COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

RECORDS 1958/105

SUMMARY OF ACTIVITIES, PALAEONTOLOGICAL LABORATORY BUREAU OF MINERAL RESOURCES, 1958

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During 1958, Bureau palaeontologists continued work on the determination of fossils for field parties and for Companies, and on the description of new species. A new field of activity was the work on microplankton.

The Bureau palaeontology group comprises Miss Irene Crespin, D.J. Belford, P.J. Jones, Dr. P.R. Evans, and F. Hadzel in micropalaeontology, and Dr. A.A. Öpik, G.A. Thomas, J.M. Dickins, Dr. J.J. Veevers and Miss J. Gilbert Tomlinson in macropalaeontology.

MICROPALAEONTOLOGY

The year 1958 has been an active one for the Micropalaeontology Group. Approximately 9,000 samples have passed through the laboratory, and the majority of them have been examined for microfaunas. Cores submitted from deep bores have received prompt attention.

The material has been submitted by geologists of the Bureau of Mineral Resources from Western Australia, Northern Territory, Queensland, Papua, New Guinea and Antarctica; by Australasian Petroleum Company in Papua; by Mines Administration Pty Ltd, Associated Australian Oilfields N.L. and Papuan Apinaipi Petroleum Ltd from Queensland and Papua; by Australian Oil and Gas Corporation from New South Wales and Queensland; by West Australian Petroleum Pty Ltd, from Western Australia; by the Division of Land Research, C.S.I.R.O., from New Guinea; and by the Geological Survey of New South Wales. Collections have also been submitted by the Bureau of Mines, Noumea, New Caledonia and by the Geological Survey of Fiji. Besides these large collections many small collections or individual samples numbering more than 1,400 have been examined. Micro-slides prepared from these collections have been labelled and for the most part, registered.

Many new and interesting discoveries have been made during the year. Miss I. Crespin has discovered, for the first time in Australia, foraminifera of Devonian age in beds of the Fitzroy Basin. D.J. Belford has described new genera of foraminifera from the Upper Cretaceous of Western Australia. The study of Palaeozoic ostracoda by P.J. Jones has given useful information for zonal purposes by this group of microfossils, in Western Australia. P.R. Evans has pioneered the study of microplankton in the Palaeozoic rocks of Australia and many interesting and rich assemblages have been discovered in cores from deep bores in Western Australia. The preparation of samples for subsequent micro-examination and the general care of the samples is carried out in a most satisfactory manner by F. Hadzel. He also prepared the illustrations in the Bulletin on Permian Foraminifera and the paper on the genus Hantkenina in Western Australia.

Miss Crespin completed the preparation of the Bulletin on "Permian Foraminifera of Australia" which was published in September. She has also completed a draft copy of the revision of Bulletin No.7 on Diatomite which was originally published in 1947. She attended the meeting of

ANZAAS in Adelaide in September as a deleg te from the Bureau and read a paper on "Permian Foraminifera in Australian Stratigraphy".

In addition to the Records listed below, Miss Crespin has prepared many short notes on samples not requiring lengthy reports.

The Records prepared are as follows:

Permian Foraminifera from the Irwin River area, Western Australia. Records 1958/19.

Recent Foraminifera from Shore Sands from Noumea, New Caledonia and other Islands in the Loyalty Group. Records 1958/25.

Foraminifera from rock samples from the Fiji Islands. Records 1958/31.

Micro-examination of further samples from Dural No.2 P.D.H., New South Wales. Records 1957/34.

Foraminifera in Australian Permian Stratigraphy. Records 1958/41.

Outcrop samples from Western Queensland. Records 1958/62.

Micropalaeontology of A.A.O. No.8 Bore, Karumba, North Queensland. Records 1958/93.

Publications

Permian Foraminifera of Australia. Bulletin No.48.

The Occurrence of Hantkenina in Western Australia. Micropalaeontology, 4 (3), 1958, 317-319.

D.J. Belford examined samples submitted by Bureau field parties (geological and geophysical), private companies engaged in oil exploration, and other organisations.

When time permitted, description and illustration of Upper Cretaceous foraminifera from Western Australia were carried out; this work is now nearing completion.

The following reports were prepared:

Micropalaeontological examination of samples from A.O.G. Scout Bores Nos. 1 and 2, Talbalba, Thallon Basin, Queensland. Records 1958/2.

Micropalaeontology of samples from Kaufana No. 1 Well, Papua. Records 1958/9.

Micropalaeontology of samples from the Yule Island, Lakekamu River and Popo areas, Papua. Records 1958/32.

Micropalaeontology of samples from the Surat area, Queensland. Records 1958/74.

Micropalaeontology of samples from the Kerema-Karova Creek and Malalaua-Saw Mountains areas, Papua. Records 1958/94.

The following two papers were also written during the year and submitted for publication overseas:-

1. Stratigraphy and micropalaeontology of the Upper Cretaceous of Western Australia.

2. The genera Nuttallides Finlay, 1939 and Nuttallina, n.gen.

P.J. Jones examined 150 surface samples collected from the Bonaparte Gulf and Fitzroy Basins, Western Australia for ostracods in an attempt to correlate the subsurface samples from which ostracods have been previously extracted. These samples were taken from rocks of Lower Carboniferous and Upper Devonian ages in the Fitzroy Basin, and rocks of Lower Carboniferous age in the Bonaparte Gulf Basin.

Core samples of the Upper Carboniferous Anderson Formation taken from the WAPET bore, Frasor River No.1 were examined, but no fossils were found. An examination of the subsurface samples taken from the recent WAPET bore, Meda No.1 has yielded Lingula, Isaura and foraminifera from cuttings of the Blina Shale, foraminifera and ostracods from cores of the Permian Noonkanbah Formation (examined by Miss I. Crespin), ostracods and brachiopods from the Lower Carboniferous Laurel Formation (also examined by Mr. G.A. Thomas), and brachiopods and ostracods from the Upper Devonian section (also examined by Dr J.J. Veevers).

The writing of the descriptions of the ostracod species found in the Lower Carboniferous rocks of Western Australia is now in progress.

The stratigraphical results of the examination of samples collected from the Fitzroy and Bonaparte Gulf Basins of Western Australia, have been recorded in a number of unpublished preliminary reports, viz.,

(i) B.M.R. Record 1958/26 - Preliminary report on micro-palaeontology of samples from the Bonaparte Gulf Basin.

(ii) Correspondence with Mr E.P. Utting, Chief Geologist of Westralian Oil Limited, on the stratigraphical results of the examination of material from the Bonaparte Gulf Basin, (Ref. BMR file 151/NTW/1, date 4/2, 23/7, 17/9).

(iii) Memoranda to the Chief Geologist on the examination of core samples from WAPET bore Meda No.1, dated 12/8 and 19/9.

Also brief comments were written on the latest unpublished report of Mr E.P. Utting, on the geology of the Burt Range area of the Bonaparte Gulf Basin, (Permit No.3 of Westralian Oil Limited).

The editor was assisted in the compilation of the index to the B.M.R. bulletin 48, "Permian Foraminifera of Australia". Also some time was spent on the organization of the Ellis and Messina Catalogue of Ostracoda.

P.R. Evams started the study of Australian microplankton. The aim has been to establish a succession of fossil microplankton assemblages within the Palaeozoic. The year has been occupied by the search for such assemblages while, at intervals, post-Palaeozoic samples have been examined and also empirical experiments conducted to reduce the time required to prepare concentrates of the organic contents within samples. Two hundred samples have been examined during the year.

The processing technique has been successfully modified to produce good concentrates from up to 12 samples in 2-3 days.

The systematic search for fossil plankton has been conducted successfully on sub-surface samples only. No surface sample has yielded plankton as yet, due, probably, to the highly oxidizing weathering conditions of Australia's climate and vegetation. Surface samples from the A.C.T., Queensland, Northern Territory and Western Australia have been processed with similar negative results.

The following samples from boreholes have been examined during the year:

Borehole	Age	No. Samples	Result
Yass No.1 (A.O.G.)	Silurian	14	Barren
Roebuck Bay No.1 (WAPET)	Mesozoic Permian ?Devonian(i) Ordovician	9	Plankton Spores Plankton Barren
B.M.R.3 (Prices Creek)	Ordovician	4	Cysts only
Dampier Downs No.1 (WAPET)	Ordovician	4	Barren
Samphire Marsh No.1 (WAPET)	Ordovician	7	Plankton
Goldwyer No.1 (WAPET)	Ordovician (ii)	10	Plankton
Dirk Hartog 17B (WAPET)	Silurian	12	Barren
Brickhouse No.1 (Water)	Indet. (iii)	1	Plankton
Meda No.1 (WAPET)	Permian Carboniferous Devonian	18	Plankton & Sporae Dispersae
B.M.R.4 & B.M.R.4A	Cretaceous (ii) to Permian	21	Plankton & Spores
B.M.R.5 (Giralia)	Mesozoic	2	Spores.

(i) The Thangoo Calcarenite contained a few plankton of Upper Ordovician age or younger, differing from known Australian Lower Ordovician plankton. They await comparison with dated Devonian forms.

(ii) Still under examination.

(iii) Samples from B.M.R. Museum collection labelled as if from the level of alleged Silurian (McWhae et al. 1958, Geol.Soc.Aust.Journ. p.30). Plankton appear Mesozoic in character, as also does the lithology.

MACROPALAEONTOLOGY

A.A. Öpik

Description of Cambrian faunas. The palaeontological text, text-illustrations, and plates (24 plates) were prepared for the Bulletin "Cambrian geology and palaeontology of the headwaters of the Burke River". It contains the description of 6 new genera, 24 new species, and 5 Scandinavian species; the total number of species is 55.

Description of the Cambrian trilobite Tricrepicephalus from the Cambridge Gulf region and from Queensland is in progress. It is an index-genus for a particular stage of the North American Cambrian.

Current work in palaeontology. Developing and study of Middle Cambrian faunas from north-western Queensland, and routine work in palaeontology and stratigraphy for field parties and oil exploration continued, also examination of bores, in collaboration with J. Gilbert-Tomlinson.

Field Work. A visit was paid to the Georgina party and the Jervois Range party to assist geologists in the field. Special attention was directed to the study of the Cambrian sequence in Queensland south of the 22nd parallel. In Canberra Dr. Öpik took part in mapping Palaeozoic rocks of the Australian Capital Territory.

Dr. Öpik attended ANZAAS meeting in Adelaide and convened the discussion on the Australian Precambrian Shield.

Papers. The paper "Tumblagooda sandstone tracks and their age" was prepared for publication.

Published

1. "Australian Cambrian Geology". B.M.R. Bull. No.49. Reprinted from Symposium on the Cambrian System, 20th Inter.Congr.
2. "The Middle Cambrian trilobite Centropleura in Queensland". Nature, vol.182, p.204, 1958.
3. "The Cambrian trilobite Redlichia: organization and generic concept". B.M.R. Bull. 42.

Unpublished "Cambrian succession in Queensland south of the 22nd parallel". Records 1957/95 (issued in 1958).

Discoveries. The Glandular anatomy of trilobites was elucidated: pleural caeca were discovered in several Cambrian genera owing to the exceptional preservation of Australian material.

Lectures. "The notion of the diversity of the Precambrian and Palaeozoic environments and the distribution of iron-ore formations in geological time" (B.H.P., Melbourne, 14.1.58).

"The boundary between the Cambrian and Precambrian" (Geological Soc., Canberra, 12.2.58).

"Geology of the outlier of lower Palaeozoic rocks in the Burke River and in the Selwyn Range" (Geol.Soc., Canberra March, 1958).

"The Australian shield in early Palaeozoic time" (ANZAAS, Adelaide, August, 1958).

"Dolomite formations - an interim review" (Geol.Soc., Canberra, 3.12.58).

Maps. Current work on compilation of 4-mile sheets: Lawn Hill, Camooweal, Mt. Isa, Urandangi, and Duchess.

Compiled Palaeozoic part of 10-mile map of north-western Queensland.

Compiled (for tectonic map) Palaeozoic part of 40-mile map of north-western Queensland.

G.A. Thomas

The 4th International Carboniferous Congress invited contributions to a questionnaire on Carboniferous problems. G.A. Thomas prepared a commentary, and the replies of other Australian contributors were collected and forwarded to the Congress at Heerlen. In addition two papers reviewing the Carboniferous stratigraphy of Western Australia and the Bonaparte Gulf Basin, Northern Territory were prepared and were sent to the Congress. These were read at the meeting in September by Mr. K.S.W. Campbell of the University of New England. Correlations proposed were based mainly on the work of Thomas on brachiopods, but studies of other workers were also incorporated with their permission.

A general report on macrofossils from the Bonaparte Gulf Basin was prepared and sent to Westralian Oil Ltd. Macrofossils were determined also from bores in Western Australia, notably - Wapet Meda No.1 and B.M.R. Muderong bores.

The proofs of Bulletin No.39 on the Permian Orthotetacea of Western Australia and of the explanatory notes of the Noonkanbah 4-mile geological map were checked. Both have now been published.

The world literature was read and fossils prepared, described and photographed for a bulletin entitled "Carboniferous and Early Permian brachiopods from Western and Northern Australia". This is well advanced. The work

will have about 27 plates and numerous textfigures. The stratigraphical conclusions have already been outlined in the papers sent to the Carboniferous Congress.

Specimens and photographs have been prepared for two further bulletins dealing with Devonian Spiriferaceans and Permian Spiriferaceans from Western Australia. This work is continuing. Excellent collaboration with Mr. J. Zawartko, photographer, has speeded up the photography of our extensive collections of Upper Palaeozoic fossils, the majority of which are undescribed.

J.M. Dickins

J.M. Dickins continued work on the upper Palaeozoic pelecypods of Western Australia. He is carrying out this work currently at the University of Queensland and has taken the opportunity to compare the Queensland sequences and faunas with the Western Australian.

J.J. Veevers

The manuscripts of Bulletins 45 (Devonian brachiopods from the Fitzroy Basin, Western Australia) and 55 (Devonian and Carboniferous brachiopods from north-western Australia) were sent to the Printer.

Two short papers, "Variation in Schizophoria..." and "Type species of Crurithyris..." were sent to the Editor of the Journal of Palaeontology.

As a Bureau delegate, J.J. Veevers attended the meetings and excursions of Section C of ANZAAS (Adelaide, August, 1958) and read a paper on "Fossil zones in the Devonian rocks of the Fitzroy Basin, W.A.".

Devonian brachiopods were determined in cores from Wapet Meda No.1.

Under the guidance of A.A. Opik, work was started on species of Redlichia and associated brachiopods from Queensland.

Joyce Gilbert-Tomlinson

Stratigraphical palaeontology. Collections were examined (in collaboration with A.A.O.) from the following sources:

Field parties in Northern Australia.
Resident geologist, Alice Springs.
A.C.T. regional survey.
West Australian Petroleum Pty Ltd.
Caltex, Queensland.

Results (stratigraphic; palaeogeographic)

Cambrian. Dresbachian (early Upper Cambrian) fossils were identified in central Australia for the first time - in the Waterhouse Range and in the Ross River valley. Faunas of this age are well known in Western Queensland and in the Cambridge Gulf area of Western Australia.

The known distribution of late Upper Cambrian (late Franconian and younger) faunas was further extended (to the west) by their discovery in the Ellery's Creek section, Western MacDonnell Range.

Ordovician. The late Tremadocian trilobite Dikelokephalina was identified (for the first time in Australia and in the Southern Hemisphere) in the Canning Basin, W.A. Its discovery is significant, not only for Australian stratigraphy and palaeogeography, but for its contribution to the knowledge of the world-wide distribution of late Tremadocian faunas.

The lower Ordovician ribeirioid Eopteria was identified in Australia for the first time (in the Ninmaroo limestone of western Queensland). It occurs in a molluscan fauna unique in Australia but comparable, in varying degrees, with faunas in southern Manchuria, Greenland, and North America.

Lower Ordovician graptolites were identified in the Samphire Marsh Bore, and Middle Ordovician graptolites in the Goldwyer Bore, W.A. Both are associated with shelly faunas not known in outcrop in Australia. The Goldwyer Bore also provides the only Australian record of the well-known trilobite Triarthrus.

Silurian. The genus Monograptus (several unidentified species) was identified in the Einasleigh area, northern Queensland. This is the first record of graptolites in Queensland.

Unpublished reports. "Lower Palaeozoic fossils in Samphire Marsh No.1 Bore, W.A. (Preliminary Report)". Records 1958/90.

"Middle Ordovician sequence in Goldwyer No.1 Bore, Western Australia (Progress Report)".

Paper. Prepared for publication a short paper "The lower Ordovician trilobite Dikelokephalina Brögger in the Canning Basin, W.A."