question for future study.

*H. Deane Rec. Geol. Surv., N.S.W., vii. (1900-04), p. 231, pl. XLV.

†Proc. Roy. Soc. Qld., xxvii (1915), 1916, p. 115.

‡Op. cit., p. 125.

§Proc. Roy. Soc., Qld., xxvii., 1916, p. 110.

||Op. cit, p. 139.

QUEENSLAND ETHNOLOGICAL NOTES.

BY RONALD HAMLYN-HARRIS, D.Sc., F.R.A.I.

(*Read before the Royal Society of Queensland, 25th September, 1916.*)

PLATE IV.

(a) A SO-CALLED "MORAH" SLAB FROM NORTH QUEENSLAND.

In the Cairns District of Queensland, a special mealing stone is met with, the set consisting of (a) a nether stone, a piece of slate transversely fluted on one side only known locally by the name of "Morah"; (b) a spheroidal upper stone. The former represents the fixed slab and is oblong-ovate—the contours being irregularly defined, one end being less obtuse than the other. The tranverse grooves, 36 in number, being continuous over the rounded edges to the circumference (Plate IV., fig. 1).

With the crusher or upper stone the natives grind and work the beans or nuts into a paste, the moisture of which—often poisonous in character—drains off by means of the grooves. When the paste is fine enough the product is dried in the sun or by the fire, and rubbed into a flour and put away for future use.

As this process entails some amount of care and pains, it is naturally to be supposed that only those who are not too lazy would go to the trouble, and in reality this is so.

Measurements are as follows:—

Length of slab, $13\frac{1}{4}$ ".

Greatest width of slab, $6\frac{7}{8}$ ".

Thickness of slate, $1\frac{1}{4}$ in."

The top stone is evidently a naturally-formed river pebble picked up in the first instance on account of its suitability, and measures $5\frac{3}{4}$ " x 4".

Through the kindness of Mr. R. Etheridge, the Curator of the Australian Museum, Sydney, I am permitted to make use of the following information:—

“In our collections are three specimens of the grooved or fluted type, as follows:—

1. Cast of Slate Slab, oval, 12" x 8", transversely fluted, the latter sharply cut on both sides. Whether these grooves are for the better distribution of the grain or to run off juices is not known. The original was found in the scrub, near Atherton, Queensland.

2. Cast of the upper portion of Fluted Sandstone Block, oval, 7" x 5", flutings longitudinal, more or less undulating. The original is from the bed of Moona Creek, Georgina River, Queensland.

3. Deltoid fragment of a large Slate Millstone, fluted on both sides; similar to specimen No. 1. This third specimen was called “Morah” when collected by Mr. Hedley in the Cairns District in 1901. Accompanying it was a river pebble Rubber or Top-stone, used in conjunction for “grinding nuts into flour.”

The geographical distribution is evidently very limited. The home of the fluted type of grinding stone made of slate is in the Cairns District, and the presence of a similar, though distinct, specimen of sandstone in the bed of the Moona Creek rather suggests the possibility of transportation, along certain recognised routes such as the Georgina River for purposes of barter.

(b) AN ABORIGINAL KNIFE FROM QUEENSLAND.

A knife somewhat unique in its manufacture has recently come into the possession of the Queensland Museum through the kindness of Mr. T. Illidge, who acquired it some thirty years ago at a native camp at St. Lawrence. This implement, consisting of a single-flaked knife and a protecting part, differs from the usual kind of hafted knives, and is an illustration of an example of individual idiosyncrasy in handicraft.

It was known by the native name of "Decrannie," and the keen edge of the lancet made the latter particularly suitable for scarifications (tribal marks, etc.)

The specially-flaked piece of bottle glass is not too securely attached to a flat piece of wood by means of gum (not gum cement). The blade when not in use is protected by being inserted into a groove at the upper end of a piece of rounded hardwood as seen in the illustration. (Pl. IV., fig. 3). The two pieces are then tied together with some grass or vegetable fibre to keep them intact, and when thus placed the scarifying portion of the implement is in an unsymmetrical position, due to inaccuracy in the making.

Measurements are as follows :—

Length of knife, 73mm.

Length of blade of knife, 25mm.

Width of handle of knife, 11mm.

Length of protecting case, 120 mm.

Width of protecting case, 15mm.

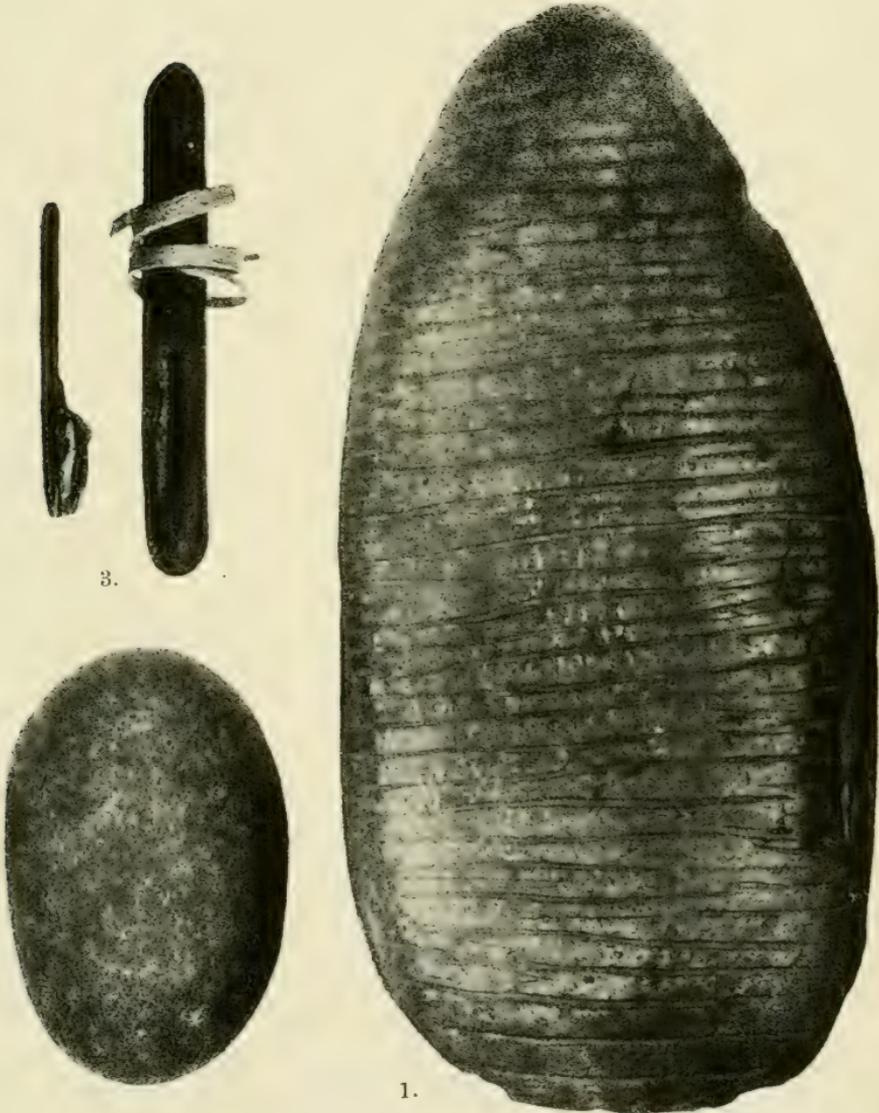
and the greatest width of the groove is 5mm, narrowing down towards the centre of the wood to suit the shape and angle of the blade.

Lord Avebury, in "*Prehistoric Times*" (1900), (p. 422) refers to and figures (fig. 220) a knife similarly mounted but consisting of splinters of quartz (or flint) arranged in a row after the manner of the Queensland "Shark-Tooth Knife," but possessing no protective portion as in specimen above described. This instance is also interesting evidence that there was no persistency of type amongst Australian hafted cutting implements.

EXPLANATION OF PLATE IV.

FIGS. 1 AND 2.—A "Morah" Slab, with its grinder from Cairns, North Queensland.

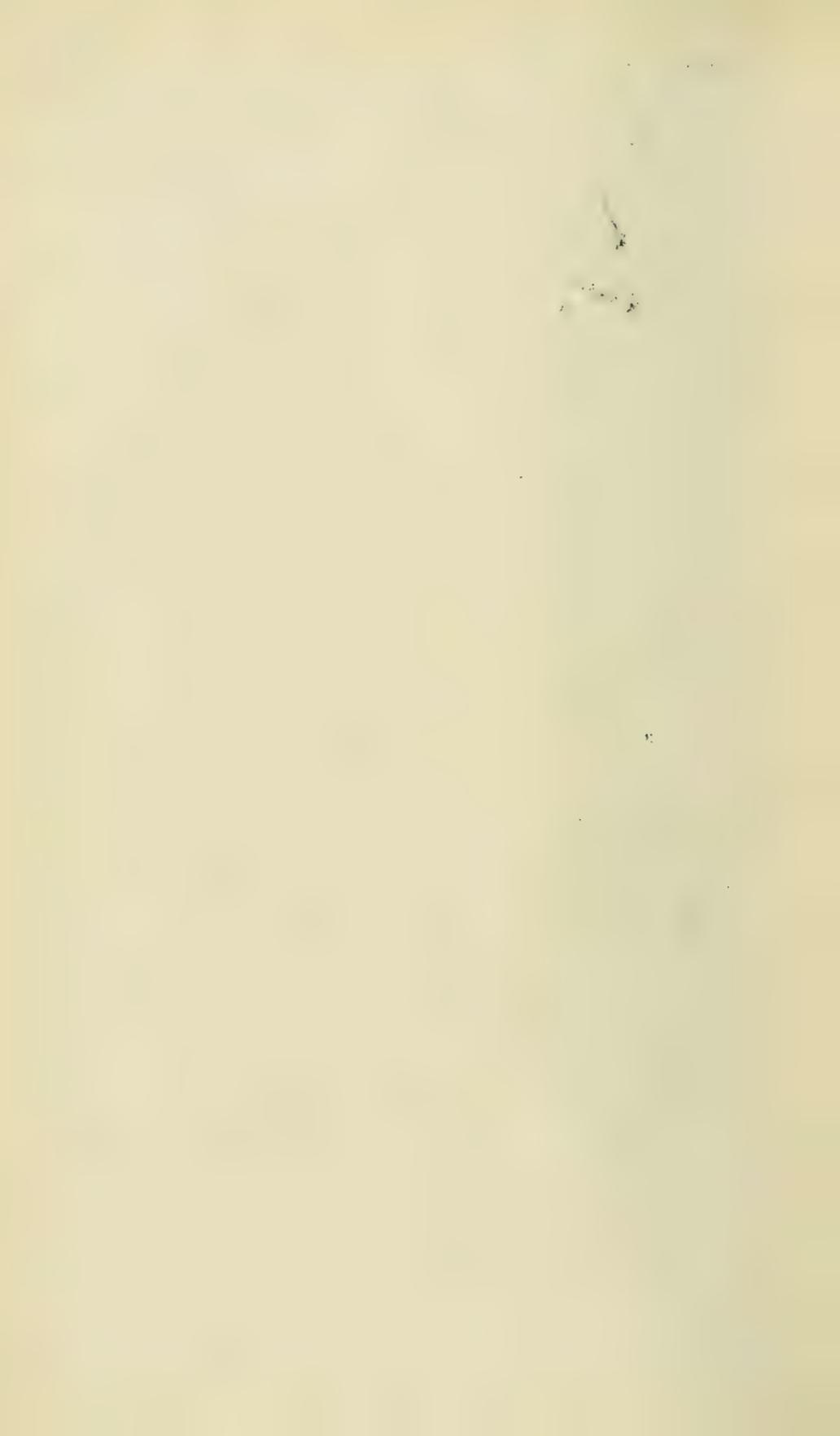
FIG. 3.—An Aboriginal Knife and Protecting Sheath from St. Lawrence, Queensland.



3.

2.

1.



NOTES ON A FEW INTERESTING PLANTS
COLLECTED IN THE VICINITY
OF BRISBANE.

BY C. T. WHITE
(Botanic Gardens, Brisbane).

(Read before the Royal Society of Queensland, 30th October,
1916).

The following observations relate to a few plants collected during the past couple of years in the neighbourhood of Brisbane; unless otherwise stated the specimens have been gathered personally by myself and many of them on the local excursions of the Field Naturalists' Club. Several references are made to specimens in the Queensland Herbarium, and my thanks are due to the Government Botanist (Mr. J. F. Bailey) for permission to use this material.

MENISPERMACEÆ.

LEGNEPHORA MOOREI, *Miers*.

This is a very common climber in the Brisbane scrubs, the leaves are often very large, some in our collection being 10in. diam. on petioles of 7in.; these leaves are found scattered about the floor of the scrub in great abundance.

MALVACEÆ.

SIDA CORDIFOLIA, *Linn.*

Has been met with in several places about Brisbane. It is a very common weed about some of our northern towns. In the Queensland Herbarium we have it from the following localities:—Johnstone River (N. Michael); Stannary Hills (Dr. T. L. Bancroft); Lucinda Point (G. B. Forrest); Cairns (E. Jarvis); Rockhampton (C.T.W.); Townsville (various collectors).

CELASTRINEÆ.

CELASTRUS BILOCULARIS, *F.v.M.*

The form with sharply-toothed leaves is to be found about Brisbane, usually on the edge of scrubs and in the thicker forest country.

LEGUMINOSÆ.

DAVIESIA UMBELLULATA, *Sm.* Sunnybank (C.T.W.), Stradbroke Is. (various collectors).

DAVIESIA CONCINNA, *R.Br.* Chermside.

These specimens are typical and, by the broadly ovate leaves, can be distinguished from *D. umbellulata* which it approaches very closely, and of which in my opinion it should only rank as a variety.

CROTALARIA JUNCEA, *Linn.* Brisbane River.

CROTALARIA QUINQUEFOLIA, *Linn.* Kedron Brook (J. Keys)

In the "Flora Australiensis" and "Queensland Flora" this species is recorded only from the Endeavour River. It has recently been gathered at Buderim Mt.; there is also an old specimen in the Queensland Herbarium labelled "waste places about Brisbane, F.M.B."

COMPOSITÆ.

COTULA CORONOPIFOLIA, *Linn.*

This succulent Composite, recorded for Queensland by F. M. Bailey in 1910 without specific locality, has recently been met with in great abundance in several places along the Brisbane River:—Norman Ck. (C.T.W.); Breakfast Ck. (H. A. Longman); near Botanic Gardens (W. Sauer). It has also been met with at Currumbin Creek.

EMILIA SONCHIFOLIA, *DC.*

This tropical weed has been noticed growing in abundance in several localities in Southern Queensland; it seems generally to grow in the vicinity of railway lines, between the sleepers, etc., so in all probability has been introduced from the North.

SENECIO AMYGDALIFOLIUS, *F.v.M.* Gold Creek, near Brisbane.

This large growing *Senecio* is fairly common in Southern Queensland; besides the habitats recorded in the "Queensland Flora," we have it in the Queensland Herbarium from the following localities:—Wellington Pt. (J. Wedd); Macpherson Range (C.T.W.); Killarney (J. F. Bailey); Mt. Samson (C.T.W.); Mt. Perry (J. Keys).

MYRSINEÆ.

MYRSINE CAMPANULATA, *F.v.M.*

Very common on hills in the forest country about Brisbane (Taylor's Range, Enoggera Range, Gold Creek, etc.)

F. v. Mueller, in *Fragm.*, VI., 235, and F. M. Bailey in "Queensland Flora," p. 949, both describe the margins of the leaves as entire. It is a common shrub in Southern Queensland, but in all our specimens a leaf with entire margin is rare, most of them being distinctly dentate in the upper half as shown in the "Comprehensive Catalogue of Queensland Plants," p. 302, fig. 275. Nimmul Mt. (C.T.W.), and Nambour (Dr. F. H. Kenny) are extensions of our knowledge of the plant's range.

POLYGONACEÆ.

POLYGONUM PROSTRATUM, *R. Br.* Brisbane (E. W. Bick).

These specimens are glabrescent, almost glabrous. We have specimens in our collections from the following localities:—Tarampa (F. M. Bailey), Roma, Hendon and Taabinga (C.T.W.); these are all strongly strigose. All our specimens show the stipules bearing a short, foliaceous, lobed lamina at the mouth.

ALISMACEÆ.

DAMASONIUM AUSTRALE, *Salisb.*, Brisbane River.

We have numerous specimens in the Queensland Herbarium from various localities in Southern Queensland.

NAIADEÆ.

TRIGLOCHIN PROCERA, *R. Br.* var., DUBIA (*R. Br.*), *Benth.*

Swamps at Sandgate (Moreton Bay). The large curved carpels free from the base distinguish this variety from the normal form. The plants are of a more robust, upright growth, the leaves are stiffer and more ascending than in typical *T. procera*. *Triglochin procera*, *R. Br.*, is a very common plant in the pools about Brisbane and is extremely variable.

GRAMINEÆ.

PANICUM OBSEPTUM, *Trin.* Wellington Point and Enoggera.

In these two localities this grass is found covering fairly large areas of wet, swampy land, and is undoubtedly one of our best sorts for such places.

CHAMÆRAPHIS PARADOXA, *Poir.* In swamps, Wellington Point.

This grass is admitted into the "Queensland Flora," as 'Recorded for Queensland by F.v.M.,' so this record of a specific locality is interesting.

CHRYSOPOGON ELONGATUS, *Benth.*, var. FILIPES, *Benth.*

This grass is common on hill-sides in forest country about Brisbane.

ARISTIDA CALYCINA, *R. Br.* Brisbane River (E. W. Bick).

CHLORIS UNISPICEA, *F.v.M.*

F. M. Bailey, in "Comprehensive Catalogue of Queensland Plants," p. 627, refers to the inflorescence in some specimens from Tarampa bearing 1-3 spikes: the species is fairly common in some places along the Brisbane River and shows the same variation: it has also been collected at Mt. Larcom by E. W. Bick, and these again more frequently have 2-3 than 1 spike to the inflorescence.

ELEUSINE INDICA, *Gaertn.*, var. MONOSTACHYA, *Bail.*, *Ql. Flora*, p. 1898.

E. indica is one of the commonest grasses in Queensland; it is very abundant about Brisbane and exhibits great variation in the number of spikes in the inflorescence,

and specimens with only one spike have frequently been gathered about Brisbane, this reduction occurs especially amongst starved and depauperate plants; as, however, specimens have several times been gathered showing a variation of 1-2-3 spikes in the same plant, it seems hardly advisable to keep this variety.

FILICES.

ADIANTUM HISPIDULUM, *Sw.*, var. HYPOGLAUCUM, *Domin.*

Gold Creek and Pine Mt., in the neighbourhood of Brisbane.

THREE UNDESCRIBED QUEENSLAND FISHES.

BY J. DOUGLAS OGILBY.

(Communicated by Mr. H. A. Longman.)

(Read before the Royal Society of Queensland, 27th November, 1916).

PARAPLESIOPS JOLLIFFEI, *sp. nov.*

(Bluetip Longfin).

Body subovate, its depth subequal to the length of the head, which is 2.67 in that of the body. Snout linear, three fourths of the eye-diameter, which is 3.25 in the head; interorbital width 2.67 in the eye-diameter. Maxillary extending to below middle of eye. Scale formula 2/32/14; lateral lines 28/12. Dorsal xii10, originating above opercle; last spine longest, 1.9 in length of head and 2.15 in the 7th and longest ray, which is 2.4 in the body-length. Caudal rounded; middle rays as long as dorsal lobe. Anal iii11, originating below the 11th dorsal spine, the last spine and the seventh ray a little longer than those of the dorsal. Pectoral with 18 rays, rather longer than the head. Ventral one seventh longer than pectoral, extending to the 8th anal ray, its spine four sevenths of head. Gill-rakers 11 (four tubular) on lower branch of anterior arch, the longest one fourth of the eye-diameter. Body purplish black, the last third of the trunk and the tail with six obscure grayish cross-bands, which do not reach the dorsal surface. A navy blue band from the nostril to the angle of the preopercle; cheeks and opercles sparsely blue-spotted. Pectorals greenish yellow; other fins purple tipped with sky-blue; caudal, and in a lesser degree soft dorsal and anal, with a network of grayish lines, forming a mosaic pattern. (Named after my friend, Mr. Edwin Alfred Jolliffe, an enthusiastic fisherman and keen observer, by whom it was captured).

Described from a single example, 151 millim. long, caught at Green Island, Moreton Bay. Reg. no., I. 16/2652.

From *Paraplesiops poweri*, Ogilby, the only other species as yet recorded from the Bay, this fish differs, not only by its wholly diverse colour-scheme, but by the extremely narrow interorbital region (8.75 in head), the additional anal ray, and the more produced ventral.

NEMIPTERUS THEODOREI, *sp. nov.*

(Butterfly Bream).

Body elliptical, its width about a half of its depth, which is subequal to the length of the head and 3.2 in that of the body. Snout convex, 2.4 in the length of the head; diameter of eye 1.55 in length of snout and subequal to the preorbital width; interorbital width convex, three fourths of the eye-diameter. Maxillary not extending to level of eye. Lower jaw without canines. Scale formula 3 48 9. Dorsal originating above opercular spine; spinous portion low, the spines feebly exerted, gradually increasing in length to the last, which is 2.4 in the head and 1.33 in the penultimate ray; soft dorsal and anal angulate. Caudal forked, upper lobe slightly the longer, 3.67 in the body-length. Anal originating below 2nd dorsal ray; 3rd spine longest, one third of the head and 1.45 in the last ray. Pectoral with 17 rays, 2.33 in the body-length. Ventral a little shorter than the pectoral, extending to the 2nd anal spine. Gill-rakers 7 on the lower branch of the anterior arch. Roseate above, shading imperceptibly through the iridescent pink of the sides to the pearly white of the lower surface; sides below the lateral line with five greenish-yellow horizontal bands, each of which occupies the middle of a series of scales, the upper and lower bands shorter and less conspicuous than the intervening bands; a shining red shoulder'spot, covering the upper half of two consecutive scales, which vary from the 2nd and 3rd to the 4th and 5th below the lateral line. Upper surface of head with a tinge of lavender overlying the pink; a curved light blue bar from the front of the eye, passing along the upper edge of the preorbital and anteriorly changing gradually to a deep violet; a similar but less conspicuous band along the lower edge, continued as a violet band along its free border; upper lip yellow; cheeks and opercles pink with golden reflections; a distinct greenish blue spot, preceded by a purplish spot,

behind the upper angle of the preopercle. Lower two-thirds of iris vivid scarlet, upper third green, the colors sharply defined. Dorsal fin pink, bordered by a broad, gold-edged, lilac band; caudal pinkish yellow, broadly tipped with rose, the upper ray narrowly edged with gold, the lower with rose; proximal half of anal yellow, distal half lilaceous silvery, the former with a basal and two median pale blue bands: pectorals and ventrals colourless. (Named after the Hon. E. G. Theodore, M.L.A., in recognition of the formation by him of a Department of Fisheries.)

Described from a fine example, measuring 267 millim., taken by the writer on the Caloundra Banks, and now in the Queensland Museum, as also is a somewhat smaller example caught at the same time by Mr. T. C. Troedson; a third example is in the Museum of the Amateur Fishermen's Association. Reg. no. of type, I. 16/2648.

Five species of *Nemipterus* have now been recorded from the Queensland Coast, and may be recognized as follows:—

*a*¹. Lower jaw with distinct canines.

*b*¹. Scales in transverse series 4/14; spinous dorsal higher than the soft; colouration uniform *robustus**

*b*². Scales in transverse series 4/11; spinous dorsal lower than the soft; body with yellow bands *tæniopterus*

*a*². Lower jaw without canines.

*c*¹. Median dorsal spines longest.

*d*¹. Scales in transverse series 3/12; upper caudal lobe not produced; colouration uniform† *upeneoides*

*d*². Scales in transverse series 3/10; upper caudal lobe much produced; body with yellow bands *aurifilum*

*c*². Posterior dorsal spines longest; scales in transverse series 3/9; caudal lobe not produced; body with yellow bands *theodori*

CANTHERINES MAYNARDI, *sp. nov.*

(Brown-spotted Leatherjacket).

Body ovate, its depth at the ventral spine half of its length. Length of head 3.6 in body-length. Snout

*New name for *Synagris furcosus*, Gunther, not *Dentex furcosus*, Valenciennes.

†Bleeker (Atlas Ichth., pl. cccxxvii, fig. 2), figures this species with a large oval blackish shoulder-spot.

with an anterior protuberance, behind which it is feebly concave. Diameter of eye 3.8 in the length of the snout and equal to the convex interorbital width. Gill-opening exceptionally oblique, three-fourths longer than the eye-diameter, its upper and lower ends below the middle of the eye and the nostrils respectively. Scales represented by soft granules: caudal peduncle unarmed (?♀); sides with a few short, thread-like cirri. Dorsal spine above the last quarter of the eye, anteriorly with two approximate rows of blunt tubercles, posteriorly with two more remote rows of short blunt spines, its length 1.6 in that of the head; 2nd dorsal spine weak; soft dorsal feebly rounded with 35 rays, its height one third of length of head. Caudal rounded, a little longer than the head. Anal with 32 rays, one fourth shorter and a trifle higher than the soft dorsal. Pectoral inserted below the anterior half of the eye, a little longer than the gill-opening. Ventral spine small and rough, not projecting beyond the flap, which is moderately developed. Stone-gray, the head and body, except the throat and ventral flap, with numerous small round brown spots; outer edge of throat, in advance of the gill-opening, with a much larger blackish spot, which is connected with its fellow by a brown band; above the spot are two concentric semicircles of pale blue. Soft dorsal and anal gray, each ray with an inconspicuous darker intrabasal spot; caudal profusely brown-spotted. (Named after my friend, Mr. Lewis Holden Maynard, of Bundaberg, in recognition of his keen interest in the biology of our State).

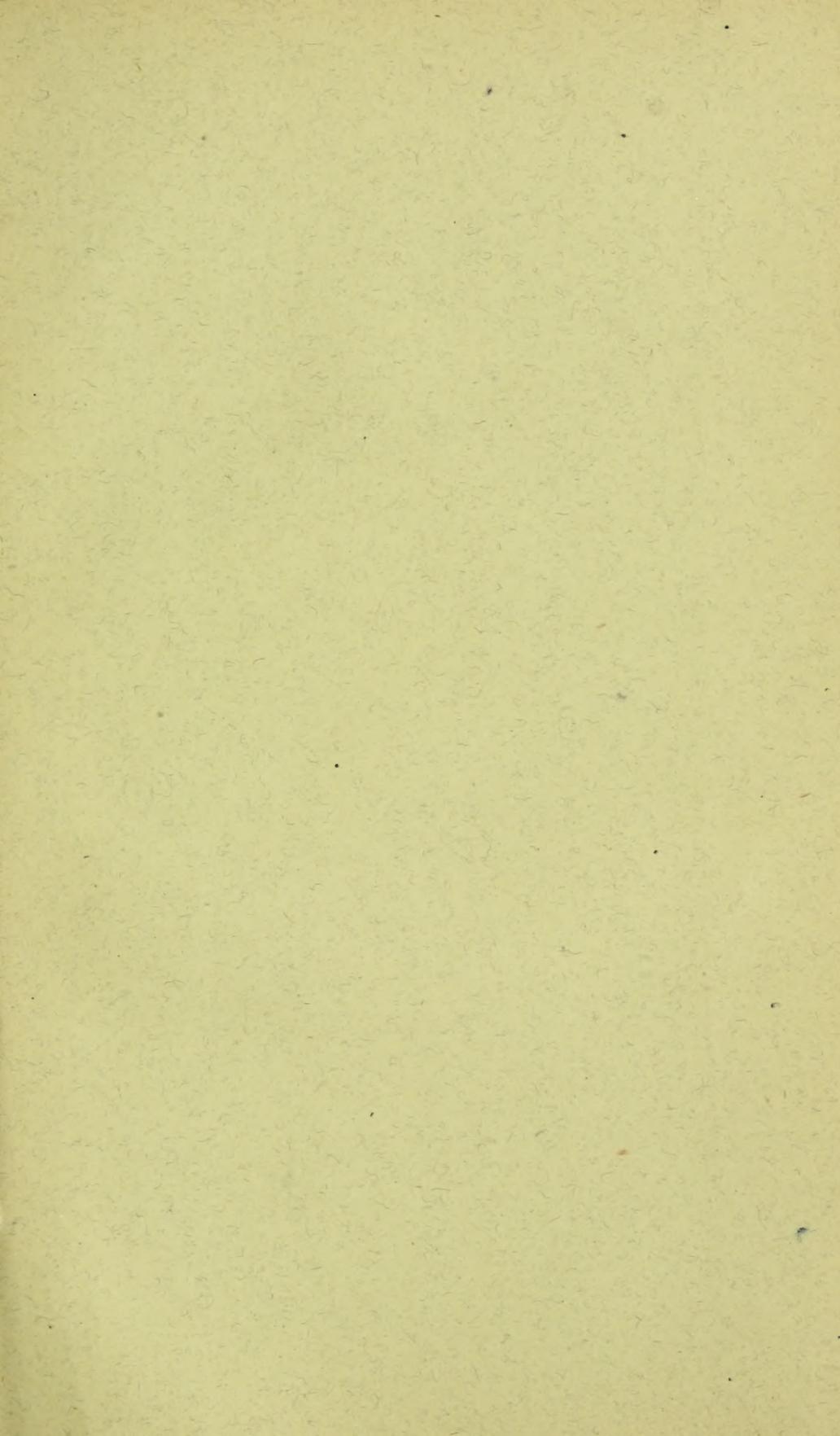
Described from a fine specimen, measuring 317 millim., taken at Cowan Cowan, Moreton Bay, by Mr. James Palmer, and presented by him to the Queensland Museum. Reg. no. 1. 16/2643.

The nearest ally of this species is *Cantherines macrurus*, Bleeker*, from which, however, it differs in numerous minor characters, such as the increased number of dorsal and anal rays, etc.

**Monacanthus macrurus*, Bleeker, Nat. Tijds. Nederl. Ind., xii., 1856, p. 226; *Pseudomonacanthus macrurus*, Bleeker, Atlas Ichth., v., p. 134, pl. ccxxviii, fig. 2.

NOTE ON *AMIA NIGRIPES*, *Ogilby*.

Five years ago I described (Ann. Queensl. Mus., No. 10, 1911, p. 49) a new percelle under the name *Amia nigripes*, which has recently been beautifully figured by McCulloch (Biol. Res. Endeavour, iii, 1915, pl. xv, fig. 2). Having failed to notice that this name had been previously given to an East African species by Playfair (Fish Zannibar, 1866, p. 19, pl. v, fig. 1), I hereby propose to change the name of the Australian fish to *Amia atripes*.



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