VOLUME 13 PART 2

# MEMOIRS

## OF THE

# QUEENSLAND MUSEUM

BRISBANE

[redacted]

VOLUME 13 PART 2

# MEMOIRS

## OF THE

# QUEENSLAND MUSEUM

ISSUED BY THE AUTHORITY OF THE SECRETARY FOR PUBLIC INSTRUCTION,
THE HON. G. H. DEVRIES.

[redacted]

# CONTENTS.

VOLUME 13 PART 2.

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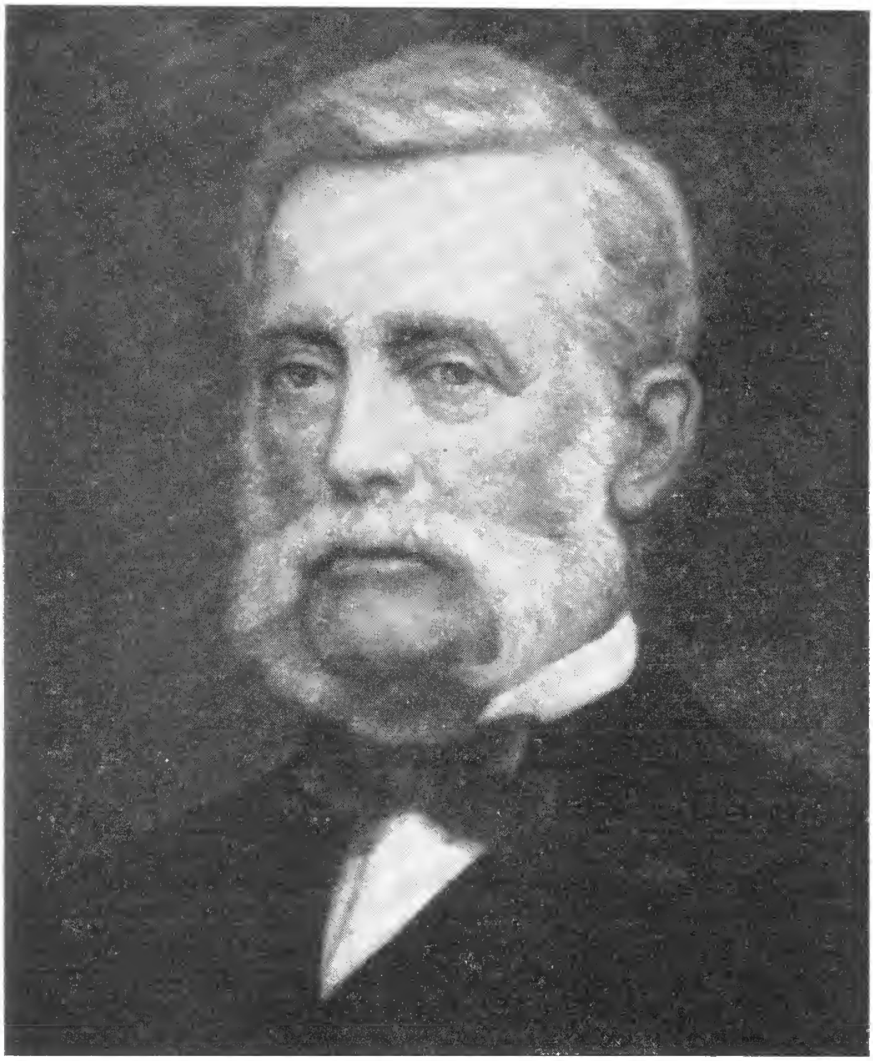


Plate III.

CHARLES COXEN (1809-1876).
Founder and first Curator and Secretary (Honorary) of the Queensland Museum, 1855-1876.

# THE QUEENSLAND MUSEUM, 1855–1955.

George Mack.

Queensland Museum.

Permanent settlement came to Brisbane, then part of the Moreton Bay district of New South Wales, in 1842 when the first land sales were held. Twelve years later men were considering ways and means of establishing a museum of natural sciences. At the time, there were no municipalities, and the district only had a Police Magistrate (Captain J. C. Wickham) representing authority in Brisbane. It is greatly to the credit of these early settlers who, in a relatively crude and small settlement, were keen to advance the things of the mind. Men of this calibre were not exceptional in the small communities of the early days.

Allan Cunningham, botanist and explorer, initiated the spread of settlement northwards when he journeyed from the Liverpool Plains to the Darling Downs, about one hundred miles west of the settlement on Moreton Bay. Men with sheep and cattle followed through and out to the north and west. One of the first, and reported to be the third party to move sheep overland to the Darling Downs, was Charles Coxen. Coxen had emigrated in 1836 to New South Wales from England. Before long he had taken up land near Scone in the Upper Hunter River district, where his brother, Stephen, had settled a few years earlier, and it was from here that he moved north to the Darling Downs in the early 1840's. This was the man who took the lead in founding the Queensland Museum in 1855.

Coxen was a keen naturalist. He had collected and prepared many specimens of Australian birds for his brother-in-law, John Gould. Probably the presence of the Coxen brothers in Australia encouraged Gould to visit this country to see something of the land and to collect material. He stayed with the brothers in the Hunter River district for some time in 1840, and he made good use of the specimens obtained there in the preparation of his magnificent folio work on the Birds of Australia. It is of interest to record in passing that a good copy of this eight-volume work to-day, when available, costs about £A800.

## CHARLES COXEN AND THE PERIOD 1855–1876.

Charles Coxen was born in Kent on 20th April, 1809. His parents, Nicholas and Elizabeth Coxen had nine children of whom five died in infancy. The eldest of the four surviving children, Henry, became an officer in the Army and died as a result of an illness contracted at Waterloo. This left Stephen, who migrated to New South Wales in 1827 ; Elizabeth, who became Mrs. John Gould ; and Charles, who followed his brother to New South Wales in 1836.

When Charles Coxen moved north to the Darling Downs, he settled on a property at Jondaryan, about thirty miles west of the present city of Toowoomba There is little detailed information about him at this stage, but apparently fortune did not altogether favour him. He married Elizabeth Isaac of Gloucestershire, England, in 1851, and between bouts of ill-health he is known to have taken up two other properties on the Darling Downs at different times. Finally, he came to reside permanently in Brisbane in 1861. Two years later he was elected to represent the Northern Downs district in the infant parliament of the colony and was appointed Chairman of Committees, an office which he held until 1867.

He was then appointed a Commissioner for Crown Lands in the Moreton district near Brisbane, and inspecting Commissioner for the settled areas of the Darling Downs. Upright and just in character, Coxen readily gained the esteem and respect of all with whom he came in contact. He continued his official duties until shortly before his death in 1876 at the age of sixty-seven years. Throughout the period 1855–1876 he was Honorary Curator and Secretary of the Queensland Museum. His widow died in 1906 ; there were no children.

Coxen was the moving force in collecting and preparing specimens for the purpose of establishing a public museum in Queensland. A beginning was made in 1855 when official permission was given for the use of some rooms at the signal station on a hill above the river to house the collections and cases already on hand. It has been generally assumed that the space granted was actually within the windmill or signal station as it was then known, but it is highly probable that the " rooms " were in a building within the grounds of the station. The windmill, on Wickham Terrace, is now preserved as an historical landmark, and it can readily be seen that there is little space within, while the associated wooden building, commonly shown in old photographs, no longer stands.

When this first accommodation was provided, permanent settlement had been established for thirteen years and the population of Brisbane was about four thousand. In 1859, Queensland was declared a separate colony and Brisbane became the capital. The Philosophical Society of Queensland (forerunner of the present Royal Society) was formed in the same year, and the first Governor of the Colony, Sir George Ferguson Bowen became its first president, with Charles Coxen as vice-president. The Society was inaugurated in March, 1859, and it is apparent from the first annual report that the members were strongly behind the efforts to provide a public museum. Reference is made to the existing nucleus of collections, the use of the rooms at the signal station granted by the government, and tribute is paid to Messrs. Coxen, Rawnsley, Waller and others for material contributed. It is recorded that additional suitable cases were purchased to house the collections, and this expense may well have been met from money given by the government to advance the aims of the Society.

With the support of the Philosophical Society, efforts to have a suitable building erected continued to be made. In 1863 a site was granted near the entrance to the " Government Domain," but no immediate progress resulted. The collections were growing, and this must have afforded many problems to Coxen whose labour in " setting up valuable specimens of birds " is acknowledged, and it is recorded that " the fine collection of shells belonging to that gentleman still continues to adorn the Society's rooms." The government was not unsympathetic ; it provided a variety of temporary accommodation for the collections as well as funds for maintenance. Two rooms were assigned in the Parliamentary Building in 1871 for the display of portion of the geological material. This building, which had previously been a barracks, was situated in Queen Street where Allan and Stark's department store is to-day. Here the collection of rocks, minerals, and fossils was arranged by D'Oyley H. Aplin, first Government Geologist of southern Queensland. Naturally, the authorities at the time were most concerned with economic aspects of settlement ; the discovery of gold, for example, had already given a great uplift to development in other Colonies to the south.

In the following year, considerable additional space was provided in the first General Post Office building, close to the Parliamentary Building in Queen Street, and the possibility that the government would agree to the erection of a museum building was brighter. The matter had been for some time a subject of parliamentary discussion.

Brisbane by this time had a population of 15,000, and the number throughout the Colony was about 125,000.

A collection of Queensland plants was being brought together within the Museum, and in 1874, Frederick Manson Bailey was appointed Keeper of the Herbarium. Bailey went on to become a notable figure first as Colonial Botanist and finally as Government Botanist in Queensland. He entered upon his work as Keeper under Charles Coxen, the Honorary Curator. At the same period, and probably before F. M. Bailey's appointment, K. T. Staiger, who was Government Analyst, became, in addition, Custodian of the Queensland Museum.

In 1875, the staunch efforts of Coxen and members of the Philosophical Society were crowned by the decision of the authorities to appoint a Board of Trustees for the Museum, and the much more important decision to erect a building at a cost of £11,000. From the records available the impression is gained that at no time had the authorities been difficult in this matter; indeed, they had been consistently helpful. Time and circumstances were the overriding factors. The parliament had to make laws for the good government of a new and large State with all sorts of unforseen needs and difficulties arising daily.

The Board of Trustees was appointed in February, 1876. Charles Coxen was a member, A. C. Gregory, at various times member of Parliament, explorer and Surveyor-General, was Chairman, and K. T. Staiger became Secretary to the Board. During the ten months, from February to December, 1876, fifteen meetings were held, and in the first Annual Report the Board remarked upon the Museum and its collections as follows: " In regard to the condition of the Museum at the time the present Trustees entered on their charge, they desire to record their opinion, that taking into consideration the great difficulties their predecessors had to encounter, the condition and arrangement of the collection reflects the highest credit on their administration." Charles Coxen died in this year, and the Trustees recorded their sincere regret on the passing of one " whose labours in developing the natural history of Australia are so well known to the scientific world, and who may be considered the principal founder of the Queensland Museum." This was indeed a serious loss. Coxen was the only man with any knowledge of museum collections, and there was no trained member of staff upon whom the Trustees could depend.

### 1876–1900.

Although the collections were scattered, it is apparent that the public was finding them useful and interesting. This is well shown by the record of 30,000 visitors to the display in the accommodation in the General Post Office building in 1876. Despite the public response and the co-operation of the authorities, in the second Annual Report the Trustees recorded that, " No great progress in the development of the institution under the control of the Trustees can be expected, or is it possible, in the present existing temporary condition of the Museum premises and material at their command." The real difficulty was that the well-intentioned Trustees were endeavouring to manage an institution about which they had little knowledge. Their greatest need was for trained staff.

The new building in William Street was ready for occupation before the end of 1878, and the collections were transferred to it the following year. In January, 1880, W. A. Haswell, M.A., B.Sc. of Edinburgh, was appointed Curator at a salary of £200 per annum. How Haswell came to be available for appointment is not known, but there is no doubt that the salary provided was far too small. He held the position from January, 1880 to November of the same year, when he accepted the Chair of Biology in the University of Sydney. This is the man whose name, together with that of Parker, is so well known through the text books which they produced on zoology. Even had his salary been three times greater, it is probable that Haswell would have gone to Sydney. Nevertheless, the amount was far too meagre for the position.

Following Haswell's departure, F. M. Bailey, Keeper of the Herbarium associated with the museum, performed the duties of Curator from December, 1880 to March, 1882, when Charles Walter De Vis, B.A. (Cantab.), was conditionally appointed Curator. This appointment, which was made on recommendation of the Rev. J. E. Tenison Wood, was confirmed later in the same year. De Vis was born in Birmingham, England on 9th May, 1829, and therefore was fifty-three years of age when he commenced his work in the Queensland Museum. He had been educated at Edward VI Grammar School, Birmingham and Magdalen College, Cambridge. On graduating, he was ordained and entered the Church of England, but his enthusiasm for natural history led him to accept the position of Curator of a small museum in England. This would appear to have been in the period 1865–1870. In June, 1870, he sailed for Australia. He resided for a time near Rockhampton and later in the Clermont district, Queensland. After a visit to England, he became librarian at the School of Arts in Rockhampton, and at this time he contributed articles on the local geology and bird life to a weekly newspaper. The museum required able and forceful leadership, but one cannot avoid the impression that De Vis would have been happier in a secluded room describing fossil and recent vertebrate animals, rather than building up the collections of a new museum. However, there is no doubting his devotion to the work he had undertaken.

Before his appointment a select committee had been named to enquire into and report upon the working of the Queensland Museum. Apparently, this was an effort by the authorities to ascertain what was required in the way of funds for the proper functioning of the Museum in the new building. At any rate, in the Trustees' report for 1882, the Parliament was thanked for the liberal manner in which their needs had been met. Emphasis was laid upon collecting, and Kendall Broadbent was appointed for this purpose. Broadbent had collected in Victoria for some years for Professor (afterwards Sir) Frederick McCoy who took over the direction of the infant National Museum of Victoria in 1857. In the same report the Trustees recorded their appreciation of the gratuitous assistance given by Henry Tryon in the work of collection and investigation during the past year. This was a forerunner to Tryon's appointment as Assistant Curator in charge of invertebrates.

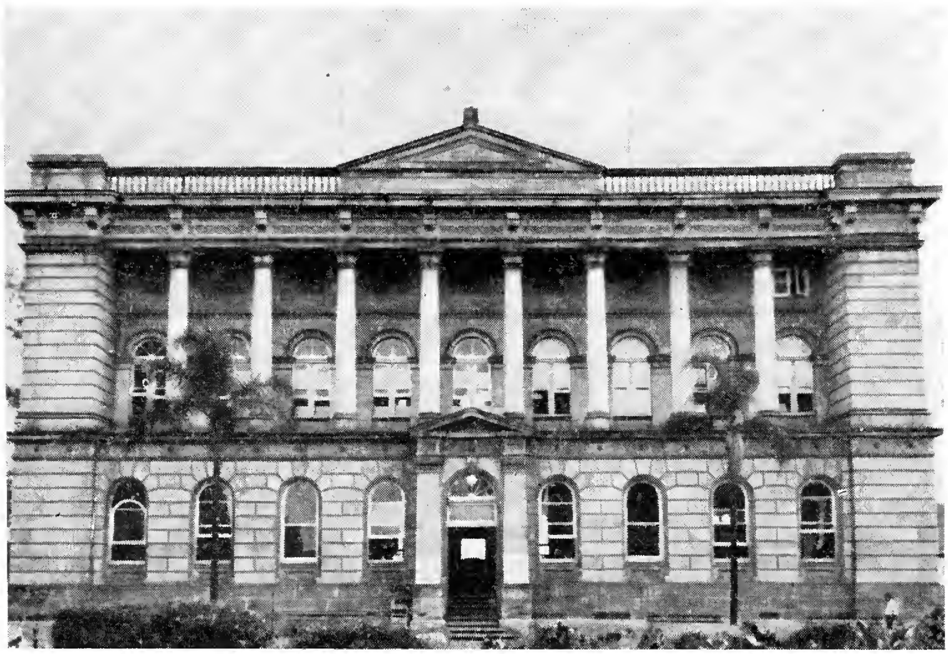


Figure 1.
The first building erected for the Queensland Museum, William Street, Brisbane.

Behind the fine fascade of the new museum building in William Street beside the river, there was little to praise. There was not sufficient space for existing collections, and storage and staff accommodation apparently had not been considered. Very soon the plea for space became a regular feature of the Trustees' reports, and at one stage it was remarked that the building was unfit for a museum, but that it may be considered suitable for a library. It does house a library today.

A. C. Gregory, first Chairman of the Board of Trustees, was succeeded in this position in 1883 by Sir A. H. Palmer. Following this change, it is noted that the report signed by the Chairman gradually became smaller until it was only a matter of a few lines of print. On the other hand, De Vis' report to the Trustees became considerably enlarged, and it is apparent that a great deal of his time must have been given to keeping a record of all that was included in his statements for the Trustees. In addition to a lengthy formal portion, he prepared a number of appendices under the following headings: I. Classified List of Donations, II. Abstract of Collections, III. Alphabetical List of Donors, IV. Additions to Library, V. Purchases,

VI. Exchanges, VII. Visitors, VIII. Attendance of Trustees, IX. Mr. Wallman's Report, and so on. Keeping records for the report and appendices, identifying material as it came in daily from the general public and from his collectors, dealing with numerous inquiries throughout each day, and attempting to prepare papers on new material for publication as well as managing the general affairs of the Museum with a minimum of staff, was indeed a tremendous task. It is to be remembered, too, that De Vis commenced as Curator at the late age of fifty-three years.

Nine Trustees constituted the Board, but it was seldom that more than two or three were present at any one meeting. Commonly two or three Trustees would go through a whole year without attending one meeting of the Board. Yet, in 1888, Sir A. H. Palmer commenced his brief report of about twelve lines of print with the statement that " Under our direction the management of the Museum continues to give us entire satisfaction."

Over a period of years, Kendall Broadbent continued to do good work in the field. Series of vertebrate animals were obtained from many widely separated localities, and he collected fossil vertebrates in the Darling Downs district. At various times, geological collectors were in the field, but either they resigned after a period or the Museum finances would not permit retention of their services. Henry Tryon continued as Assistant Curator in charge of invertebrates and in 1888, Charles Hedley, who later became a well-known worker on molluscs in the Australian Museum, Sydney, was appointed a temporary assistant in Malacology.

The difficulties arising from shortage of space and staff were to increase. In 1888, native material began to come in from New Guinea and the New Hebrides, and in 1889, Sir William MacGregor, Lieutenant-Governor and Administrator of British New Guinea, signified his intention to donate his magnificent collection of New Guinea ethnological material and birds to the Queensland Museum. At this time, Charles Hedley spent some time in New Guinea under Sir William MacGregor, but he became ill and upon his return to Brisbane, he had to resign his position owing to the state of his health. It was impossible for De Vis and his few assistants to cope with the material on hand, quite apart from additional large accessions, and it should be remembered that in the climate of south-eastern Queensland, expert curating of collections is an even greater need than in a purely temperate climate.

However, hope for the provision of another new building was still very much alive. In 1885, the Government of the day had set aside a sum of £40,000 for this purpose, and in 1890 the Board of Trustees examined plans for the proposed building. Tenders for its construction were called, but the Government failed to accept any of the tenders submitted. It was stated that the present building had been brought to a fair state of repair, and with this the subject seems to have been dropped.

If shortage of space, staff, and probably funds were cause for concern in the first ten years of De Vis' curatorship, worse was yet to come. All the Australian colonies were seriously affected by the financial blight of 1893. Values in every sphere tumbled, and many banks were unable for a time to meet their commitments. The museum staff was reduced to three, consisting of the Curator and two Attendants (Kendall Broadbent and C. J. Wild) both of whom previously had been field collectors. The sum of £650 was provided to meet the salaries of the staff and the general expenses of the museum. The position was really serious, and for De Vis, at sixty-four years of age, the state of affairs must have been a severe trial.

The first duty of a curator or director of a museum is the care of collections on hand, expecially the reference or study collections. This is something that is not appreciated even today by those not experienced in museum work. To do this work effectively requires knowledge, time and labour, even when the collections are contained in properly constructed cabinets and cases. But De Vis had only a number of ill-constructed cabinets and cases, and there is little doubt that we suffer for this today. The general run of museums contain a considerable amount of irreplaceable material, and the Queensland Museum was no exception in this respect even in the early years. The magnificent collection of New Guinea material presented by Sir William MacGregor suffered severely. Duplicates were sent to other institutions as gifts, and the remainder was packed in boxes and ultimately stored in a shed !

The first issue of the Annals of the Queensland Museum was published in 1891, and a second part appeared the following year, but owing to the financial position, No. 3 was not published until 1897. The Annals became a new medium for De Vis' papers based on the collections. Previously, he had published mostly through the Royal Society of Queensland and the Royal and Linnean Societies of New South Wales.

With the coming of the financial slump, A. Norton became Chairman of the Board of Trustees in 1893, and the lengthy appendices and statement by the Curator were no longer published as part of the Annual Report, probably as a means of economising. This was no loss ; indeed, had the time which must have been given to their preparation been devoted to a proper system of registration and card indexing, the museum, then and now, would have gained immeasurably. A point of interest is the fact that the Board of Trustees was not constituted by Act of Parliament ; the members appear to have been appointed by the Executive Council. At various times the Trustees remarked upon the anomaly of their position and requested that steps should be taken to provide them with legal standing. This was never done, and it is difficult to see what difference any alteration in their status would have brought about. Most of them seem to have had little interest in the institution as evidenced by their poor record of attendances at meetings, and nothing of any moment seems to have been accomplished by them. This is really not surprising. Museum work is highly specialized, and Trustees are not appointed because of their knowledge of this work.

1900–1955.

Norton was a member of the Legislative Council, and judging by his reports, he keenly desired to do his best for the museum. The need for greater space was constantly stressed, and soon after the authorities had dropped the idea of providing another new building, they offered the use of the National Association Building in Bowen Park to the Board. This was accepted, and in 1900, the collections were moved to the building in which they remain to this day. The new move provided much more display space, while leaving a great deal to be desired aesthetically and from the point of view of convenience within the building, but storage and working space

Figure 2.
The present Queensland Museum building, Gregory Terrace, Brisbane.

behind the scenes remained and continues to be a problem. In recent years, portion of the display area has been taken over to provide storage, but the difficulties increase with the passage of time. To store, care for, and work collections of a modern museum of consequence, requires twice the space behind the scenes as that which is given to public display.

The museum appears to have been closed throughout the year 1900, but by January, 1901, all was ready and it was reopened to the public. De Vis was now seventy-two years of age, and doubtless he was a tired man. One or two new appointments were made, all of little consequence, except for A. Alder who became taxidermist in 1905.

The last report issued by the Board of Trustees was for 1901. The general impression is that within the Museum matters were going from bad to worse. There was no one on the staff, with the exception of the ageing De Vis, with any competence in the work, and if the Trustees were making any effort to improve staff and conditions, it is apparent that they were having no success. In 1903, the museum as a sub-department was transferred from the Department of Public Instruction to the Department of Agriculture and Stock. No explanation for this change can be given. In 1905, De Vis was retired at the age of seventy-six, and C. J. Wild, who was an insect collector, was appointed acting Director. De Vis was named as "scientific consultant."

Control of the museum was again changed from the Department of Agriculture and Stock to that of the Chief Secretary's Department in 1907. It is possible that responsible individuals were feeling concerned about the state of affairs, and this final move brought the institution under the Premier of the day. Again, one or two junior appointments were made, and by 1910, the Premier decided to take action. He obtained the services of the curator of the Australian Museum, Sydney (Robert Etheridge, junr.), from the Premier of New South Wales, and requested this officer to investigate the affairs of the Queensland Museum and report to him in person.

The Etheridge report was informative and fair, and the recommendations made were practical. The main outcome was the appointment of Dr. Ronald Hamlyn-Harris as director of the museum which became a sub-department without a Board of Trustees. Hamlyn-Harris was not a museum worker, but his background and training were excellent. He had been educated at schools in England and Germany, and he was graduated as a Doctor of Science from the ancient University of Tübingen in Germany. He had carried out research at the Naples Marine Biological Aquarium, and had travelled widely.

On accepting the appointment, Hamlyn-Harris very wisely visited the museums in Adelaide, Melbourne, and Sydney, and he benefited greatly from the sage advice of Robert Etheridge, junr. His task was a mighty one, but he set to work with a will. He had to clean the entire building, fumigate, reorganise collections and library, and build up a staff. Henry Hacker, a capable man of the old school, was appointed entomologist ; H. A. Longman, a naturalist whom Hamlyn-Harris had come to know in Toowoomba, was appointed senior assistant ; A. Alder was taxidermist with M. J. Colclough as assistant and T. C. Marshall as a cadet. A librarian was appointed, and among others, mention should be made of Miss Eileen G. Murphy who became shorthand-typist. Miss Murphy has continued through to the present on the staff of the Queensland Museum.

Great progress was made under Hamlyn-Harris's direction. The collections, which had suffered severely, were consolidated and gradual rebuilding was commenced. The display series was improved, lectures both for school children and adults were undertaken, and, altogether, the museum came to life. The Memoirs replaced the Annals of the Queensland Museum as a medium of publication, and Hamlyn-Harris contributed some excellent papers on native peoples and their material culture.

He showed great enthusiasm and ability, but the authorities, probably as a result of their experience prior to Hamlyn-Harris's appointment, tended to restrict his endeavours. He was not allowed the full responsibility of museum management, and those who applied the restrictions had little knowledge of the museum, its work and its needs. With the coming of the 1914–18 war, funds were reduced for most cultural activities, and the museum was no exception. Hamlyn-Harris persevered, but the difficulties normally present and those placed in his path began to affect his health and he resigned in August, 1917. His resignation must have been regretted by all concerned with the welfare and progress of the museum. He had worked hard and had accomplished much in the short period of six years.

Heber A. Longman, the senior officer on the staff, was appointed in the following year to succeed Hamlyn-Harris. His was not an easy assignment. His interest in living reptiles gave way to a study of fossil vertebrates upon which he published a number of papers in the next twenty-five years.

The death of A. Alder, the taxidermist, in 1915 was a loss which had not been overcome. M. J. Colclough was appointed in his place, but the latter's position as assistant was not filled. However, by way of compensation, T. C. Marshall, who commenced as a cadet under Hamlyn-Harris, was now preparing excellent painted casts of fishes for display, examples of which he continued to produce over a period. In addition to many other duties, and following on the earlier work of J. D. Ogilby, Marshall also continued to build up a fine study collection of Queensland fishes.

A few well-prepared mounts of foreign mammals were purchased abroad, and some display cases and storage cabinets were constructed, but bad times were again on the way. During the so-called depression period commencing in 1929, H. Hacker, the entomologist, who had worked tirelessly to build up the insect collections, and M. J. Colclough, taxidermist, transferred to other departments. The loss of two senior men from a very small staff was disastrous. Colclough had to be reinstated at the end of three years, and Hacker attended at the museum on one and a half days each week. The small, capable staff which Hamlyn-Harris had brought together was breaking up.

Only one new appointment was made ; K. Jackson, a young man who was especially keen on ethnological work took up duty in 1937. At the outbreak of war in 1939, he entered the Army, and in 1943, to the great regret of all who knew him, he was killed in New Guinea.

During the 1939–1945 war, T. C. Marshall, after more than thirty years' service, and the librarian at the time, transferred to other departments. At this stage, the staff was reduced to the director, a clerk, a temporary employee in the library, and three or four attendants on duty in the halls. This meant that the collections which had been saved and added to under Hamlyn-Harris were subject to serious deterioration once more.

Longman suffered considerable ill-health in 1945, and, as he was close to the retiring age, I was appointed in October of that year and became director early in 1946.

## PRESENT AND FUTURE.

In the past ten years (1946–1955) considerable change has taken place in the Queensland Museum, and this has been made possible through the consideration shown by the Queensland governmental authorities. It is a privilege to pay tribute to those who have provided every reasonable facility for the advancement of the museum.

Staff, and the means to train and keep the staff at work with a purpose were the outstanding needs. Every assistance has been given in these matters. Improved working accommodation was readily provided, and equipment has been and continues to be obtained as the need arises. For a variety of reasons, which need not be detailed here, it has always been difficult to find both graduate and non-graduate staff for work in Australian museums. In this respect, Queensland has been fortunate in recent years, but the position is still far from satisfactory. The Sir William MacGregor collection, for example, which has suffered much from the time it was presented, is still without a curator. It receives attention at present, and this has not always been the case, but it is not yet possible to work this and other collections as they deserve to be worked.

North-eastern Australia (Queensland) has a greater concentration of fauna than any similar area in this country, and the basic work of collecting, describing and recording relationships has lagged in this State. In the main, work of this nature is carried out by museum staffs, and it is not yet generally realised how important the resulting information is from the point of view of the material welfare of the State and country. For example, soil erosion is a serious matter in Australia, and it is not possible to overcome and prevent soil erosion unless we know and understand the relationships of animals, plants and soil, and knowing this, conserve in reasonable proportion the native fauna and flora.

The energies of the present staff have been largely devoted to the preparation of new displays on modern lines for the public, and once more, the treatment and consolidation of collections has taken much time. This work, even with additional staff and numerous new storage cabinets, will have to be continued for many years before a reasonably satisfactory state of collections is attained. The building has been wired throughout for electric light and power, providing for good general lighting and for the use of vacuum cleaners, polishing machines and other mechanical equipment. Fluorescent lighting has been installed in all new display cases. Instructive films are shown to the public at suitable intervals, series of public lectures are now provided, in addition to the considerable number given each year to various outside bodies, and classes of school children attend throughout the school year for lessons supported by pertinent films. This last activity has developed entirely at the request of teachers in and near the metropolitan area. It is hoped that the work will be extended and that it will become possible to provide the usual travelling case exhibits for country schools, but for this purpose, it will be necessary to have teachers seconded to the museum, and teachers are in short supply.

In the past four years a refresher course in Natural Science for teachers has been conducted in the museum during long vacations. The course lasts for one week, and teachers have responded with marked enthusiasm and appreciation. The response of the general public, too, has been altogether gratifying, not only in the greatly increased number of visitors and the attention which they give to the displays, but in the desire shown for information. Specimens of all kinds and correspondence are received daily, and it is remarkable the amount of material which has been added to the collections in this way. The desire to know and understand something of the natural life around them is characteristic of a large section of the population.

Field work, that is, the collecting and preserving of specimens necessary both for display and study, is a normal function of a museum. So far, a limited amount has been done, but now it is imperative that fresh material should be obtained in many sections. Staff is required for this purpose, but efforts will be made whenever present members can be spared for periods even of one or two weeks.

Finally, the great need for more space for display and especially for storage and working room behind the scenes must be stressed once more. To do justice to the State collections and provide facilities for greater service to the public, a modern museum building is required. Extensive repairs of various kinds have been carried out to the present building at intervals since 1946. The work done was necessary to maintain a large government structure in a reasonable state of repair. It has provided a much more favourable background for the new, instructive displays, and the encouraging response shown by all concerned to what has been accomplished so far provides good reason to look to the future with confidence.

## STAFF—1955.

| | |
|---|---|
| Director .. .. .. | George Mack |
| Geology and Palaeontology .. | Jack T. Woods |
| Zoology .. .. .. .. | George Mack<br>Shirley B. Gunn<br>Margaret B. Wilson |
| Preparation .. .. .. .. | D. P. Vernon<br>M. E. McAnna<br>G. W. Ayre |
| Art .. .. .. .. .. | Valerie B. Smeed<br>Jennifer J. Trivett |
| Library .. .. .. .. | Jennifer J. Uscinski |
| Photography .. .. .. | Roland V. Oldham |
| Office .. .. .. .. .. | Eileen G. Murphy<br>Shirley A. Landy |
| Attendants .. .. .. .. | M. P. Beirne (Senior),<br>C. J. Yorke, G. Walker,<br>C. O. Bowman, J. Jones,<br>A. J. Watson, L. F. Platt. |

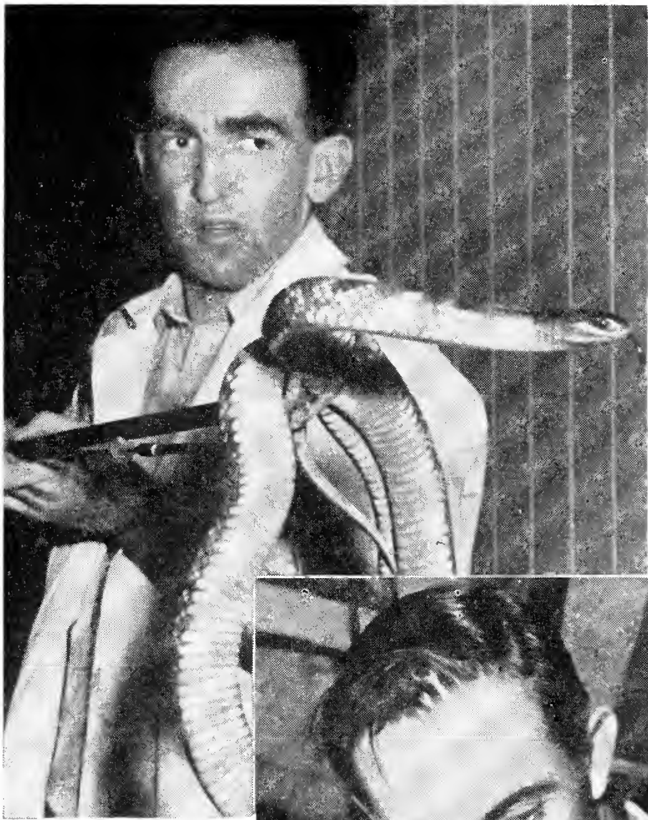


Figure 3.

A large specimen of the rare Variegated Snake (*Pseudechis colletti*) held with a snake-stick.

[*Courier-Mail photo.*

Figure 4.

Removing latex cast of the Water Dragon (*Physignathus lesueurii*) from a mould.

[*Courier-Mail photo.*

Figure 5.
Painting latex casts of Frilled Lizards (*Chlamydosaurus kingii.*)
[*Courier-Mail photo.*

Figure 6.
Mounting a female specimen of the Superb Lyrebird (*Menura novae-hollandiae*).

Figure 7.
Reconstructing fossil skull of an extinct marsupial.

[*Telegraph photo.*

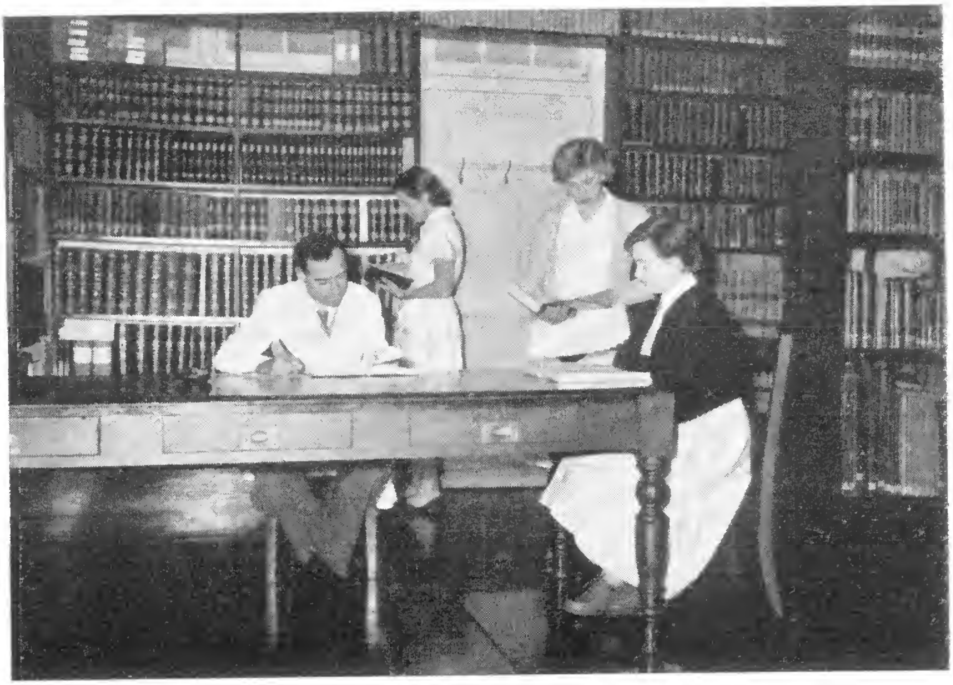


Figure 8.
A corner of the library of about 30,000 volumes.

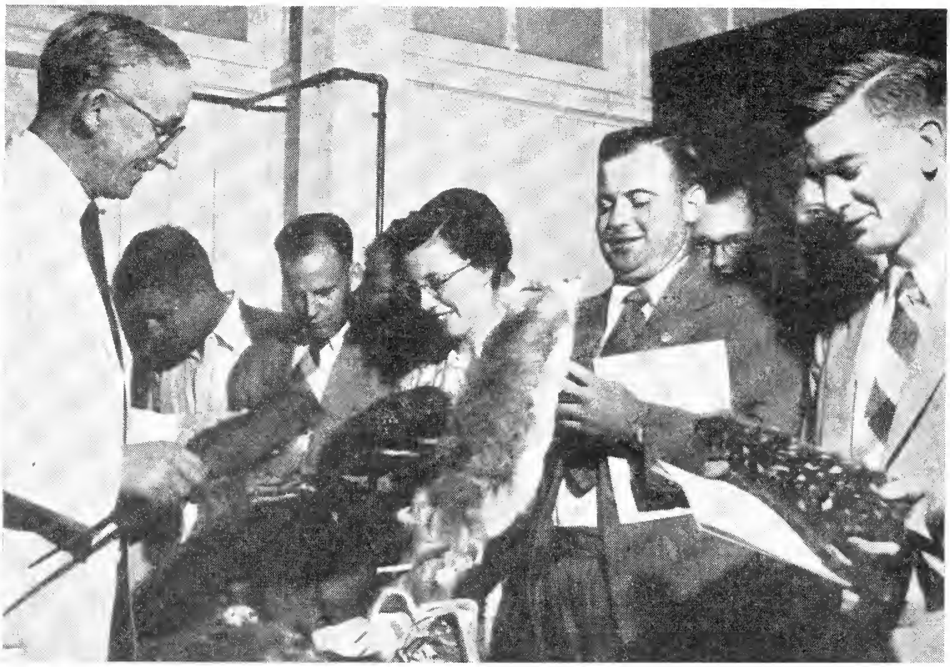


Figure 9.
Teachers examining specimens during a refresher course.
[*Courier-Mail photo.*

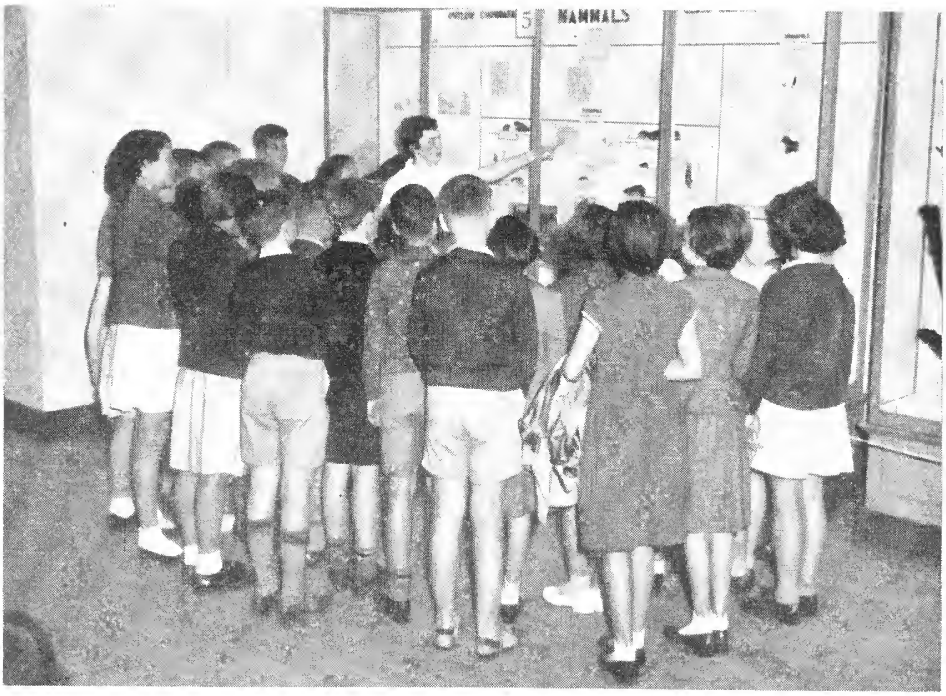



Figure 10.
A lesson on marsupial mammals to a class of children.

# THE SKULL OF THYLACOLEO CARNIFEX.

JACK T. WOODS.

Queensland Museum.

The early descriptions of the skull of *Thylacoleo carnifex* are contained in several papers by Owen (1859–1888). The feeding habits of this marsupial have continued to arouse the interest and imagination of palaeontologists, but apart from the remarks of Anderson (1929), little additional information on the morphology of the skull has been provided. No remains of the post-cranial skeleton are known; several specimens have been attributed to *Thylacoleo*, but their association is uncertain. A bibliography of the genus has been provided by Gill (1954).

Most of the specimens referred to *Thylacoleo*, in the collections of the Queensland Museum, have been obtained from the late Cainozoic fluviatile deposits of the Darling Downs, south-east Queensland. The majority were collected by K. Broadbent and H. Hurst, collectors on the staff of the Museum, in the decade beginning 1885. A few specimens from the cave deposits of Marmor, mid-east Queensland, and Gore, south-east Queensland, also are present. The old collections are poorly documented and it is regrettable that they have not always received the attention they deserve. However, with modern treatment, they constitute a very useful collection for morphological study, and here serve as a basis for a detailed description of the skull.

The type of *T. carnifex*, which is in the collections of the Museum of the Royal College of Surgeons, London, came from the Pleistocene lacustrine deposits of Lake Colongulac, Victoria. It is apparent, from a careful check of the material from the Darling Downs with Owen's description and figures (1859), that, with the possible exception of specimens from the Chinchilla district, they are conspecific.

The use of dilute acetic acid has been found to facilitate preparation of material for this study. The soils of the Darling Downs are usually calcareous, and fossils from beds associated with them often carry strongly adherent calcareous nodular material, which is difficult to remove mechanically.

Following the removal of matrix from the undistorted cerebral cavity of one specimen, an endocranial cast in agar was prepared. The cast was removed by opening the skull along an adventitious equatorial fracture and from it a master mould in plaster was made. From this mould, casts in latex were prepared for study, and in order to minimize shrinkage, these were supported internally by a thin shell of plaster before vulcanization.

All measurements are in millimetres.

## MATERIAL AND DESCRIPTION.

The description is based on the following specimens :—F. 744, nearly complete cranium with $I^1$, C—$P^3$, Pilton, Darling Downs ; artificial endocranial casts from F. 744 ; F. 754, anterior part of cranium with C, $P^3$—$M^1$, Pilton, Darling Downs ; F. 2927, right mandibular ramus with I, $P_3$—$M_1$, lacking the coronoid process, believed to belong to same individual as preceding ; F. 767, ventral part of cranium with $P^2$—$M^1$, Pilton, Darling Downs ; F. 2930, incomplete premaxillae and maxilla with $I^{1}$—$^{2}$, C—$P^3$, Clifton, Darling Downs ; F. 745, nearly complete left mandibular ramus with $I_1$, $P_3$, Spring Creek, Darling Downs ; F. 2929, right mandibular fragment with $P_3$—$M_2$, aged, Gowrie, Darling Downs ; F. 2491, left mandibular fragment with $I_1$, $P_3$—$M_1$, juvenile, near Dalby, Darling Downs ; F. 2928, right mandibular fragment with $P_3$—$M_1$, Gowrie Creek, Darling Downs ; F. 748, left mandibular ramus with $I_1$, $P_3$—$M_1$, young, lacking condyle and coronoid process, locality unknown.

### Cranium.

Measurements.

| Specimen. | Length Prosthion-basion. | Width. | Length of tooth-row at alveolar margin. | Length of $P^3$ at alveolar margin. | Palatal width between anterior cusps of $P^3$. | Angle of wear of $P^3$ with horizontal. |
|---|---|---|---|---|---|---|
| F. 744 .. .. | 220 | 198 | 98·2 | 51·5 | 71·2 | 63° ; 67° |
| F. 754 .. .. | .. | 196 | 100·7 | 53·8 | 70·9 | 63° ; 65° |
| F. 767 .. .. | 206 | 186 | 94·0 | 49·8 | 68·0 | 59° ; 64° |

Broad, sub-triangular in ventral view, with rostrum, anterior to $P^3$, markedly concave laterally; dorsal longitudinal profile asymmetrically convex, descending gradually anteriorly from highest point on coronal suture to slightly concave rostrum.

Nasals produced to an apex anteriorly, contracted in middle, widest posteriorly above orbit ; naso-frontal suture angular, with median wedge of frontals separating nasals posteriorly ; inferior surface of nasals deeply excavated to form dorsal meatus.

Premaxillae short, high, arcuate in profile ; each separated from frontal by prominent dorsal tongue of maxilla ; antero-ventrally much thickened for incisor roots ; premaxillo-maxillar suture oblique, premaxilla expanded internally ; mesial surface crossed by longitudinal ridge, separating lateral from ventral meatus, and carrying groove for naso-lachrymal duct traceable to lachrymal foramen ; ridge extending posteriorly on to maxilla and presumably serving for attachment of maxillo-turbinal. Bar of premaxillae separating elongate oval anterior palatine foramina, intertonguing between maxillae and vomer.

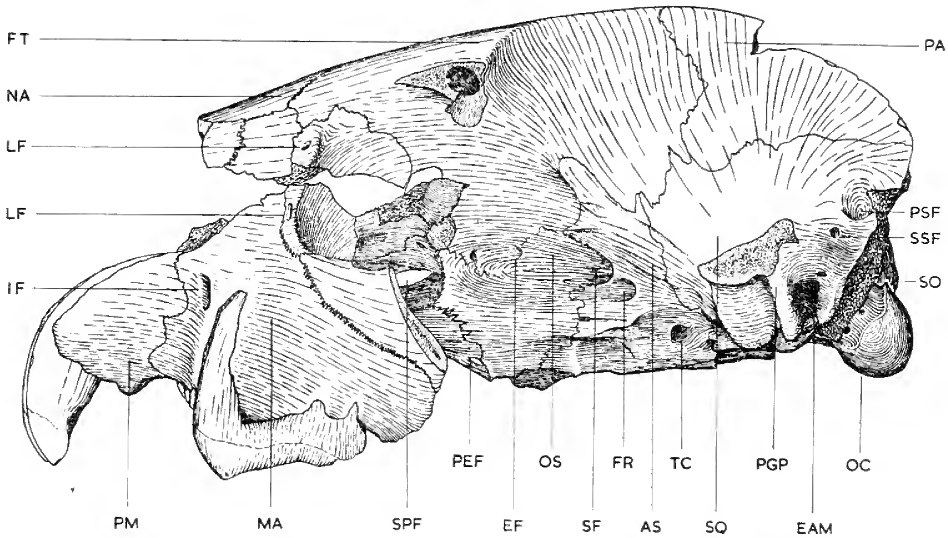



Figure 1.—*Thylacoleo carnifex* Owen. Lateral view of cranium, F. 744 (Q.M.) ; half natural size.

*AS*, alisphenoid
*EAM*, external auditory meatus
*EF*, ethmoid foramen
*FR*, foramen rotundum
*FT*, frontal
*IF*, infraorbital foramen
*LF*, lachrymal foramen
*MA*, maxilla
*NA*, nasal
*OC*, occipital condyle
*OS*, orbitosphenoid
*PA*, parietal
*PEF*, postero-external palatine foramen
*PGP*, postglenoid process of squamosal
*PM*, premaxilla
*PSF*, postsquamosal foramen
*SF*, sphenoptic foramen
*SO*, supraoccipital
*SPF*, sphenopalatine foramen
*SQ*, squamosal
*SSF*, subsquamosal foramen
*TC*, transverse canal

Maxillae short, each with the infraorbital foramen opening dorsal to anterior of $P^3$ ; convex over anterior root of this tooth; alveolar walls thinning, roots becoming exposed with age, with simultaneous development of an inter-rootial depression. Maxilla posteriorly forming anterior margin of temporal fossa ; postero-laterally curving to unite with jugal ; postero-mesially bounding portion of sphenopalatine foramen, extending below palatine to intersect transversely directed postero-external palatine foramen, and bounding large confluent posterior palatine vacuities laterally ; postero-dorsally flooring orbit and pierced by opening of infra-orbital canal ; relationship between maxilla and palatine above sphenopalatine foramen not observable. Maxilla much thickened above $P^3$, space between roots occupied by large pneumatic sinus extending posteriorly into zygomatic process. Antero-mesially, maxillae form high wide arch between third premolars.

Lachrymals, each forming narrow strip anterior to margin of orbit , with two foramina, the dorsal immediately ventral to boss close to fronto-lachrymal suture ; expanded to form much of mesial wall of orbit.

Frontals large, fused in adult ; anteriorly broad ; each with tapering ventro-lateral process abutting on post-orbital process of jugal to form post-orbital bar ; postero-dorsally narrowing, forming projecting tongue into parietals ; dorsally flattened and postero-laterally perpendicular to mesial walls of temporal fossae ; temporal line slightly rugose, extending from posterior of post-orbital bar on to parietal. Lateral wall of frontal extensive ; sutures with orbitosphenoid and palatine indistinct. Ethmoid foramen small, close to fronto-orbitosphenoid suture, posterior to small posteriorly directed foramen, near fronto-palatine suture ; canal leading from this latter foramen, with exit on palatine in nasal cavity. Frontals anteriorly roofing olfactory chamber containing ethmo-turbinal complex attached to cribriform plate anteriorly and antero-dorsally ; posteriorly excavated for pneumatic sinus system, extending posteriorly above cerebral cavity into parietals, antero-laterally into roots of post-orbital process.

Palatines, each ventrally restricted to short, vertically compressed process posterior to palatal vacuities (sufficient of these structures is preserved to indicate their union as a transverse bar) ; antero-laterally forming postero-ventral and posterior margin of sphenopalatine foramen ; postero-laterally with strong longitudinal ridge continuing on alisphenoid. Internally, palatines forming high arch over part of narial passage ; anteriorly supporting vomer ; posteriorly separated by narrow wedge of presphenoid.

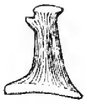
Vomer narrow, with two longitudinal grooves, lateral anteriorly, converging and becoming ventral posteriorly ; median ridge enveloping narrow anterior projection of presphenoid. Vomer laterally channelled in advance of foramen on wall of palatine in nasal cavity ; dorsally with median groove for mesethmoid.

Presphenoid dorsally fused with mesethmoid, laterally with orbitosphenoids. Orbitosphenoids small, bordering sphenoptic foramina mesially ; latter confluent through low slit.

Pterygoids each anteriorly slender, posteriorly thickened ; ventral margin posteriorly with shallow groove ; hamulae absent.

Basisphenoid fused with basioccipital. Alisphenoid wings small, relative to expanded frontal and squamosal ; each laterally with radiating ridges presumably for muscle attachment ; ventrolaterally with rugose concave area ventral to posterior continuation of prominent longitudinal ridge on palatine ; rugosity extending on to lateral wall of pterygoid. Foramen rotundum prominent, immediately postero-ventral to sphenoptic foramen. Transverse canal opening at points collinear with these foramina, but near ventral margin ; tunnelling basisphenoid and communicating with channel for maxillary nerve within cerebral cavity. Foramen ovale with tubercle at antero-lateral margin ; almost wholly within squamosal ; lipped by squamoso-alisphenoid suture. Alisphenoid postero-ventrally restricted to narrow tongue, mesial to squamosal, terminating at slit flanking petrosal in roof of eustachian canal ; no alisphenoidal bullae. Entocarotid foramen opening antero-mesiad at anterior end of canal.

Parietals fused, restricted dorsally, with temporal lines in adults converging posteriorly to form short, low sagittal crest ; concave laterally ; bounded posteriorly by sharper lambdoidal crests, extending over supraoccipital region, uniting with sagittal in smooth curves. Lambdoidal suture obliterated ; interparietal not recognised.



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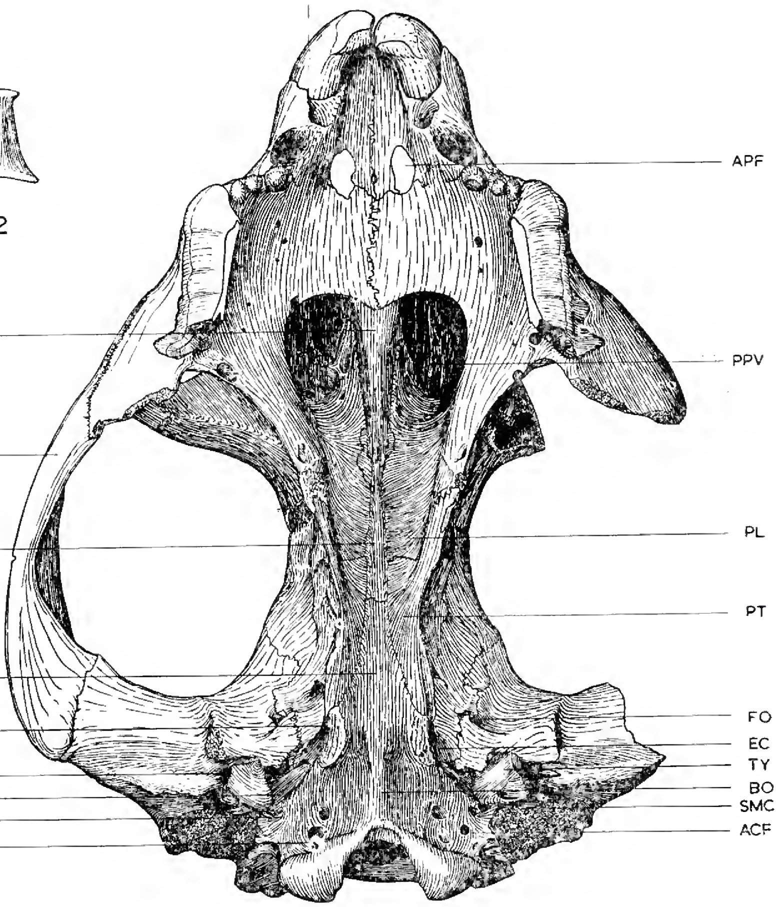


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Figure 2.—*Thylacoleo carnifex* Owen. Lateral view of stapes, F. 767 (Q.M.) ; x 5.

Figure 3.—*Thylacoleo carnifex* Owen. Ventral view of cranium, F. 744 (Q.M.) ; half natural size.

*ACF*, accessory condylar foramen
*APF*, anterior palatine foramen
*BO*, basioccipital
*BS*, basisphenoid
*CF*, condylar foramen
*EC*, eustachian canal
*ECF*, entocarotid foramen
*FO*, foramen ovale
*JF*, jugular foramen
*JU*, jugal
*PE*, petrosal
*PGF*, postglenoid foramen
*PL*, palatine
*PPV*, posterior palatal vacuity
*PS*, presphenoid
*PT*, pterygoid
*SMC*, stylomastoid canal
*TY*, tympanic
*VO*, vomer

Squamosals strong, expanded mesially, with subsquamosal and postsquamosal foramina variably developed, sometimes confluent. Zygomatic limb of squamosal broad and rather flattened above glenoid fossa; becoming higher and narrower laterally, above jugal. Glenoid fossa transverse, wide and deep; bearing surface slightly convex downwards, almost transverse; laterally bounded by bulbous postero-ventral termination of jugal; mesially by part of pretympanic expansion of squamosal; posteriorly by groove, anterior, for mesial two-thirds of its course, to prominent postglenoid process. Postero-mesial margin of fossa interrupted by groove, continuing on posterior or low bullate pretympanic expansion of squamosal, forming postglenoid foramen with antero-lateral margin of tympanic. External auditory meatus deep; bounded posteriorly by mastoid and post tympanic process of squamosal; open dorsally to extensive sinus system in squamosal root.

Jugals, each postero-ventrally broad at union with squamosal; anteriorly narrow and slightly longitudinally curved on lateral flank of very large temporal fossa; antero-dorsally contributing to post-orbital bar and forming postero-ventral margin of orbit.

Tympanics relatively small, each completely exposed ventrally, not extensively united with surrounding elements; arching below external meatus; posteriorly perforated by groove or foramen directed dorso-mesiad.

Mastoids, each posteriorly forming oblique rugose strip on occiput, terminating dorsally at small mastoid foramen; mesial to flange of squamosal forming ventro-lateral portion of lambdoidal crest; anteriorly restricted in the meatus. Petrosals, each visible in contact with basioccipital in ventral view; with fenestra rotunda at postero-lateral margin and fenestra ovalis slightly dorsal to it; exit for facial nerve at antero-lateral margin, opening to canal passing posteriorly, dividing to form stylomastoid canal crossing mastoid and squamosal obliquely to emerge on postero-lateral margin of meatus; with other branch crossing exoccipital ventrally, confluent with jugular foramen. Stapes columelliform, with small lateral spur immediately below head; crura fused, bearing median groove, and thickened at attachment of slightly concave base.

Basioccipital fused with exoccipitals; ventrally with median ridge separating two depressions, each flanked antero-laterally with rugose projection.

Exoccipitals ventrally with condylar and accessory foramina asymmetrically distributed between condyles and prominent jugular foramina; posteriorly with venous foramina irregular distributed dorso-lateral to condyles. Condyles heavy, well rounded, separated ventrally by deep median embayment; foramen magnum flattened oval in posterior view. Paroccipital processes incomplete in all specimens studied; postero-ventrally directed.

Supraoccipital fused with exoccipitals; concave with a low median vertical ridge separating two foramina; overhung by lambdoidal crest dorso-laterally. Occipital region as a whole nearly twice as broad as high.

ENDOCRANIAL REGION.

Maximum dimensions of artificial endocranial cast: length, 97; width, 66; height, 46; volume, 131 cc.

Cast with slight axial flexure, rather compressed vertically, elongate hexagonal is dorsal view, widest across middle of hemispheres, tapering only slightly posteriorly to cerebellum. Olfactory bulbs, not markedly divergent at mid-line, high and wide, with cribriform plate, on the whole, beyond vertical; olfactory peduncle short, covered dorsally by truncated frontal poles of hemispheres. Rhinal fissures distinct only posteriorly, pyriform lobes restricted in ventral view by ventro-lateral spread of hemispheres. Hemispheres relatively extensive, moderately convoluted; dorsally with sulci as recognised by Elliot Smith (1902, p. 198); ventro-laterally with prominent, oblique sulcus (sulcus F in Elliot Smith's terminology, and possibly equivalent to postsylvian sulcus of other orders). Hemispheres separated dorso-medianly by prominent impression of superior sagittal sinus; postero-laterally in contact with cerebellum; tentorial ridge feebly impressed, cut by prominent transverse sinus, continued by low antero-mesial ridge of petrosal. Cerebellum short, medianly with high, narrow vermis; laterally broad behind postero-lateral lobes of hemispheres; floccular projection variably developed; pons with slight elevation.

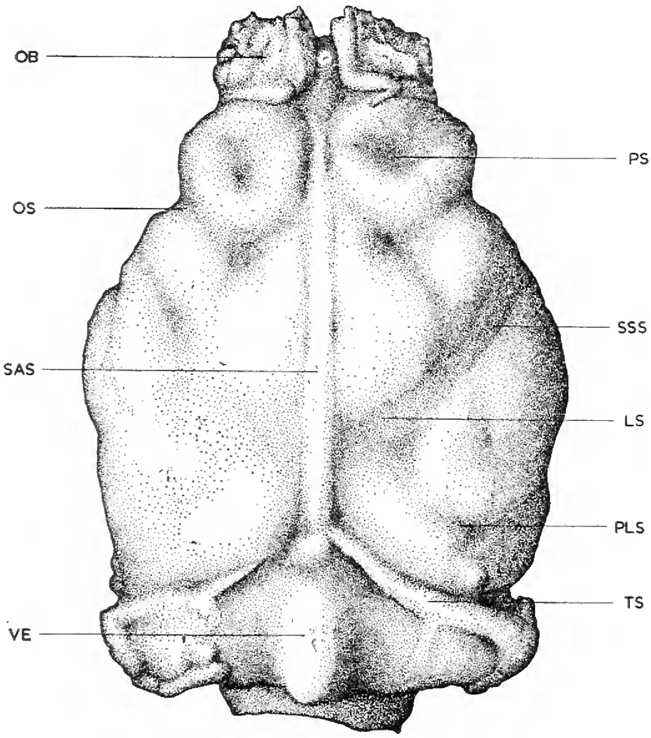
Cribriform plate well preforated for olfactory nerves. Olfactory lobes ventrally with impression of vessel traceable through canal to ethmoid foramen. Sella turcica shallow, posterior to exit of confluent optic, oculomotor, trochlear, ophthalmic and abducens; antero-medianly with small hypophysial fossa; laterally perforated for entrance of entocarotid artery, mesial to gasserian fossa. Gasserian fossa communicating posteriorly with slit in roof of eustachian canal as well as foramen ovale; flanked mesiad by groove, presumably for inferior petrosal sinus, terminating posteriorly at jugular foramen, communicating with entocarotid canal in one specimen. Internal auditory meatus piercing petrosal near antero-mesial margin. Short lateral groove, for glosso-pharyngeal, vagus and spinal accessory, passing below petrosal to jugular foramen. Internal condylar foramen for hypoglossal slightly postero-ventral to this, communicating with jugular foramen and condylar foramina. Transverse sinus passing ventrally, posterior to petrosal, emerging at jugular foramen.

MANDIBLE.

Measurements.

| Specimen. | Depth of ramus posterior to $P_3$. | Length of crown of $P_3$. | Length of crown of $M_1$. | Angle between ramus and symphysial plane. | Angle between $I_1$ and base of mandible. |
|---|---|---|---|---|---|
| F. 745 .. .. | 50 | 40·7 | .. | 30° | 51° |
| F. 2927 .. .. | 44 | .. | 13·7 | 28° | 48° |
| F. 2929 .. .. | 44 (incomplete) | 39·3 | 13·2 (worn) | .. | .. |
| F. 748 .. .. | 37 | 35·3 | 11·9 | 30° | 48° |
| F. 2928 .. .. | 44 | 39·2 | 13·8 | .. | .. |

Rami strong, deep, diverging posteriorly at approximately 60°; longitudinal axes slightly convex laterally; symphysis not fused; symphysial plane short, sub-triangular, somewhat upturned; fossae subalveolaris deep, confluent; mental foramen prominent, ventral to anterior margin of $P_3$, and dorsal to junction of anterior margin and inferior surface of ramus at blunt angle; lateral alveolar walls of $P_3$ thinning, roots becoming exposed with age, with simultaneous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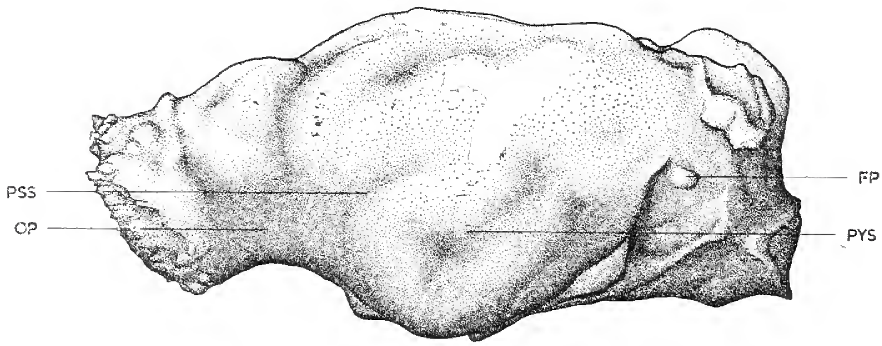
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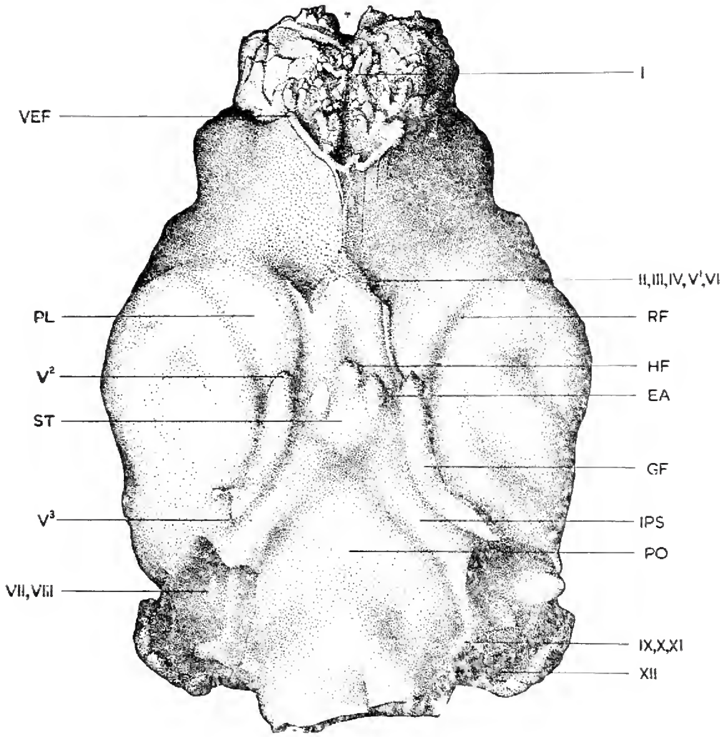


Figure 4.—*Thylacoleo carnifex* Owen. Dorsal, lateral, and ventral views of endocranial cast prepared from F. 744 (Q.M.); natural size.

*EA*, entocarotid artery
*FP*, floccular projection
*GF*, gasserian fossa
*HF*, hypophysial fossa
I–XII, cranial nerves
*IPS*, inferior petrosal sinus
*LS*, lateral sulcus
*OB*, olfactory bulb
*OP*, olfactory peduncle
*OS*, orbital sulcus
*PL*, pyriform lobe
*PLS*, postlateral sulcus
*PO*, pons
*PS*, prorean sulcus
*PSS*, pseudosylvian sulcus
*PYS*, postsylvian sulcus
*RF*, rhinal fissure
*SAS*, superior sagittal sinus
*SSS*, suprasylvian sulcus
*ST*, sella turcica
*TS*, transverse sinus
*VE*, vermis
*VEF*, vessel passing to ethmoid foramen

development of inter-rootial depression. Ramus ascending at low angle posterior to smooth, feebly developed diagastric process, ventral to $M_2$; post-alveolar ridge not prominent, ascending gradually, disappearing on mesial wall of large coronoid process. Process diverging from line of ramus, directed antero-posteriorly; antero-dorsal margin ascending at about 45°, grooved, laterally flanged: flange continuing ventrally on body to ramus, limiting large ectocoronoid fossa anteriorly. Wall of fossa with ridges ascending posteriorly; ventrally perforated by two or three small masseteric foramina opening into inferior dental canal, close to mandibular foramen; postero-ventrally limited by prominent angular process, posterior to which ramus rises steeply to condyle. Condyle broad, nearly transverse, low, without neck; articulating surface postero-dorsally rounded; mesially with a narrow anterior projection. Postero-mesial angle of ramus broadly inflected, thickened and rugose at margin; pterygoid fossa very deep, produced laterally.

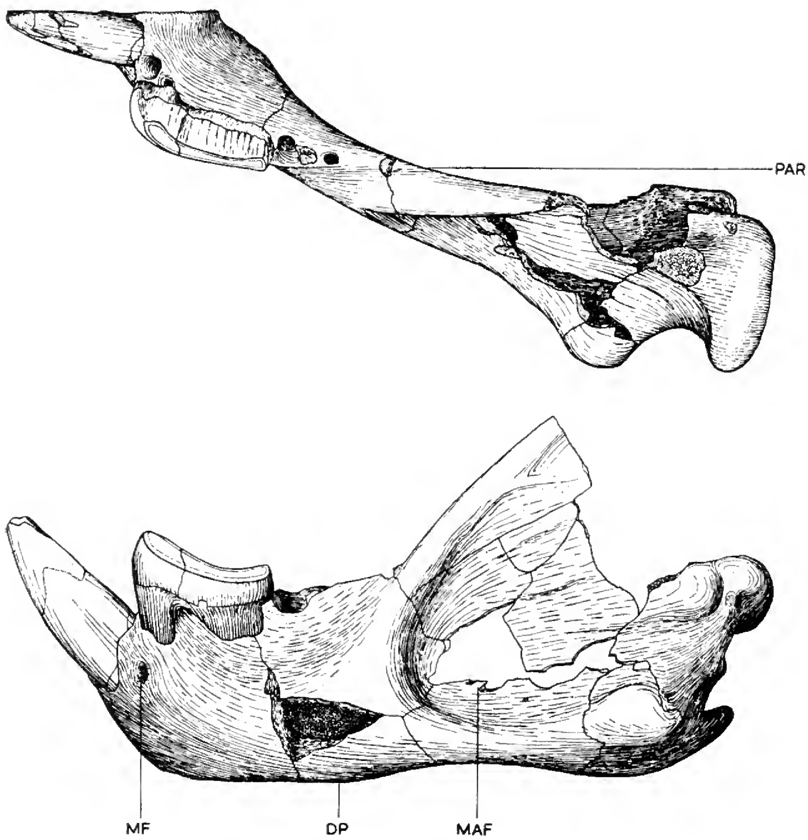


Figure 5.—*Thylacoleo carnifex* Owen. Occlusal and lateral views of left ramus, F. 745 (Q.M.); half natural size.

*DP*, diagastric process
*MF*, mental foramen
*MAF*, masseteric foramina
*PAR*, postalveolar process

DENTITION. $I\frac{3}{1}$ , $C\frac{1}{0}$ , $P\frac{3}{3}$ , $M\frac{1}{2}$.

Median upper incisors large, strong, curved, laterally compressed, convergent, in contact distally, with mesial facet of wear on enamel ; crown sub-quadrantal in section, tapering distally, tips blunted by wear often involving fracturing ; posteriorly grooved by movement of $I_1$ ; enamel most extensive labially, postero-laterally produced to low flange ; roots open, compressed oval in section. Second incisor small, directed antero-mesiad, with lingual facet of wear. Third incisor larger, incomplete in specimens examined ; alveolus postero-lateral to that of $I^2$. Canine small, posterior to $I^3$ ; crown tapering, obliquely compressed, labially convex, lingually flattened, not descending to level of $I^2$ ; not functional, but occasionally damaged. First and second premolars smaller than C, set almost transversely between C and $P^3$ ; crowns ovate, blunt, not functional, often lost during life. Third premolars exceedingly large, sectorial, subparallel, with axes slightly convergent anteriorly ; deeply rooted ; anterior root longer, convex laterally ; posterior root directed ventro-mesiad, so crown moves in this direction during growth. Crown vertically ridged ; enamel thickened to flange on anterior edge ; widest below anterior root ; trenchant, asymmetric, with longitudinally concave labial face at much lower angle with horizontal than lingual ; main surface of wear near planar, developed dorso-mesial to cutting edge by shearing with $P_3$ and $M_1$ ; making angle of approximately 60° with horizontal, decreasing in aged individuals ; direction of movement indicated by slightly oblique surface scoring, paralleling posterior ridge due to passage of junction of $P_3$ and $M_1$ ; enamel also removed lingually at margin of crown by contact with labial side of $P_3$ at ultimate occlusion. Molar series reduced to $M^1$ ; small, set obliquely, postero-mesial to $P^3$ ; trapeziform in outline ; paracone predominant ; metacone reduced ; lingually low, with fine anastomosing ridges ; functional as stop for $M_1$, with facet of wear developing on antero-mesial surface ; tri-rooted with larger roots implanted above cusps ; other smaller, variably developed, set slightly antero-mesial to axis of tooth.

Median lower incisors similar to upper, but more compressed, less curved, making an angle of approximately 50° with base of mandible ; converging at much lower angle, approximated at tips, with development of mesial facet of wear ; tip passing posteriorly to $I^1$, blunted by wear, but not commonly fractured ; dorso-lateral flange of enamel worn by indirect attrition with $I^2$ and $I^3$. First and second premolars not retained in any specimen examined ; alveoli small, shallow, mesiad to anterior root of $P_3$. Third premolar shorter than $P^3$, sectorial, deeply rooted ; roots directed somewhat dorso-laterally, so crown moves in this direction during growth ; crown with enamel vertically ridged especially on lingual surface, thickened to flange on anterior edge ; asymmetric, with longitudinally convex labial face set at much higher angle with horizontal than lingual ; main surface of wear near planar, developed ventro-lateral to cutting edge by shearing with $P^3$ ; enamel also removed labially, at margin of crown, by contact with lingual side of $P^3$ at ultimate occlusion. Molar series reduced ; $M_1$ small, subtriangular, anteriorly with metaconid high, flanged, with short longitudinal cutting edge in functional continuity with that of $P_3$ ; posteriorly reduced, medianly with narrow, finely ridged area ; developing facet of wear in continuation with that of $P_3$, and another directed postero-laterally due to movement against $M^1$ ; bi-rooted, anterior larger. Second molar very small, functionless, single rooted, often lost during life.

No deciduous teeth are present in any specimen.

## DISCUSSION.

The reduced state of the molar series is a unique feature of this phalangeroid marsupial. Of the premolars, the third is exceedingly large, while the others are small, functionless, and telescoped in the tooth row. These dental characters may be correlated with the relatively short rostrum, which together with the width of the temporal fossae imparts to the skull a broad subtriangular outline resembling those of some of the larger aeluroid carnivores.

The upper median and lower incisors form two laniariform structures, which, while formidable, lack the efficiency of the large canines of dasyuroid marsupial and eutherian carnivores. Anderson (1929, p. 45) has described the upper median incisors as blunt tusks, but examination of his figure of the young individual (pl. 19) does not support his statement. The tips of the lower incisors were fractured less commonly than those of the upper median incisors ; they passed behind the former in occlusion, and were attached to a less rigid structure. Anderson has claimed that the incisors meet at an angle approaching 90°, but as shown in the restored profile (fig. 6), the curved axes meets at a much greater angle. Krefft (1872, p. 181) recognised the median facet of wear at the tips of the lower incisors and concluded that the rami were loosely attached. However, the occurrence of a similar facet between the upper median incisors nullifies argument based on this observation.

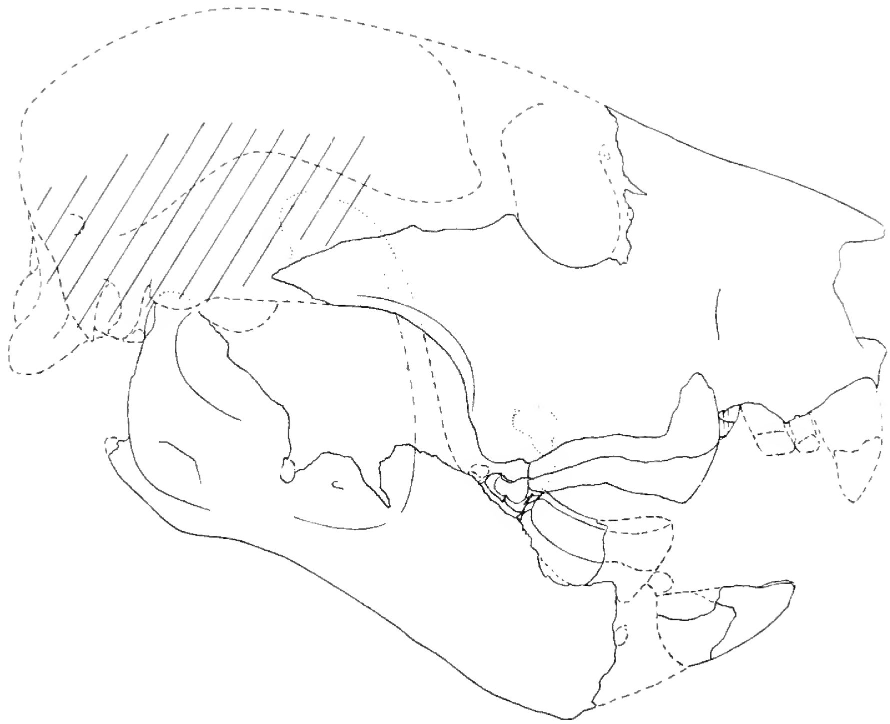

Figure 6.—*Thylacoleo carnifex* Owen. Restored profile of skull, based on F. 754 (Q.M.) and F. 2927 (Q.M.), with the area of the cerebral cavity cross-hatched ; half natural size.

Much has been written about the third premolars, but evidence of the relative motion of the teeth, afforded by the surfaces of wear, has not been examined. The slightly oblique posterior ridge on the upper tooth was made by the junction of the lower third premolar and first molar by upward and slightly forward movement in the arc of closure of the mandible. The development of this structure and the parallel scoring on the facets of wear on the teeth shows that they were opposed in a shearing movement and, contrary to the suggestion of Anderson (p. 43), there could have been no propalinal or rotational motion of the mandible. The upper third premolar is opposed to the lower third premolar and first molar, and they resemble the upper and lower carnassials of some of the eutherian carnivores. This structural convergence is continued in the disposition of the upper first molar, which functions as a stop for for its lower homologue and prevents propalinal motion.

In measuring the attitudes of the facets of wear on upper premolars, it is impossible to obtain comparable results unless sufficient of the skull is preserved to assure uniform orientation. For similar measurements involving lower premolars, the mandibular remains must be oriented in the position of occlusion. Results suggest that an angle of approximately 60° with the horizontal was maintained during much of adult life, before it decreased in aged individuals. Teeth opposed during life wore at the same angle. Gill (1954, p. 20) makes a statement to the contrary but his remarks are based on an upper left tooth opposed to a right lower tooth reversed (pl. 4).

Growth of the oblique roots of these premolars had the effect of moving the cutting edge of the upper premolar ventro-mesiad and that of the lower premolar dorso-laterally. This balanced the effect of wear and tended to keep the cutting edges opposed vertically at the commencement of occlusion so that the bite involved an efficient shearing motion. Furthermore, the facets of wear formed by the mutual attrition of the teeth were kept at a moderately high angle and the resultant cutting edge was sharp. The progressive exposure of the roots of these teeth with age, and the simultaneous development of an inter-rootial fossa were due to the growth of roots and the closure of the alveolus between them, following the emergence of the crown.

Additional structural convergence with some of the aeluroid carnivores is exemplified in the disposition, relative to the temporal fossa, of the shearing teeth at occlusion. The longitudinal axes of the teeth tend to lie in the plane of the coronoid process which bisects the fossa, and the zygomatic arch anteriorly joins the skull in the region of implantation of the roots of the upper tooth. Shearing, therefore, is activated by a relatively efficient lever, and the skull is also locally strengthened to resist the confined reactionary stresses transmitted by the upper tooth.

An extensive area of attachment existed for the apparently powerful temporal muscle. The masseter muscle, with the exception of the superficial layer, was also well developed. The ventro-lateral groove on the jugal is reduced and the ventrally projecting boss of the maxilla, usually conspicuous in phalangeroid marsupials, is absent. The areas of attachment for the pterygoid muscle indicate that the medial pterygoid, especially, was well developed. No satisfactory explanation of this structure is proposed; clearly, there was no rotational movement of the mandible, but the fact that the lower sectorial teeth lie mesiad to the upper teeth at ultimate occlusion indicates that there was a component of movement in this direction. It is possible that the pterygoid muscle balanced the action of the masseter in the control of this movement. In the temporomandibular joint, mesial movement of the condyle was limited by the wall of the fossa which otherwise reflects the phalangeroid affinities of the genus, and among living forms, resembles most closely that of *Phascolarctos*. The significance of the structure of the condyle was discussed by Owen (1888, p. 2).

As in *Phascolarctos*, the tympanics are small, not transversely elongated and not united extensively with the surrounding elements to form the floor of much of the meatus. Instead of the bullate pretympanic expansion of the alisphenoid, there is a rather similar structure formed by the mesial extension of the squamosal. In this feature the resemblance exists with the Phascolomidae. Of the auditory ossicles, only the stapes is preserved and its simple fused columelliform structure recalls those of *Phascolarctos* and *Phascolomis* as figured by Doran (1879, pl. 64).

In his examination of endocranial casts from marsupials Gervais (1869, p. 236) made a generalized comparison between those of *T. carnifex* and *P. ursinus*. Elliot Smith (1902, p. 189) extended that comparison with a survey of the indications of dorsal sulci on the cast, but he does not mention the prominent impressions of the superior sagittal and transverse sinuses. These impressions, although less conspicuous, are also recognisable in skulls of Phascolomidae. They suggest that the tissues superficial to the brain were thin.

Owen (1871, p. 263) concluded some of his remarks on *Thylacoleo carnifex* with the statement that "a great proportion of the fair edifice of Palaeontology still rests upon a scaffolding of wise and well-founded conjecture." That the animal was carnivorous is still unproved, but on an analysis of the morphology I consider that this conjecture is well founded. Owen (1871, p. 246; 1888, p. 2) and Bensley (1903, p. 203) both recognised this example of the adaption of the diprotodont dentition for a carnivorous function. That the dental specialization would function efficiently in this way has been questioned by Anderson (p. 45) who pointed out the lack of a transverse incisor row for the stripping of flesh. This argument may be countered by reference to felines with large carnassial teeth which, as Owen (1871, p. 242) mentions, are applied to food when the mouth is turned sideways. Furthermore, he stresses the absence of a cingulum on the premolars and molars, but the inclination of the crowns of the teeth in question is such that any bone splinters would be readily diverted from the gums. It cannot be expected that the replica of structures of an eutherian carnivore will be observed in a phalangeroid marsupial, even if they involve functional similarity. Study of the post-cranial skeleton may help solve the problem of whether *Thylacoleo* sought live prey or was a carrion-feeder. Both types of food would have been readily available during the Pliocene and Pleistocene, and indeed, the marsupial fauna would have been markedly unbalanced if the large herbivorous diprotodontids sustained carnivores no larger than *Thylacinus*. If *Thylacoleo* is included with the carnivores, it does not appear likely that it would be reduced to chewing the bones left by more active predators. Every carnivore encounters some bone in its diet, and the evidence of occasional damage to the functionless canine and anterior premolars of *Thylacoleo*, suggests that hard and irregular objects passed beneath its palate.

Nothing is known of the phylogeny of *Thylacoleo carnifex*. Described specimens are believed to be of Pleistocene age and in view of the specialization of many features of the species, inferences based on comparisons with other Quaternary marsupials must be generalized if they are not to be erroneous.

## A NOTE ON FRAGMENTARY REMAINS OF *THYLACOLEO* FROM THE CHINCHILLA FORMATION.

The Chinchllla Formation of the north-western Darling Downs, differs lithologically and palaeontologically from the superficial fluviatile deposits of the south-eastern Downs, and appears to be older, possibly of Pliocene age. Fossil remains are usually harder and more mineralized than material preserved in the beds to the south-east. Bone is usually lustrous, but occassionally exhibits limonitic staining. The stratigraphic distinction of the beds was discussed with Dr. R. A. Stirton, of the University of California, during his recent visits to Australia, and he, too, was impressed with the differences noted.

In maxillary fossils, no difference is apparent in the third premolar, and the preservation of the material does not allow any comparative series of measurements to be made. Two specimens display the first molar more distinctly tri-rooted and the base of the crown wider than in the later forms.

Mandibular remains differ in that the longitudinal concavity of the mesial side of the ramus is less pronounced and the ramus is wider in the region of implantation of the first molar. The third premolar is only well preserved in two individuals, and they indicate that this tooth is relatively broader posteriorly and displays a stronger longitudinal convexity on the labial side. The posterior root of the first molar is wider, and in two specimens which are without data but have the characteristic preservation of the Chinchilla fauna, the posterior part of the crown of the tooth is comparable with the size of the root and exhibits a much wider median ridged area. The second molar is rarely preserved. It is variable in development, but appears to be stronger and the alveolus is partially divided by a vertical ridge on the lateral wall. In a large specimen, there is a depression immediately posterior to the relatively large second molar. This is interpreted as the alveolus of a very small third molar.

It appears that the thylacolean population of the Chinchilla Formation, while showing considerable variability in its dental characters, differs from typical representatives of *T. carnifex* in that the molar series is less reduced both in size and numbers. This is precisely what would be expected after considering the suggested time relationship of the faunas, and a specific distinction may have to be recognised.

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# NOTES ON SOME AUSTRALIAN SNAKES.

S. B. Gunn.

Queensland Museum.

Several species of Australian snakes are confined, or almost confined, in distribution to the State of Queensland. Little has been recorded about most of these forms.

The collections of the Queensland Museum have expanded considerably in recent years, and many specimens have been added of species formerly scarce in collections. Notes on four of these are provided.

## **DENISONIA DAMELII** (Gunther).

*Hoplocephalus damelii* Gunther, Journ. Mus. Godeffroy, 12, 1876, p. 46.

Range in Queensland.—From about Rockhampton, mid-east Queensland, south to the vicinity of the Queensland-New South Wales border, and west within these limits for approximately 200 miles.

Specimens Examined.—9 from the following localities. Rockhampton, mid-east Queensland ; Oakey, Jandowae, Warra, Dalby, Darling Downs District of south-east Queensland ; Forest Hill, south-east Queensland.

Scale Count.—Scales always in 17 rows ; ventrals 148–162 ; anal divided ; subcaudals 31–44 single.

Maximum length of specimens in the collections is 578 mm.

Colour pattern shows little variation. The dorsal surface is dark olive grey or brown, the head darker or black. Ventral surface either cream or cream spotted with grey. In one specimen the hind edges of the ventral scales are grey, and in another, there is an irregular grey stripe in the centre of the ventral surface.

A specimen from Forest Hill, south-east Queensland, has a small, irregular, sub-triangular shield between the frontal and prefrontals. Another example from Warra, Darling Downs, south-east Queensland, has an irregular frontal with an angular bend on each lateral margin.

The only specimen recorded outside the range given is an example collected at Mount Harris, 30 miles north-west of Nyngan, central New South Wales, Kinghorn (1942, p. 120).

### PSEUDECHIS COLLETTI Boulenger.

*Pseudechis colletti* Boulenger, Ann. Mag. Nat. Hist., ser. 7, 10, 1902, p. 494.

RANGE.—Western Queensland, extending from Julia Creek in the north-west to Hughenden, and south to Charleville.

SPECIMENS EXAMINED.—17 from the following localities. Julia Creek, Maxwelton, north-west Queensland; Richmond, Hughenden, Telemon Station, 30 miles north-west of Hughenden, central north Queensland; Aramac, Whitewood, Barcaldine, Longreach, Dartmouth, central Queensland; Charleville, south Queensland.

SCALE COUNT.—Scales always in 19 rows; ventrals 218–230; anal divided; subcaudals 57–64, majority single, the last 1–14 paired.

Maximum length of specimens in the collections is 1898 mm.

The colour of *Pseudechis colletti* shows considerable variation. The dorsal surface may be medium brown, pink or red, with irregular broad, dark brown or black bands. Many of the lighter scales are dark tipped. The head and neck are dark brown dorsally with a median stripe of lighter colour about one scale wide extending for ten scales along the neck. The ventral surface may be cream, pink or bright red, the scales edged or blotched with dark grey. A damaged specimen received from Dartmouth, central Queensland, is predominantly bright red in colour, and this colour has been retained although the specimen is preserved in spirit.

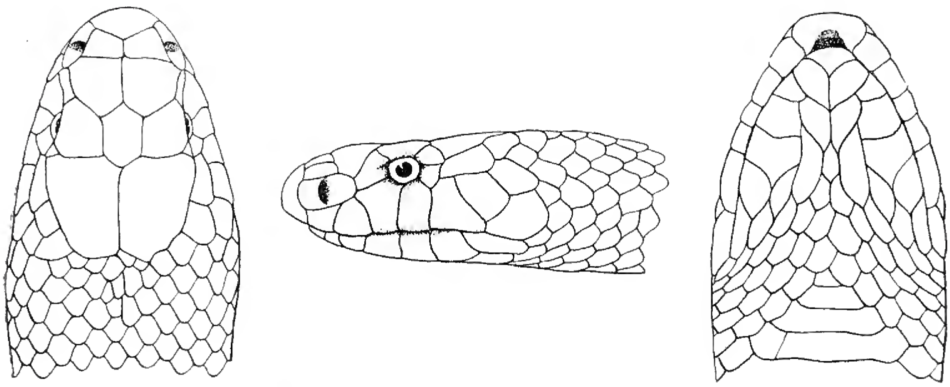

Figure 1.—Head of *Pseudechis colletti* Boulenger. Natural size.

Boulenger described the frontal as not longer than the prefrontals, but in all specimens examined, the frontal shield varies from just slightly to one and one third times longer than the prefrontals.

Specimens of *Pseudechis colletti* have previously been scarce in collections and little information has been recorded. For many years this species was believed to attain a length of about three feet (900 mm.), but specimens in the collections measure from 965 mm. to 1898 mm. The latter measurement is the length of a specimen received alive from Central Queensland in 1953. It was subsequently photographed and cast for display purposes.

Other specimens of *P. colletti* were recently recorded by Mackay (1955, p. 20).

## DEMANSIA GUTTATA Parker.

*Demansia guttata* Parker, Ann. Mag. Nat. Hist., ser. 9, 17, 1926, p. 668.

RANGE.—A restricted area of western Queensland, from Julia Creek in the north-west to Quilpie in the south.

SPECIMENS EXAMINED.—20 from the following localities. Julia Creek, Maxwelton, north-west Queensland; Corfield, Longreach, Stonehenge, Isisford, central Queensland; Quilpie, south Queensland.

SCALE COUNT.—Scales in 21 rows; ventrals 191–213; anal divided; subcaudals 51–58 pairs, (in one specimen 13 single and 42 pairs).

Maximum length of specimens in the collections is 1244 mm.

In some specimens the colour of the dorsal surface varies from pale brown to reddish tan, often with thirteen large, dark brown blotches, two of which are on the tail. Others are irregularly flecked with dark brown, generally with only one dark blotch behind the head. The colour of the ventral surface varies from uniform cream or light brown to bright orange-pink.

Kinghorn (1931, p. 86) figured a specimen in the collections of the National Museum, Melbourne, which had only 19 rows of scales. It was collected at Avon Downs, mid-east Queensland (approximately 140 miles from the coast), a locality far to the east of the range of all other specimens collected.

**DEMANSIA NUCHALIS** (Gunther).

*Pseudonaja nuchalis* Gunther, Cat. Colubr. Snakes Brit. Mus., 1858, p. 227.

*Diemenia carinata* Longman, Mem. Qld. Mus., 3, 1915, p. 31.

Range in Queensland.—Throughout the State.

Specimens Examined.—40 from the following localities. Stannary Hills, Charters Towers, north-east Queensland; Carl Creek, Julia Creek, north-west Queensland; Longreach, Barcaldine, Jericho, Jundah, Yaraka, central Queensland; Adavale, Quilpie, Birdsville, south-west Queensland; Charleville, Wyandra, Cunnamulla, Sunnybrae, Yuleba, St. George, Gradule, south Queensland; Eidsvold, Kingaroy, Pittsworth, Stradbroke Island, south-east Queensland.

Scale Count.—Scales always in 17 rows; ventrals 162–222; anal divided; subcaudals 37-61 pairs.

Maximum length of specimens in the collections is 1689 mm.

It is clear from an examination of forty specimens, including the type and ten others previously identified as *carinata*, that *Diemenia carinata* Longman is conspecific with *Demansia nuchalis* (Gunth.). The main character cited by Longman when describing his species was that " this snake has the remarkable keeled ventral scales of *Hoplocephalus stephensii* and *bitorquatus*." This is incorrect. In the genus *Hoplocephalus* the ventrals are angulate and notched laterally. In the type of *carinata*, the ventrals are angulate, but they are not notched. The type is preserved in a partly collapsed condition.

In his description of *Demansia nuchalis*, Gunther stated that the belly is flat, and while this character is present in all specimens examined, the extent of the flattening, and consequently the angle of the keel produced at each side of the ventral scales, are not constant. In the majority of specimens the ventrals are conspicuously keeled, while in a few, the keeling is just evident. This variation was noted by Thomson (1935, p. 729).

The condition of the nasal shields is variable. In the majority of specimens the nasal is completely divided; in one, both nasals are semi-divided; in another, there is one divided and one entire nasal; while in the type of *carinata*, the left nasal is entire but notched below, and the right nasal is completely divided. Longman gave both nasals as entire but notched below.

The colour of the larger specimens is light to medium brown or tan on the dorsal surface, with darker flecks, sometimes forming narrow, irregular bands, or with ten to fifteen broad, dark blotches, the last three on the tail. In the latter, there may be three narrow bands about one scale wide between the darker blotches. The head and neck are usually dark brown, but in a specimen examined from Charters Towers, north-east Queensland (not in collections), this area was black, and the colour extended for fifteen scales behind the neck and on to the edges of the ventrals. Ventrals cream, or cream with grey, brown or pink spots. In one specimen, the ventrals are cream edged with brown.

Juvenile examples up to about 450 mm. in length have dark patches on the head and neck ; remainder of the dorsal surface light brown, speckled with dark brown or with two to eight narrow, dark bands on the body, and one to three on the tail ; ventral surface uniform cream, or cream spotted with grey or brown.

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# FIRST RECORD OF THE FAMILY LEPTOPODIDAE (HEMIPTERA) FROM AUSTRALIA.

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This article reports the occurrence of the shore-bug family Leptopodidae in Queensland, Australia, heretofore unknown from the Australian Region. I am indebted to Dr. T. E. Woodward, University of Queensland, Brisbane, for kindly sending me the specimens for study. The type and allotype are deposited in the Queensland Museum.

## VALLERIOLA WILSONAE sp. nov.

Moderately large, slender, blackish with a few pale markings as noted along with structures. Length, 3·90 mm.; width, 1·25 mm.

Head strongly convex between eyes, with a median longitudinal furrow in front of ocellar tubercle, black with apical margin of front, two large calluses (one on each side) on anterior part of vertex and a quadrate spot back of ocelli flavotestaceous, clothed with suppressed pale pubescence, armed on each side with three, extremely long, slender, laterally-projected, whitish testaceous spines ; gula, lora and juga flavous, the former clothed with rather long hairs ; ocelli small, slightly separated, placed on top of a low tubercle, each slightly sloping downward laterally ; eyes extremely large, slightly convergent anteriorly, placed on the end of large tubercles, pale fuscous with darkened areas. Rostrum pale testaceous with last two segments dark fuscous ; segment I longest, flattened and slightly convex beneath, armed on each side with two slender, extremely long, laterally-directed, whitish testaceous spines ; II with one or two stiff, white hairs on each side ; measurements—I, 35 ; II, 25 ; III, 18. Antennae long, slender, blackish fuscous, nude save for tiny pubescence on terminal segment ; segment I short, stout, with one side testaceous ; II a little stouter than last two segments, much slenderer than I ; III and IV quite slender ; measurements—I, 25; II, 60 ; III, 120 ; IV, 95.

Pronotum strongly narrowed anteriorly, with fore lobe much narrower than hind lobe (52 : 95), slightly shining, black with a median longitudinal flavotestaceous streak on disc and on posterior margin of hind lobe, sparsely beset with rather long, fine, erect, pale hairs ; paranota very narrow, nearly of uniform width, slightly reflexed, fuscous with turned-up exterior margin blackish fuscous ; collar narrow, truncate in front, deeply and widely constricted behind collar forming a wide furrow which is very coarsely punctate (reticulate) at bottom ; fore lobe rather strongly tumid, impunctate, with a prominent, median, longitudinal furrow dividing it into right and left lobes ; hind lobe convexly elevated posteriorly, higher than front lobe, very coarsely punctate (reticulate), subequal in length to fore lobe and collar conjoined ; scutellum rather small, triangular, with base deeply impressed at middle, the basal width and median length subequal.

Hemelytra with veins and cells typical of the genus *Valleriola*, sparsely clothed with long pale hairs as on pronotum, slightly shining, black with apex and two subbasal marks in clavus, a short streak near the middle of inner corium, a small rounded spot in outer corium just opposite the rounded basal spot in fourth cell of membrane flavous ; membrane dark fuscous save basal spot in last cell ; embolium narrow, pale flavous, feebly widened basally, with a submarginal row of very slender, fairly long, erect, pale flavous, bristle like spines. Abdomen beneath dark fuscous with hind margin of segments testaceous. Acetabula becoming whitish towards inferior edge. Legs long, slender, sparsely, indistinctly pubescent, with all femora strongly tapering apically ; all tarsi testaceous with last segment blackish fuscous, the second segment much longer than the third. Anterior coxae and trochanters whitish testaceous, the former armed with three very long spines on front face ; anterior femora much stouter than other femora, whitish testaceous with long dorsal stripe beyond base and short (transverse) stripes on hind surface dark fuscous, armed beneath with two long rows of short, slender, closely-set, blackish fuscous spines. The posterior row also with four or five very long, slender, erect, whitish spines about equally spaced (sometimes one or two similar long spines in front row) ; tibiae slender, straight, testaceous, becoming brownish apically, armed beneath with a long row of slender, rather short, brownish spines, all of which are tilted apically ; femora longer than tarsi (130 : 92). Middle legs unarmed, slender ; femora whitish testaceous with a dorsal stripe and apical part fuscous or blackish fuscous ; tibiae slender, straight, testaceous with apical part brownish, subequal to femora in length (134 : 132). Hind legs longest, unarmed, colour and markings very similar to middle legs, the tibiae longer than femora (210 : 148). Measurements ; 80 units equal 1 mm.

Type (female, T5313) and allotype (male, T5314), Somerset Dam, south-east Queensland, 26–5–1952, collected by Miss M. Wilson, in whose honour the insect is named. Both in collections of the Queensland Museum. Paratype : 1 female (damaged), Tolga, Atherton, north Queensland, 20–5–1951, D. J. Tranter.

In size and general aspect, this species resembles *V. buenoi* (Usinger) of the Philippines, but is easily distinguished from it by the shorter fourth antennal segment, less tumid anterior lobe of pronotum and arrangement of the two flavous apical spots on the hemelytra.

# A NEW SPECIES OF THE GENUS MERANOPLUS.

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Melbourne.

## Subfamily MYRMICINAE Lepeletier
## Tribe MERANOPLINI Emery
## Genus MERANOPLUS Smith, F., emend. Mayr.

### MERANOPLUS TESTUDINEUS sp. nov.

Worker. Length of head dorsally 1·13 mm. ; Weber's length 1·13 mm. ; cephalic index 93 ; total length 4·15 mm.

Colour uniformly yellowish-red or orange, except for the eyes and mandibular teeth which are black. Mandibles smooth except for a few transverse striae. Scrobes smooth ; sides of head with a few transverse striae, but remainder of head microscopically densely reticulate with a few additional scattered shallow punctures. Dorsum of thorax, petiole, postpetiole and gaster microscopically densely reticulate. Sides of thorax with finer sculpture and some traces of transverse striae, while the posterior face of the postpetiole has traces of circular striae. Scapes and femora finely longitudinally stiate.

Hair long, pale reddish-yellow, suberect, scattered on head and body ; it is shorter on the upper surface of the head, scapes and legs, while on the funiculi it is denser and adpressed.

Head, excluding the translucent border, very slightly longer than broad, subcordiform, broadest across the occiput ; sides curved inwards at the posterior quarter and outwards again at the centre, so that the head is almost as broad across the centre as at the occiput. Anterior half of the head is narrowed with evenly convex sides. On each side of the head from the posterior corners to the clypeus is an evenly convex pale reddish-yellow, broad, translucent lamella, one-fifth as broad as occiput through which can be seen the distorted outline of the black eyes. The occipital border is concave and posterior corners rounded. Mandibles short, very curved, with five sharp black teeth, the apical longest. Mandibles concealed by clypeus, only visible when front of head is tilted. Clypeus subperpendicular to upper surface of head, transverse, anterior border concealed in dorsal view, but it is concave with anterior corners produced forward as blunt prongs, the posterior border faint. Frontal area indistinct ; frontal carinae represented by flattened lobes bordering the clypeus, each slightly longer than broad. Below the lamellate border, in profile view, can be seen the deep scrobe which holds the entire folded antenna. The scape extends almost to posterior border of head. Funiculi eight segmented ; first segment almost as long as three following together ; second and third as long as broad, equal in size ; fourth and fifth slightly larger ; apical three segments form a distinct club with apical segment almost equal to the two preceding. Eyes moderately large, hemispherical, placed below the scrobe at the posterior quarter of sides of head.

Thorax, excluding the translucent membrane, very irregular in outline ; including the membrane, it is almost twice as broad as long, slightly broader behind than in front ; anterior border feebly concave with anterior corners sharp, sides evenly convex curving into the posterior border which is slightly concave in the middle. No sutures on the dorsum. Between each anterior corner of prothorax and neck is an arc of translucent membrane. About the centre of the thorax on each side is a large oval of translucent membrane, separated from a smaller oval by a narrow, long, blunted projection from the epinotal region. Another oval of translucent membrane on the posterior border is almost enclosed by narrow curved projections from the posterior corners of the epinotum. Through the broad lamellate border extending behind the thorax can be seen the outline of the petiole. In profile, the dorsum of the thorax is feeble convex. Below the lamella the anterior corners of the prothorax are produced as short sharp spines. The posterior upper corner of the epinotum is produced in a longer spine which is partly covered by the lamella. About the middle of the declivity of the epinotum is a long, sharp, straight spine, over which spreads a triangular translucent lamella, partly concealing the profile view of the petiole and extending almost to the dorsum of the epinotum.

Upper border of petiole, viewed from above, is reduced to a transverse line ; in profile it is scale like with the anterior and posterior faces feebly convex and meeting at the blunt apex ; ventrally a short sharp spine is present. From the front, the node of the petiole is twice as broad as at the base, the upper border convex and without a trace of lamellae.

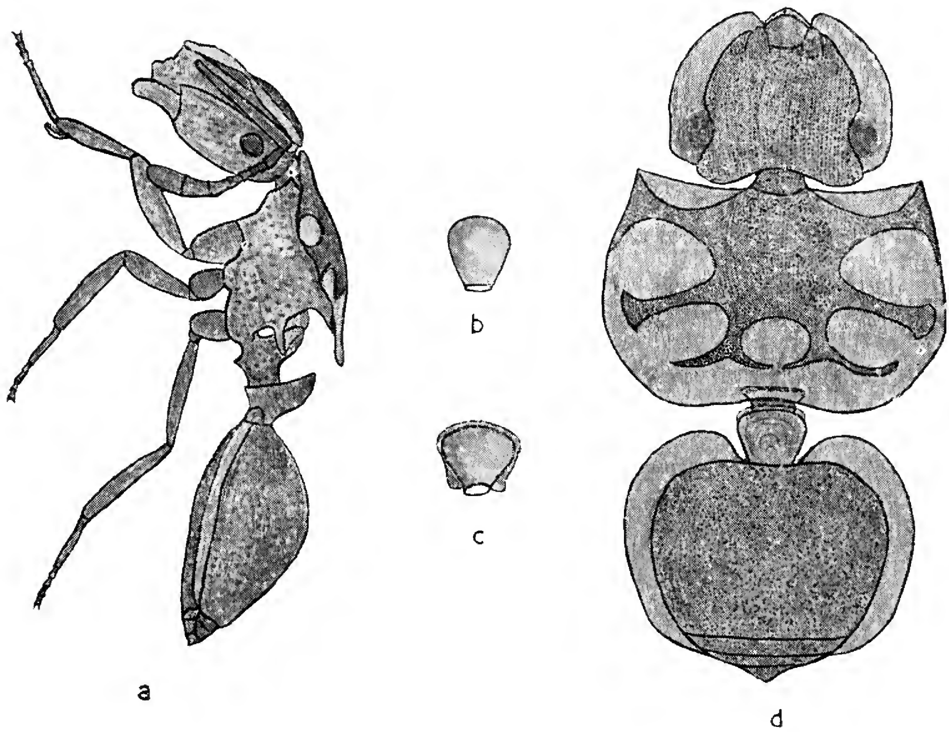



Figure 1.—*Meranoplus testudineus* sp. nov.

a. Lateral view of worker. b. Petiole ; node viewed from front. c. Postpetiole ; node viewed from front. d. Dorsal view of head and body.

Postpetiole similar to petiole in size, but from above, the posterior face can be seen giving the impression that the postpetiole is a large trapezium ; in profile, it is scale-like, a little higher than the petiole, with anterior face straight, the posterior face convex and meeting the anterior face at a sharp angle. From the front, the node of the postpetiole is similar to the petiole, but broader and bordered by a margin of translucent membrane. Gaster cordiform, consisting mostly of the first segment ; sides bordered by a broad translucent lamella. Legs slender and comparatively long ; tibiae of the anterior pair with large pectinate spurs.

LOCALITY.—Port George the Fourth, north-western Australia. Collected by H. Taylor.

MATERIAL.—Holotype worker (T5319), in collections of the Queensland Museum, Brisbane ; four paratypes in collections C.S.I.R.O., Canberra, National Museum, Melbourne, and collection McAreavey, Melbourne. These five workers show little variation in colour or size.

MEASUREMENTS OF FOUR PARATYPES.—Length of head, dorsally 1·00–1·13 mm., Weber's length 0·95–1·13 mm., cephalic index 93–95, total length 3·5–4·15 mm.

# A NEW SPIDER OF THE GENUS ARCHAEA FROM AUSTRALIA.

R. R. Forster.

Canterbury Museum, N. Z.

## Family ARCHAEIDAE.

## Genus ARCHAEA Koch and Berendt, 1854.

### **ARCHAEA NODOSA** sp. nov.

Holotype Female

Measurements (mm.)

Carapace. length 0·99, width 0·83, height 2·15

Abdomen. length 1·87, width 1·02

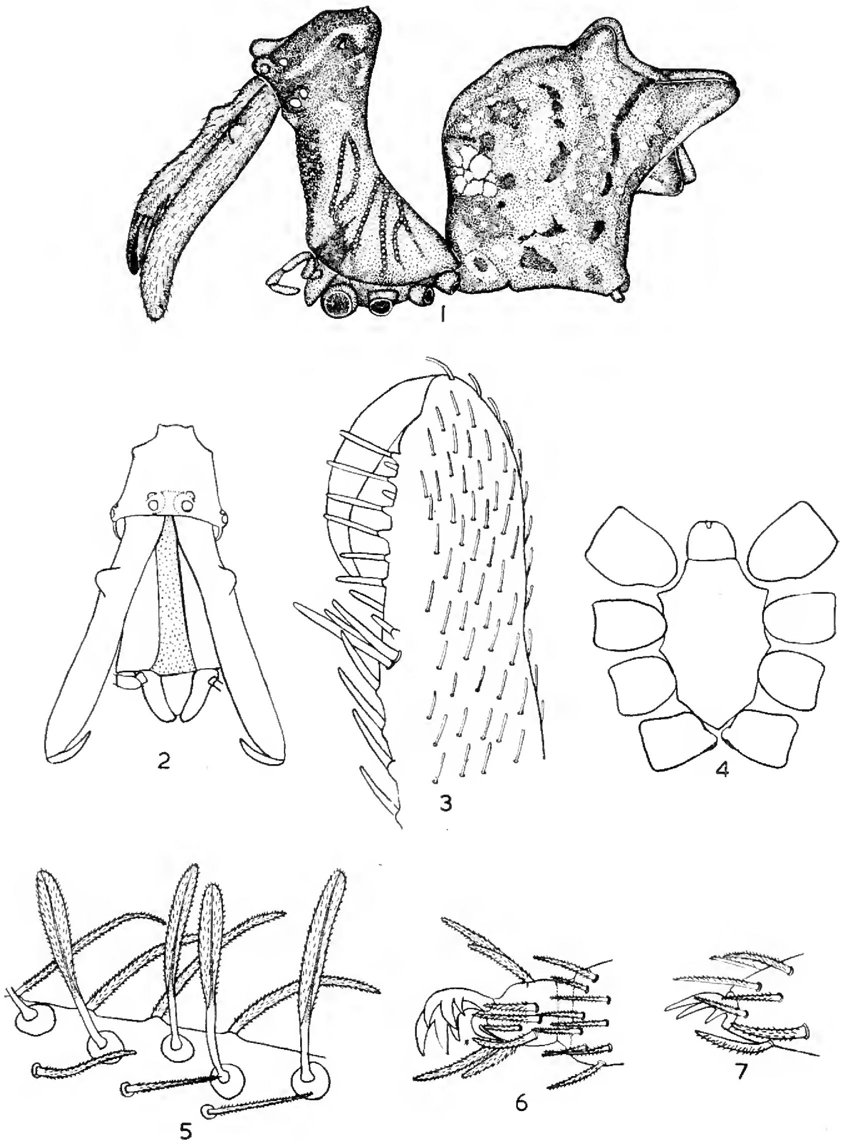
| | Fem. | Pat. | Tib. | Met. | Tars. | Total. |
|---|---|---|---|---|---|---|
| Leg 1 .. .. .. .. | 2·29 | 0·88 | 1·68 | 0·81 | 0·68 | 6·35 |
| Leg 2 .. .. .. .. | 1·48 | 0·27 | 1·17 | 0·52 | 0·40 | 3·85 |
| Leg 3 .. .. .. .. | 1·07 | 0·31 | 0·90 | 0·42 | 0·34 | 3·05 |
| Leg 4 .. .. .. .. | 1·49 | 0·33 | 1·02 | 0·51 | 0·39 | 3·75 |
| Palp .. .. .. .. | 0·29 | 0·12 | 0·33 | .. | 0·39 | 1·15 |

Chelicera. length 1·94

Colour. Chelicerae and carapace dark brown, with dark, almost black, markings on the carapace as indicated in figure 1. Abdomen mottled with areas of black and brown, which are broken up by paler circular patches. Two prominent white patches on the dorsal surface at about $\frac{1}{3}$ of its length, and a smaller pair at midway. Posterior portions of tubercles white with a thin overlay of reddish brown pigment. Legs with dark and pale brown bands; palp pale cream, but tibia dark brown.

Eyes. AME round and black, remaining eyes oval in shape and white. Ratio of AME : ALE : PME : PLE = 11 : 10 : 11 : 11. The AME and ALE are placed on mounds. The AME are separated from each other by 47/11 and from the ALE by 28/11 of the diameter of an AME. The lateral eyes are subcontiguous, separated by a distance equal to 3/11 of the diameter of an AME. PME separated from each other by 45/11, from the PLE by 20/11, and from the AME by 6/11 of the diameter of an AME. The median ocular quadrangle is wider in front than behind in the ratio of 18 : 17, and the depth is equal to 4/18 of the width in front. The clypeus is short, less than the diameter of an AME.

Carapace. Smooth, apart from rows of minute pustules extending from the base of the neck; these are continued on the anterior surface of the neck as shown in figure 1. Longer than wide at the base in the ratio of 8 : 7. Neck relatively stout, the width at the narrowest portion being almost equal to that of the carapace at the base. Height of head equal to $2\frac{1}{5}$ times the length of the carapace at the base. Dorsal surface of head slopes down anteriorly, with a pair of small tubercles near the posterior margin and a similar pair about $\frac{2}{3}$ of the distance back from and in line with the lateral eyes. There are numerous small white decumbent setae, which appear under high magnification to be somewhat flattened, spatulate and finely ciliate. Median portion of the anterior surface of the neck from the opening for the chelicerae to the base of the carapace is pale and appears to be only lightly sclerotised (figure 2).




Figures 1–7.—*Archaea nodosa* sp. nov.

1. Side view of female. 2. Front view of cephalothorax and chelicera (lightly sclerotised area stippled). 3. Distal portion of chelicera, prolateral surface. 4. Sternum and pedal coxae. 5. Ventral surface of tibia of leg 1, showing spatulate hairs. 6. Tarsal claws and onychium of leg 1. 7. Tarsal claw of pedipalp.

CHELICERAE. Long and slender, length equal to approximately 11/12 of the height of the carapace. The distal seventh is bent back towards the maxillae. There is a rounded boss on the dorso-lateral surface at 2/7 of the length of the chelicera from the base. Clothed with pale hairs similar to those on the carapace. Fang short but strong, with rod-like bristles on the promargin and a group of three or four around the proximal margin of the furrow (figure 3). A row of relatively strong bristles extends along the entire mid-prolateral surface. Close examination has failed to show the presence of stridulating ridges.

MAXILLAE. Longer than wide at base in ratio of 5 : 4, converging over the labium, with a weak distal scopula, but with well defined serrula. The palp appears to be inserted dorso-laterally near the base of the maxillae.

LABIUM. As long as wide at the base. Evenly rounded anteriorly, with a notch on the antero-median surface.

STERNUM. Longer than wide in ratio of 4 : 3. Shape as shown in figure 4, with a somewhat obtuse point on the posterior surface where it only reaches the anterior surfaces of the fourth pair of coxae, which almost touch in the midline.

LEGS. 1. 2. 4. 3. All segments finely granulate and clothed with finely ciliate hairs which are usually blunt apically and directed along the surface of the legs. On the ventral surfaces there are a number of hairs which are tapered distally. Double rows of spatulate hairs are present on the ventral surface of the metatarsus and tarsus of the front pair of legs ; each rises from a large pale circular area. They are swollen at the base and appear to have an evenly rounded. tubular proximal portion which may be hollow, and they are expanded and flattened distally, where there appears to be a thick median vein (figure 5). The distal spatulate portion is finely ciliated. Trichobothria are present in single rows on the dorsal surfaces of the tibia and metatarsus of each leg. They are distributed as follows. Leg 1. Tibia, one at midway and one at two-thirds, metatarsus, one subdistal. Leg 2. Tibia, one at one-third, metatarsus, one subdistal. Leg 3. Tibia, one immediately beyond midway, metatarsus, one subdistal. Leg 4. One at one-quarter and one at midway, metatarsus, one subdistal. There are also a few erect ciliate hairs on the tibiae of all legs which have the appearance of short trichobothria, but they are stouter and do not rise from a pit as do trichobothria. There are three tarsal claws, placed on a definite onychium. The superior claws are homogeneous with two long pectinations on the ventral surface (figure 6). The inferior claw is curved back close to the surface of the onychium and appears to be smooth. There are strong ciliate setae on the ventral surface, but these do not have the appearance of accessory claws.

PALP. Short, equal to one-half the length of the femur on leg 1 ; clothed with finely ciliate hairs, which are stouter on the disto-ventral surface of the tarsus where they might be termed serrate. Tarsal claw strong, similar in appearance to the superior pedal claws, with two strong pectinations (figure 7). Three trichobothria present on the dorsal surface of the tibia, one at midway, one at three-quarters of the length of the segment, and one subdistal.

ABDOMEN (figure 1). Clothed with white hairs similar in structure to the hairs on the carapace and chelicera. The most prominent feature is the three pairs of large conical tubercles on the dorsal surface, of which the median pair is the largest. The posterior pair on the holotype is set in a shallow depression, probably due to post-mortem shrinkage. The spinnerets are ventral ; anterior pair contiguous at base, large, broadly conical, of two segments ; posterior pair very small, difficult to distinguish. Presence of a median pair of spinnerets indeterminable. There appears to be no colulus or posterior spiracle present. The epigynum has no particular form and is not sclerotised.

TYPE. Holotype female (W.1955) in collections of the Queensland Museum, Brisbane. Legs and palp from right side mounted in polyvinyl alcohol on slide. Tallawallal, Lamington National Park, south-east Queensland, from moss near *Nothofagus*, 31–10–1955, T. E. Woodward.

## REMARKS.

The first archaeid spider recorded from Australia was described by Butler (1929) as *Archaea hickmani*, from a single female collected in Victoria. The second species *Pararchaea binnaburra* Forster was recorded recently (Forster, 1955) from south-east Queensland. The species described above clearly falls into the genus *Archaea* but would appear to be more closely related to the Madagascan forms than to the previously recorded Australian species *A.hickmani*, which appears to show some affinity with *A.godfreyi* Hewitt from South Africa. *A.nodosa* sp. nov. is separated from *A.hickmani* by the longer neck, the presence of large tubercles on the abdomen, the absence of any sclerotic plates on the abdomen and the presence of a strong claw on the tarsus of the pedipalp. Two structures described in the present species do not seem to have been recorded in any other. They are the strip of pale, lightly sclerotised integument between the chelicerae and the base of the carapace, and the double rows of spatulate hairs along the ventral surface of the metatarsus and tarsus of the first pair of legs. It is possible that the spatulate hairs could have been overlooked, as it is necessary to remove the appendages to examine them clearly, but it seems unlikely that the thinly sclerotised area between the cheliceral opening and the base of the carapace would have been overlooked, if present in other species.

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