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REPORT No. 1949/81
(Pal. Ser. No. 9)

MICROPALAEONTOLOGICAL EXAMINATION OF ROCK SAMPLES
FROM THE GIRALIA AREA, NORTHWEST BASIN, WESTERN AUSTRALIA
COLLECTED BY DR. N.H. FISHER.

by

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CANBERRA, A.C.T.

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The samples about to be described in detail are arranged in downward stratigraphic sequence.

No. 22. Exmouth formation, E. side of Rough Range.

Pinkish travertinous rock with a fragment of a rotaline foraminifera in a concretionary portion.

No. 21. Exmouth formation, E. side of clay pan at Cardabia used as landing ground.

Calcareous sandstone representing an old beach deposit, and containing angular to rounded quartz grains, calcareous algae, foraminifera and echinoid spines.

Plantae:

Lithothamnium ramosissimum Reuss

Foraminifera:

Amphistegina sp.

Discorbis dimidiata Parker and Jones.

Globigerina sp.

Rotalia beccarii Linné

No. 18. Just E. of Lyndon River crossing on road from Minilva to Waroora.

Dense, cream, foraminiferal limestone.

Foraminifera:

Marginopora vertebralis Q. and G.

Sorites marginalis (Lam.)

Valvulina davidiana Chapman

Numerous small miliolidae

No. 23A Top of Rough Range, at Trig. Point

Dense, foraminiferal limestone with casts of indeterminate mollusca.

Foraminifera:

Discorbis cycloclypeus Howchin and Parr

Marginopora vertebralis Q. and G.

Triloculina tricarinata d'Orb.

Peneroplis planatus (F. and M.)

Spirolina sp.

No. 23B Half a mile N.E. of No. 23A.

Foraminiferal limestone with cast of indeterminate mollusca.

Foraminifera:

Borrelis melo (F. and M.)

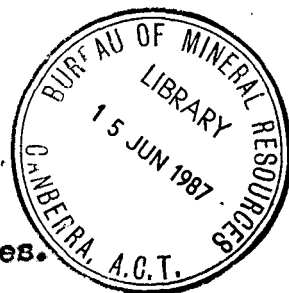
Discorbis cycloclypeus Howchin and Parr

Marginopora vertebralis Q. and G.

Peneroplis planatus (F. and M.)

Triloculina tricarinata d'Orb.

Valvulina davidiana Chapman



- No. 16. "Trig" Hill 5.3 miles bearing 69° from Jubilee Well, above laterite.

Calcareous sandstone with foraminifera.

Plantae:

Lithothamnium ramosissimum Reuss

Foraminifera:

Austrotrillina howchini (Schlumberger)

Discorbis cf. cycloclypeus Howchin and Parr

Elphidium sp.

Nos. 1 to 12 were taken from a section exposed from the top of Mt. Lefroy (705 Trig.) down to bottom of Canyon on N.E. side of Mt. Lefroy. Total vertical thickness about 350 feet. Nos. 1, 2, and 3 are taken about $\frac{1}{2}$ mile S.E. of Nos. 4-12.

- No. 4. Top of ridge at "Trig" Point ("Rough Range formation")

Cream foraminiferal limestone.

Plantae:

Lithothamnium ramosissimum Reuss

Foraminifera:

Austrotrillina howchini (Schl.)

Floresculinella bontangensis Rutten

Marginopora cf. vertebralis Q. and G.

Spiroloculina sp.

Triloculina tricarinata d'Orb.

Valvulina fusca Williamson

- No. 5. 150 feet below No. 4 and just above narrow "laterite" horizon

Cream, partially recrystalline limestone, with foraminifera poorly preserved.

Foraminifera:

Amphisterina sp.

Gypsina globulus Reuss

Lepidocyclina sp.

Spiroloculina sp.

- No. 6. "Laterite"

A. Reddish, hematitic, sandy limestone with inclusions of clear calcite.

B. Reddish, hematitic, sandy limestone, with included angular fragments of cream foraminiferal limestone.

Foraminifera:

Gypsina howchini Chapman

Lepidocyclina angulosa Provale

No. 7. Immediately below "laterite"

Cream, Lepidocyclina limestone, with some bryozoa.

Foraminifera:

Amphistegina sp.
Carpenteria sp.
Cycloclypeus sp.
Gypsina globulus Reuss
Lepidocyclina cf. rutteni Van der Vlerk var. globosa Scheffen
Lepidocyclina sumatrensis Brady
Lepidocyclina sumatrensis Brady forma mirabilis Yabe
Quinqueloculina sp.

No. 8. 12 feet below "laterite"

Cream, Lepidocyclina limestone with some iron-staining.

Foraminifera:

Austrotrillina howchini (Schl.)
Amphistegina sp.
Calcarina cf. verriculata Howchin and Parr
Cycloclypeus sp.
Lepidocyclina cf. bornëensis Provale
Lepidocyclina ferreroi Provale
Lepidocyclina sumatrensis Brady
Operculina sp.

No. 14. 14 feet below "laterite"

Cream, Lepidocyclina limestone with some iron-staining.

Plantae:

Lithothamnium ramosissimum Reuss

Foraminifera:

Amphistegina cf. lessonii d'Orb.
Austrotrillina howchini (Schl.)
Bolivina cf. folia (Parker and Jones)
Cycloclypeus sp.
Gypsina globulus Reuss
Lepidocyclina ferreroi Provale
Lepidocyclina sp. (form B.)
Operculina sp.
Planorbulina sp.
Triloculina tricarinata d'Orb.

No. 10. 25 feet below "laterite"

Yellowish to pinkish, chalky limestone with poorly preserved foraminifera.

Foraminifera:

Amphistegina sp.
Lepidocyclina spp. (small forms)
 Numerous small foraminifera.

- No. 3. Top of ravine $\frac{1}{4}$ mile S.E. of No. 10 above top of pink limestone (Nos. 2 and 11)

Cream, Lepidocyclina limestone.

Foraminifera:

Acervulina inhaerens (Schultz)
Cycloclypeus sp.
Elphidium sp.
Lepidocyclina ferrerai Provale
Lepidocyclina cf. sumatrensis Brady
Lepidocyclina sp.

- No. 11. 36 feet below "Interite"

Reddish to ochreous Lepidocyclina limestone

Foraminifera:

Amphistegina cf. lessonii d'Orb.
Gypsina globulus Reuss
Lepidocyclina angulosa Provale
Lepidocyclina ferrerai Provale
 Fragments of large tests of Lepidocyclina
 (form B)

Small rotalines

- No. 2. Consistent massive bed of pink limestone, 50 feet above No. 1

Pink Lepidocyclina limestone, with matrix partially ironstained and with foraminifera rather fragmentary.

Plantae:

Lithothamnium ramosissimum Reuss

Foraminifera:

Amphistegina sp.
Cycloclypeus sp.
Gypsina globulus Reuss
Lepidocyclina ferrerai Provale
Lepidocyclina cf. sumatrensis Brady
Marginopora sp.
Planorbulinella inaequilateralis (Heron-Allen Earland)
Triloculina tricarinata d'Orb.

- No. 1. Bottom of Gorge

Whitish limestone.

Foraminifera:

Amphistegina sp.
Bolivinita sp.
Gypsina howchini Chapman
Lepidocyclina cf. angulosa Provale.
Lepidocyclina sp.
Operculina sp.
Textularia sp.

- No. 12. Locality similar to No. 1

Cream, chalky, Lepidocyclina limestone, with bryozoa.

Foraminifera:

Ammonitina sp.
Elphidium sp.
Gypsina globulus Reuss
Lepidocyclina cf. borneensis Provale
Lepidocyclina cf. martini Schl.
Lepidocyclina sp. (form B)
Hiogypsina polymorpha Ruten
Operculina sp.

No. 13. 1 mile E. of Giralia-Bullara road along creek bank, 9.5 miles from Bullara, near Mr. Craig's No. 8

- A. Yellowish, limestone with foraminifera, echinoid spines and plates, and bryozoa rolled and replaced with limonite.

Foraminifera:

Discocyclina spp. (common)
Operculina cf. canalifera d'Archiac
 cf. Pellatispira

- B. Yellowish limestone with algae, foraminifera and bryozoa partly replaced or outline with limonite.

Plantae:

Indeterminate.

Foraminifera:

cf. Cycloloculina
Discocyclina sp.
Operculina sp.

No. 14. Craig's Station, 107, 11.5 miles E. of Bullara along road to Giralia.

A. On Dip Slope

- (a) Limonitic sandy limestone with foraminifera and bryozoa.

Foraminifera:

Globigerina sp.
Operculina cf. canalifera d'Archiac
 cf. Pellatispira

Bryozoa:

Beisselina sp.

B. Same Locality as A.

- (a) Reddish limestone with hematitic replacement of rolled specimens of foraminifera and bryozoa, and a little glauconite.

Foraminifera:

Discocyclina spp.
Nummulites cf. bagelensis Verbeek
Operculina sp.
Pellatispira sp.

C. Down side of small escarpment, 15 to 20 feet high.

Yellowish limestone with limonitic replacement

of rolled specimens of foraminifera and bryozoa.

Foraminifera:

Discoeyclina spp.
Elphidium sp.
Nummulites cf. bagelensis Verbeek
Pellatiscira sp.

D. Same locality as C.

Similar to 14C.

Foraminifera:

Discoeyclina cf. dispana (Sow.)
Discoeyclina sp.
Nummulites cf. bagelensis Verbeek
Operculina sp.
Pellatiscira cf. inflata Umbgrove

E. Half a mile E. also on dip slope, similar stratigraphic position to A and B.

Limestone with limonitic inclusions and no determinable foraminifera.

No. 15. "Xrig." Hill, 5.3 miles, bearing 69° from Jubilee Well

A. Immediately under Laterite.

Limonitic limestone with numerous tubes of Ditrupa sp. and poorly preserved foraminifera and bryozoa.

Foraminifera:

Globigerina sp.
Operculina sp.
Nummulites sp.
 cf. Pellatiscira sp.

B. 6 feet below Laterite.

Limonitic limestone with numerous tubes of Ditrupa sp. and poorly preserved foraminifera and bryozoa, and fragments of molluscan shells and ostracoda.

Foraminifera:

Nummulites sp.
Operculina cf. canalifera d'Aechiac
 cf. Pellatiscira
 cf. Rhapydionina

Bryozoa:

Beissilina sp.

Ostracoda:

Bairdia sp.

C. 15-25 feet below laterite

Limonitic limestone with fragments of organisms, foraminifera, cidaroid spines, bryozoa, and shell fragments, filled with limonite.

Foraminifera:

Asterocyclina cf. aster Woodring
Discocyclina sp.
 cf. Gypsina
Operculina cf. canalifera d'Archiac
Pellatispira cf. glabra Umbgrove
Textularia sp.

D. 50 feet stratigraphically below laterite.

Yellowish bryozoal limestone with a few foraminifera, small species being more common than in preceding samples.

Foraminifera:

Discocyclina sp.
Cibicides cf. lobatulus (W. and J.)
Globigerina subcretacea Chapman
Operculina sp.
 cf. Pellatispira

- No. 17. E. bank of tributary of Cardabia Creek. 2 miles E.S.E. of "Photo Butte". 3.6 miles, bearing 38° from Remarkable Hill.

Grey radiolarian siltstone, with foraminifera rare.

Radiolaria:

Cenosphaera
Dictyomitra
Lithocyclia
Spongodiscus
Stichocapsa

Foraminifera:

Ammodiscus cf. cretacea d'Orb.
Haplophragmoides sp.

- No. 19. About 3 miles S.W. of road from Minilva to Waroora, in low hills on W. side of N. end of Salt Marsh.

Bryozoal limestone, with small foraminifera frequently infilled with glauconite.

Foraminifera:

Anomalina
Cibicides sp.
Globigerina
Marginulina sp.
Spiroplectammia sp.

- No. 20. Same locality as No. 19, about 100 feet stratigraphically below.

Bryozoal limestone containing numerous rhombs of dolomite.

- No. 21. Lyons formation, near Round Hill Outcamp on Winning Station.

Silicified rock with no determinable microfossils.

STRATIGRAPHIC AND FAUNAL NOTES.

Rocks of Pleistocene, Pliocene, Middle Miocene, Eocene and Lower Cretaceous ages are represented in this collection of samples from the Giralda area, Northwest Basin, and all lithological types are characteristic of the Northwest Basin.

Pleistocene

Samples Nos. 21 and 22 are included in the Pleistocene. No. 21 is a consolidated beach sand and is similar in character to the Recent sands found along the western shores of Western Australia at the present time. No. 22 is a travertine and is similar to the type of rock which covers large areas in Western Australia.

Pliocene

Samples Nos. 18 and 23 are limestones with the characteristic lithology and foraminiferal content of the rocks assigned to the Pliocene in this area. This characteristic type is found as far south as the Mullarbor Plains and it is regarded by the writer as a limestone facies of the Adelaidean stage which, in the vicinity of Adelaide, is represented by a calcareous sandstone containing a similar foraminiferal assemblage and which is referred to the Lower Pliocene. Similar mega-fossils have been found in both areas, which the writer has recently included in the Austro-Indo-Pacific Province of the Australian marine Tertiary.

Middle Miocene.

Samples Nos. 16, 4, 5, 6, 7, 8, 9, 10, 3, 2, 11, 1 and 12 are Middle Miocene and can be divided into three lithological types containing characteristic foraminiferal assemblages. Type 1 is represented in Nos. 16 and 4, which are dense limestones containing Austrotrillina howchini in association with Marginopora, Valvulina and Flosculinella bontangensis. Type 2 is represented by No. 6, a reddish sandy limestone containing angular fragments of cream Lepidocyclina limestone. Type 3 is represented by Nos. 5, 7, 8, 9, 3, 10, 11 and 12 which are Lepidocyclina limestones. Until the present collection of samples was made, the exact stratigraphic relationship of types 1 and 3 was uncertain, and it will be of considerable assistance in future in the area to know that Type 1 is stratigraphically higher than Type 3.

It is not quite certain whether Nos. 16 and 4 represent the top of "f₂" stage or the base of "f₃". Glasner places the last appearance of Austrotrillina howchini at the top of "f₂" but the writer has found that in the Lepidocyclina deposits of Victoria from which A. howchini was originally described, it probably ranges into the base of "f₃". Consequently for the present, the horizon for this particular type of limestone is referred to as "f₂-f₃".

The rocks in Type 3 are typical Middle Miocene limestones in which Lepidocyclina is common. The species of Lepidocyclina in Nos. 5, 7, 8, 9, 10, 3, 2, 11, and 1 and in the included fragments of limestone in Type 2, are all apparently of the tryblielepidine type and typical of "f₂". There is a possibility, however, that No. 12 may belong to "f₁", as a true nephrolepidine form is present as well as Miocypina polymorpha, which, according to Tan Sin Hok, is characteristic of the basal Middle Miocene. This possibility will be tested when further limestones have been examined from the Northwest Basin.

Further localities for both types 1 and 3 are given by the writer in a paper "Indo-Pacific Influences in Australian Tertiary Foraminiferal Assemblages" in Trans. Roy. Soc. South Australia, vol. 72, Part 1, 1948.

Eocene

Samples Nos. 13, 14 and 15 are Eocene in age and are most probably Upper Eocene. The rocks are similar to those collected by E.A. Rudd and D.D. Condit in 1934, and by H.G. Raggatt in 1935. Two distinct lithological types are present. Nos. 13a, b, and 14a, b, c, d, e are limonitic and hematitic sandy limestones in which the foraminifera and bryozoa have been rolled and have been stained or partially replaced with limonite and hematite. Characteristic Eocene foraminiferal genera such as Discoeyclina, Pellatispira and Nummulites are present, but because of the mode of preservation, specific determinations are difficult.

Nos. 15a, b, c, d are bryozoal limestones containing Discoeyclina and Pellatispira. No. 15d contains numerous small foraminifera as well as Discoeyclina and it may be just stratigraphically higher than samples Nos. 6, 7 and 9 collected by E. Craig (Report No. 1949/65 Pal. Ser. 6). The occurrence of Eocene rocks in the Giralie area was discussed by Chapman and Crespin in their paper on "Foraminiferal Limestones of Eocene Age from North-West Division, Western Australia" in Proc. Roy. Soc. Victoria, vol. 47, part 1, 1935.

Samples Nos. 19 and 20 are Tertiary limestones but their exact stratigraphic position is uncertain.

Lower Cretaceous

Sample No. 17 is composed almost entirely of radiolaria, only two tests of arenaceous foraminifera being noted. Evidence from the micropalaeontological examination of samples from the Carnarvon and Brickhouse bores, situated about 130 miles south of Giralie, shows that the radiolarian beds there underlie chalks containing a rich assemblage of Upper Cretaceous foraminifera and numerous prisms of Inoceramus shells and occur above a limestone containing typical Cretaceous ostracoda. In the Giralie anticline, the radiolaria-bearing beds underlie Upper Cretaceous chalks which are referred to as the "Inoceramus beds", and which are presumably similar to those found in the bores.

Associated with the radiolaria in the samples from the Carnarvon and Brickhouse bores are a few arenaceous foraminifera which are characteristic of Lower Cretaceous deposits elsewhere in Australia. The belemnite Dimitobelus ditycha (McCoy) was recorded from the radiolaria-bearing rocks near Wanning Pool. A similar association of fossil forms occurs at Fanny Bay, Darwin, which Whitehouse suggested may be the equivalent of the Tambo beds in Queensland and referred to the Albian.

Radiolarian rocks are widely distributed in North-west Australia, the first record of their occurrence being made by H.G. Raggatt in 1935. The writer has listed known localities in a paper "A Lower Cretaceous fauna in the North-west Basin of Western Australia" in the Journal of Palaeontology, vol. 20, No. 5, 1946. An earlier paper "Upper Cretaceous foraminifera from the Northwest Basin, Western Australia" in vol. 12, No. 4, 1938 of the same journal, lists known Upper Cretaceous foraminiferal localities from the area.

A table showing a correlation of samples collected by Dr. Fisher and Mr. Craig respectively, is attached.

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TABLE SHOWING CORRELATION OF SAMPLES FROM GIRALIA AREA
COLLECTED BY N.H. FISHER AND E. CRAIG

N.H. Fisher			Diagnostic Species of Microfossils	E. Craig
Pleistocene		F. 22 F. 21	Travertine Calcareous sandstone (beach deposit), <u>Lithothamnium</u> , Forams.	
Pliocene		F. 18 F. 23 a, b	<u>Marginopora</u> , <u>Valvulina</u> , small <u>milliolidae</u> common <u>Marginopora</u> (Large), <u>Borelis melo</u> , <u>Valvulina</u> , <u>Peneroplis</u> , <u>Milliolidae</u> common	C 3a
Middle Miocene	"f ₂ "	F. 16	<u>Austrotrillina howchini</u> , <u>Discorbis</u> cf. <u>cyclocypus</u>	C1, C3, C3c
	"f ₃ "	F. 4	<u>A. howchini</u> , <u>Marginopora</u> , <u>Valvulina</u> , <u>Flosculinella bontangensis</u>	C4, C5, C8
		F. 5 F. 6	<u>Lepidocyclina</u> sp., <u>Amphistegina</u> Reddish sandy limestone, inclusions of cream limestone, <u>Lep. angulosa</u> <u>Gypsina howchini</u>	
		F. 7	<u>Lepidocyclina sumatrensis</u> , <u>L. sumatrensis</u> forma <u>mirabilis</u> , <u>Cyclocypus</u> <u>Amphistegina</u>	
	f ₂	F. 8	<u>L. sumatrensis</u> , <u>L. ferreroi</u> , <u>A. howchini</u> , <u>Operculina</u> , <u>Cyclocypus</u>	
		F. 9	<u>L. ferreroi</u> , <u>Lep. sp.</u> (form B), <u>A. howchini</u> , <u>Cyclocypus</u> , <u>Amphistegina</u>	
		F. 3	<u>L. ferreroi</u> , <u>L. cf. sumatrensis</u> , <u>Cyclocypus</u>	
		F. 10	<u>Lep. indet.</u> <u>Amphistegina</u>	
		F. 11	<u>L. ferreroi</u> , <u>L. angulosa</u> , <u>Amphistegina</u>	
		F. 2 F. 1	<u>L. ferreroi</u> , <u>L. cf. sumatrensis</u> , <u>Cyclocypus</u> , <u>Amphistegina</u> <u>L. angulosa</u> , <u>Gypsina howchini</u> , <u>Amphistegina</u> , <u>Operculina</u>	Pink Limestone C2
	f ₁	F. 12	<u>L. cf. martini</u> , <u>Nephrolepidina</u> sp., <u>Micogypsina polymorphina</u> , <u>Lep.</u> (form B)	
Eocene		F. 13 F. 14 F. 15	<u>Discocyclina</u> , <u>Operculina</u> , forams. rolled and replaced by limonite <u>Discocyclina</u> , <u>Nummulites</u> , <u>Pellatispira</u> , <u>Operculina</u> , rolled, hematitic Bryozoal limestone with <u>Discocyclina</u> .	
		4 4	(d) small forams with <u>Discocyclina</u>	C6, C7, C9, small forams, sponge spicules
Lower Cretaceous		F. 17	Radiolaria abundant, foraminifera rare	