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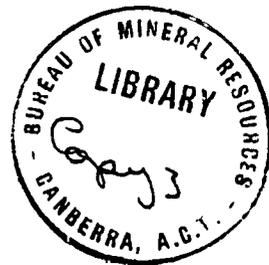
COMMONWEALTH OF AUSTRALIA



DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS

RECORDS:

1965/102



FORAMINIFERA FROM THE PORT MORESBY AREA, PAPUA

by

D.J. Belford

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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SUMMARY

Forty-three samples ranging in age from the Upper Cretaceous to the 'e' stage of the Dutch Tertiary letter classification have been examined; twenty samples are unfossiliferous and their age is not known. The stratigraphic position of the 'e' stage and the determination of the Oligocene/Miocene boundary are discussed; it is concluded that there is no basis for relating the fauna of the 'e' stage to that of the European succession.

The geology of Port Moresby was discussed by Glaessner (1952), who mapped formations ranging in age from the Upper Cretaceous to the Recent, and included an outline of the foraminiferal faunas. In the present investigation, forty-four samples collected by K.R. Yates and R.Z. de Ferranti during a survey of the Astrolabe Mineral Field have been examined; they range in age from Upper Cretaceous to the 'e' stage of the Dutch Tertiary letter classification. The sample localities are to be shown on the geological map accompanying the report on the area. Ages for the samples have been determined previously; this report gives details of the Foraminifera identified and discusses the age assigned to some formations.

Upper Cretaceous: Samples Y.98, Y.105, Y.105a, Y.113.

Samples Y.105, Y.105a and Y.113 are pale to deep pink fine-grained sheared and recrystallised limestones, with abundant Foraminifera, mainly Globotruncana spp., with rare Pseudoguembelina? sp., Racemiguembelina sp. and Pseudotextularia sp.. The lithology and fauna are characteristic of the Bogoro Limestone.

Sample Y.98 is a fine to medium grained detrital sandy limestone containing Foraminifera and bryozoa; the Foraminifera are very rare Globotruncana spp., Marssonella sp. and indeterminate smaller species; this sample differs from others of Upper Cretaceous age and could be from the Barune Sandstone.

Eocene: Rocks of this age are of two distinct types: a medium to coarse grained detrital limestone with 'larger' Foraminifera and algae, and a fine-grained limestone with abundant tests of planktonic Foraminifera. Samples Y.105, Y.118 and Z.44 are from the medium to coarse-grained limestone; Foraminifera determined are:

Y.105: Halkyardia bikiniensis Cole
Heterostogina sp.cf. H.saipanensis Cole
Cycloclypeus? sp.
Amphistegina sp.
Borelis sp.
Eorupertia sp.
Globigerinidae
Indeterminable smaller Foraminifera: rotaliids,
miliolids.

- Eocene (Discocyclina sp. (derived)
(Nummulites spp. including N.pengaronensis (Verbeek)
[derived]
- Y.311: Foraminifera, algae
- Foraminifera : Lepidocyclina (Eulepidina) sp.
Heterostegina borneensis van der Vlerk
Amphistegina sp.
- Z.538: Foraminifera, algae, corals.
- Foraminifera : Lepidocyclina (Eulepidina) spp., including
L.(E.) dilatata and L.(E.) papuanensis
Heterostegina borneensis
Amphistegina sp.
Carpenteria sp.
- Oligocene (Nummulites fichteli Michelotti (derived)
(Pellatispira sp. (derived)
- Eocene (Nummulites sp., probably N.pengaronensis (Verbeek)
[derived]

Glaessner (1952) regarded the Dokuna Tuff (in which he included the Bootless Inlet Limestone) as middle Oligocene in age, as he considered the Nummulites to be contemporaneous and not derived. The Nummulites occurring in the four present samples are mainly Eocene species, only one specimen being referred to the Oligocene N.fichteli. Lepidocyclina (E.) dilatata ranges from the Oligocene to the 'e' stage; L.(E.) papuanensis occurs in the Oligocene of Indonesia, but is also known from the Boira Tuff and Limestone, which is 'e' stage in age. Heterostegina borneensis is shown by van der Vlerk (1955) as restricted to the lower part of the 'e' stage. The one Oligocene specimen of Nummulites observed shows evidence of being derived, and the samples are considered to be 'e' stage in age. However, a sample from locality D of Glaessner (1952) collected by P. Pritchard contains abundant well-preserved Nummulites, together with Lepidocyclina (E.) spp. and Heterostegina sp. cf. H.borneensis. The Nummulites include the Oligocene N.fichteli and probably derived Eocene species. It is this sample which causes some uncertainty as to the age of the Dokuna Tuff and Bootless Inlet Limestone. The excellent preservation of the specimens of Nummulites from this locality gives no indication that they are derived, although in the case of the Eocene species this would be clear from the mixed assemblages. This fauna requires a detailed examination and identification of all the species present, in an attempt to remove any uncertainty as to age. At present, considering the evidence from the associated calcareous sediments, the Dokuna Tuff and Bootless Inlet Limestone are referred to the 'e' stage.

The Boira Tuff, undoubtedly of 'e' stage in age also contains derived Eocene Foraminifera, together with Lepidocyclina (Nephrolepidina) spp. and Miocene species of Spiroclippus; no derived Oligocene species are known from the Boira Tuff. These differences in faunal assemblage could be due to a difference in environment. Some consideration should be given to the possibility that the Boira Tuff and Dokuna Tuff resulted from the same phase of igneous activity.

Another problem is the position of the 'e' stage in relation to the European succession. Glaessner (1952) stated 'for the sake of convenience in description the Aquitanian and its equivalents are here discussed under the heading "Upper Oligocene" while the necessity of a decision on the Oligocene-Miocene boundary by agreement or by the ruling of a Geological Congress is recognised'. In later papers (for example Glaessner, 1959), the base of the 'e' stage was placed in the upper Oligocene, and this was also Australasian Petroleum Company usage before 1953. Later Company reports showed the base of the 'e' stage as corresponding with the base of the Miocene, this being the interpretation of palaeontologists of the British Petroleum Company Limited. Van der Vlerk (1955) showed the lower part of the 'e' stage as equivalent to the Chattian. The precise stratigraphic placing of the 'e' stage is impossible while the problem of the

Oligocene/Miocene boundary is unresolved. It is younger than middle Oligocene (Rupelian), but could include part of the Chattian. Conflicting opinions on the position of the Oligocene/Miocene boundary have been expressed, and as stated by Glaessner it seems best to reach a decision either by agreement or a formal ruling. The base of the Aquitanian is far from clear even in the Aquitaine Basin; there is evidence that below the base of the type section of the Aquitanian there was deposition in a continental environment, possibly with intervals of non-deposition. In the south of the Aquitaine Basin there are marine beds which are thought to be equivalent to the continental phase below the type section, for example the locality at Escornebeou. It is these beds the placing of which is in dispute; Eames, Banner, Blow & Clarke (1962; 1963) regard them as Aquitanian, and others, for example Szots (1961; 1962), Szots, Malmoustier & Magne (1964) as Chattian. The differing opinions were discussed by Drooger (1964). According to Drooger, beds at the base of the section at Escornebeou contain specimens of Nummulites, Miogypsina, Nephrolepidina, Eulepidina and Spiroclypeus. There is no natural association of this kind known from the New Guinea, Indonesian or Pacific areas; such assemblages are known but in all cases the Nummulites are derived and are generally Eocene species derived into 'e' stage beds with Lepidocyclina (Eulepidina), Spiroclypeus, etc.. In the present case the Oligocene specimens are also considered to be derived. There is no doubt that in the Indo-Pacific area there is a palaeontological break of regional significance at the base of the 'e' stage; the time interval represented is not known. At present there is no basis for relating the fauna of the 'e' stage precisely to the European succession; this is of no consequence as far as regional correlation in the Indo-Pacific area is concerned.

No Foraminifera have been found in the following samples and their age is not known: Y.12, Y.39, Y.54, Y.55, Y.59, Y.116, Y.129, Y.255, Y.282, Y.283, Y.291, Z.014, Z.016, Z.43, Z.183, Z.384, Z.385, Z.455, Z.463 and Z.464.

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FOSSIL LOCALITIES PORT MORESBY-KEMP WELCH AREA

The following is a list of localities of fossiliferous samples collected during the survey
The locality numbers correspond to those shown on the accompanying geological maps.

LOCALITY NUMBER	FORMATION	AGE	* PHOTO		REFERENCE POINT NUMBER	1:50,000 SHEET	METRIC GRID REFERENCE		
			SET	RUN			EASTINGS	NORTHINGS	
1	BOGORO LIMESTONE	UPPER CRETACEOUS	Port Moresby	4	5019	Y105	Geboria	530650	8950075
2	"	"	"	"	"	Y113	Tupuseleia	530625	8949800
3	PORT MORESBY BEDS	ECCENE	Port Moresby	4	5019	Y102	Geboria	530900	8950000
4	"	"	"	"	"	Y104	"	530775	8950025
5	"	"	"	"	"	Y105	"	530650	8950075
6	"	"	"	"	"	Y106	"	530575	8950100
7	"	"	"	"	"	Y112	Tupuseleia	530550	8949475
8	"	"	"	"	"	Y293	Geboria	530250	8950725
9	"	"	"	"	"	Y296	"	530925	8951175
10	"	"	"	"	"	Y118	Tupuseleia	531950	8948775
11	"	"	"	"	"	Y114	"	532050	8948800
12	"	"	Gaile	1	5029	Z044	"	531600	8948925
13	"	"	"	"	"	Z093	"	535725	8948450
14	"	"	"	"	5031	Z126	"	543350	8944775
15	"	"	Kapa Kapa	1	5043	Y51	Gaile	553700	8918075
16	"	"	"	"	5045	Z472	Gea	559500	8917050
17	"	"	"	2	5079	Z132	"	558425	8914900
18	"	"	"	"	5077	Z147	"	561575	8915975
19	Small inclusion in gabbro	"	Gaile	4	5037	Z274	"	575900	8922175
20	BOOTLESS INLET LIMESTONE	LOWER MIOCENE "e" STAGE	Port Moresby	4	5019	Y209	Geboria	530800	8952800
21	"	"	"	4	5019	Y311	"	531600	8952950
22	"	"	"	"	"	Y297	"	532500	8950500
23	DOKUNA TUFF	"	Gaile	1	5029	Z538	"	534750	8951000
24	GIDOBADA LIMESTONE	UPPER LOWER MIOCENE "f" STAGE	Kemp Welch River	2	5073	Z179	Kapa Kapa 1:63,360	1.7 miles east of Ginigolo	
25	"	"	"	"	"	"	Gea	577450	8913425

* These aerial photographs are held in store at the Bureau of Mineral Resources, Canberra.