

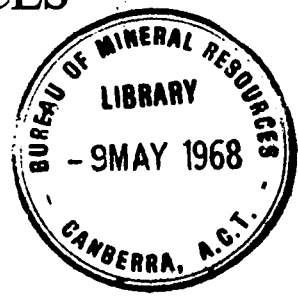
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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.
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AGE DETERMINATIONS OF LIMESTONE SAMPLES OF WOODLARK ISLAND.
PAPUA.

by

G.R.J. Terpstra



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 It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.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

Twenty samples of limestone from two localities (the Nasai limestone and the Suloga limestone) from Woodlark Island, Papua have been examined. Larger foraminifera found in both types of limestones indicate a Lower Miocene, Tertiary "o" stage, age for both localities.

Introduction

Samples from Woodlark Island, Papua, submitted by Mr. Lloyd Hamilton have been examined micropalacontologically.

The samples were collected from two localities (see attached location map.).

- 1) The Nasai limestone from Nasai Island numbered : 3/62 W.I. 2-5,
7 and 9
8/61 W./59 and /59a.
- 2) The Suloga Limestone collected from the southern part of the
Suloga Peninsula, numbered : 3/62 I/12-14, 16-18
8/61 W./60 (A-B)
8/61 W./26 (A-B)

A note by Mr. R. Bryan on the lithological description of four of the rock samples is attached as Appendix No.1.

Observations

3/62 WI/2 Coral Limestone :

The rock is composed mainly of Corals and Algae and some tuffaceous matter. A few specimens of Globigorina sp. and Quinquoloculina sp. were found in the sections. No age determination can be given.

3/62 WI/3 Coral Limestone :

The rock is composed mainly of Corals and Algae, veins of calcite and possibly some tuffaceous matter. Shell remains, Quinquoloculina sp., Austrotetrillina sp. and Spiroclypous sp. were found in the sections examined. The rock is of a Tertiary "o" stage (Lower Miocene) age.

3/62 WI/4 Limestone :

The sections examined contain foraminifera such as Amphistogina sp. Bolivina sp. Ammonia sp. and Textularia sp. and further Algae and shell remains. No age determination can be given.

3/62 WI/5 Limestone :

The sections examined contain shell remains, Algae, ?Bryozoa, Elphidium sp. and Quinquoloculina sp. No age determination can be given.

3/62 WI/5 Limestone:

The sections examined contain shell remains, Algae, ?Bryozoa, Elphidium sp., and Quinqueloculina sp.. No age determination can be given.

3/62 WI/7 Coral Limestone:

The sections examined contain Corals, Algae, shell remains, Operculina sp., Quinqueloculina sp., and some tuffaceous matter. No age determination can be given.

3/62 WI/9 Coral Limestone:

The sections examined contain ?Austrotrillina sp., Globigerina sp., Elphidium sp., Quinqueloculina sp., Corals, Algae, shell remains and tuffaceous matter. The age of the sample is probably Tertiary (e - f1) stage (Lower Miocene).

8/61 W.59 (x,y,z.) Orbitoidal Limestone:

This sample contains a rich foraminiferal fauna, in which the Orbitoids are well represented. The sections examined contain Austrotrillina sp., Borelis sp., Miogypsinoides sp., Lepidocyclina sp., Lepidocyclina (Eulipidina) sp., Spiroclypeus sp., Operculina sp., Elphidium sp., Bolivina sp., Quinqueloculina sp., Algae and tuffaceous matter.

The assemblage indicates a Tertiary stage "e" (Lower Miocene) age for the rock.

A specimen of the genus Alveolina was observed in one of the sections. This genus is restricted to the Tertiary stages 'a - b' (Eocene) and is obviously to be considered as having been reworked during Lower Miocene deposition from older deposits.

8/61 W.59a. Limestone:

The sections examined contain Coral, Algae, Borelis sp., Elphidium sp., Quinqueloculina sp., Spiroclypeus sp., shell remains and tuffaceous matter. The age of the sample is Tertiary 'e' stage (Lower Miocene).

3/62 I/12 Limestone:

The sections examined contain, Austrotrillina sp., Elphidium sp., Operculina sp., Spiroclypeus sp., and Algae. The age of the sample is Tertiary 'e' stage (Lower Miocene).

3/62 I/13 Limestone:

The sections examined contain Austrotrillina sp., Elphidium sp., Lepidocyclina (?Eulipidina) sp., Amphistegina sp., Spiroclypeus sp., Quinqueloculina sp., and Algae. The age of the sample is Tertiary 'e' stage (Lower Miocene).

3/62 WI/16 Limestone:

The sections examined showed that the material is very poorly preserved probably on account of thermal activity. The sample contains larger foraminifera; Lepidocyclina sp., and Spiroclypeus sp., seem to be present. The age of the sample therefore is probably Tertiary 'e' stage (Lower Miocene).

3/62.WI/14. Limestone :

The sections examined contain Amphistegina sp., Carpentaria sp., Elphidium sp., Operculina sp., Spiroclypeus sp., and Algae. The age of the sample is Tertiary 'e' stage (Lower Miocene.).

3/62 WI/17. Limestone:

The sections examined contain Amphistegina sp., Austrotrillina sp., Elphidium sp., Lepidocyclina sp., Spiroclypeus sp., Algae, and shell remains. The age of the sample is Tertiary 'o' stage (Lower Miocene).

3/62 WI/18. Limestone:

The sections examined contain Amphistegina sp., ?Lepidocyclina sp., Spiroclypeus sp., Algae and shell remains. The age of the sample is Tertiary 'o' stage, (Lower Miocene).

8/61 W/60 (a-b) Limestone:

The sections examined contain Austrotrillina sp., Lepidocyclina sp., Oporeulina sp., Spiroclypeus sp. and Algae. The age of the sample is Tertiary 'o' stage (Lower Miocene).

8/61 W.26 (a-b):

The section examined contains Lepidocyclina (Eulepidina) sp., Miogypsinoides sp., Spiroclypeus sp. and Algae. The age of the sample is Tertiary 'e' stage. (Lower Miocene).

Conclusions

A table (page 4) has been prepared showing the foraminifera observed and their distribution in the various samples. Only five species of those shown in the table are actually of stratigraphical significance: Austrotrillina sp., Lepidocyclina (Eulepidina sp.); Miogypsinoides sp. and Spiroclypeus sp.. They imply a Lower Miocene, Tertiary "o" stage age.

D.S. Trail (1961) described both of the limestone types and their stratigraphical relationships to the surrounding rocks.

From the field observations it would appear that the Nasai Limestone is younger geologically than the Suloga Limestone. If this is so the difference in age should not be very great as it is obvious from the distribution chart that both types are to be placed on micropalaeontological evidence in the Tertiary "o" stage (Lower Miocene). This stage had a duration of about four to five million years, and any geological features suggesting a difference in age would have to be explained within this time period.

In one sample 8/61 W/59, a specimen of the genus Alveolina was found. This genus is restricted to the Tertiary "a and b" stage (Eocene). The specimen is considered to be derived from an Eocene Deposit by reworking and redeposition during the Lower Miocene.

Reference:

TRAIL, D.S., 1961 - The geology of Woodlark Island. Bur.Min.Resour.Aust.Rec. 1961/111 (unpubl.).

Table showing the distribution of the foraminifera encountered

	<i>Alveolina</i> sp.	<i>Ammobaculites</i> sp.	<i>Amphistegina</i> sp.	<i>Austroturrillina</i> sp.	<i>Bolivina</i> sp.	<i>Bolivina</i> sp.	<i>Berolis</i> sp.	<i>Carpentaria</i> sp.	<i>Elphidium</i> sp.	<i>Globigerina</i> sp.	<i>Lepidocyclina</i> sp.	<i>Lepidocyclina</i> (Eulocidina) sp.	<i>Miocypsinoides</i> sp.	<i>Operculina</i> sp.	<i>Quinqueloculina</i> sp.	<i>Spirocleneus</i> sp.	<i>Textularia</i> sp.
<u>Nasei Lst.</u>																	
3/62 WI/2										X					X		
3/62 WI/3				X											X	X	
3/62 WI/4		X	X			X											X
3/62 WI/5									X						X		
3/62 WI/7													X	X			
3/62 WI/9				X					X	X					X		
8/61 W/59	X			X	X		X	X	X		X	X	X	X	X	X	
8/61 W/59a							X	X	X						X	X	
<u>Suloga Lst.</u>																	
3/62 I 12				X					X					X		X	
3/62 I 13			X	X					X			X			X	X	
3/62 I 14			X					X	X					X		X	
3/62 I 16											X					X	
3/62 I 17			X	X					X		X					X	
3/62 I 18			X								X					X	
8/61W./60 (a+b)				X							X			X		X	
8/61W./26 (a+b)												X	X			X	

APPENDIX IBRIEF DESCRIPTIONS OF FOUR ROCKS COLLECTED FROM
WOODLARK ISLAND, PAPUA

by

Robert Bryan.

Four specimens of limestone collected from Woodlark Island were submitted by Mr. Lloyd Hamilton for petrological examination. In particular he wanted to know if the rocks had been thermally altered to any extent, as this information might indicate whether or not the adjacent volcanics pre-or post-date the fossiliferous limestone.

Very slight regional alteration has affected the specimens, as seen by the presence of chlorite and albite, and in one case probable epidote as well; this suggests that the rocks are in the transition zone between the "zeolite" facies and "greenschist" facies (Turner and Verhoogen, 1960, 'Igneous and Metamorphic Petrology' 2nd Edition, McGraw-Hill). It would involve a maximum temperature of 300°C. to 400°C. There is nothing to suggest that these changes were in any way related to the formation of the adjacent volcanic rocks.

R 12163, T.S. 9008, Field No. 8/61 W60(A)

Fossiliferous limestone. The hand specimen is a pale grey, massive carbonate rock cut by a white carbonate vein. In thin section the rock is seen to consist of over 90% carbonate, probably calcite. The abundant fossils are preserved as very fine grained carbonate, and the interstitial carbonate anhedral range in size from extremely fine grained up to 1 mm. Scattered fine grained quartz, albite and chlorite, and stringers of hydrated iron oxide make up the remainder of the rock. The brown pockets of chlorite are up to .2 mm. across but the mineral itself is cryptocrystalline. The albite and quartz occur in accessory amounts only.

R 12162, T.S. 9007 Field No. 8/61 W60(B)

Fossiliferous limestone. This rock is virtually identical to R 12163, except that the carbonate is rather coarser grained, the anhedral being up to 2 mm. across. The white vein cutting the rock is of well twinned interlocking calcite anhedral having grain sizes from .5 mm. up to 3 mm.

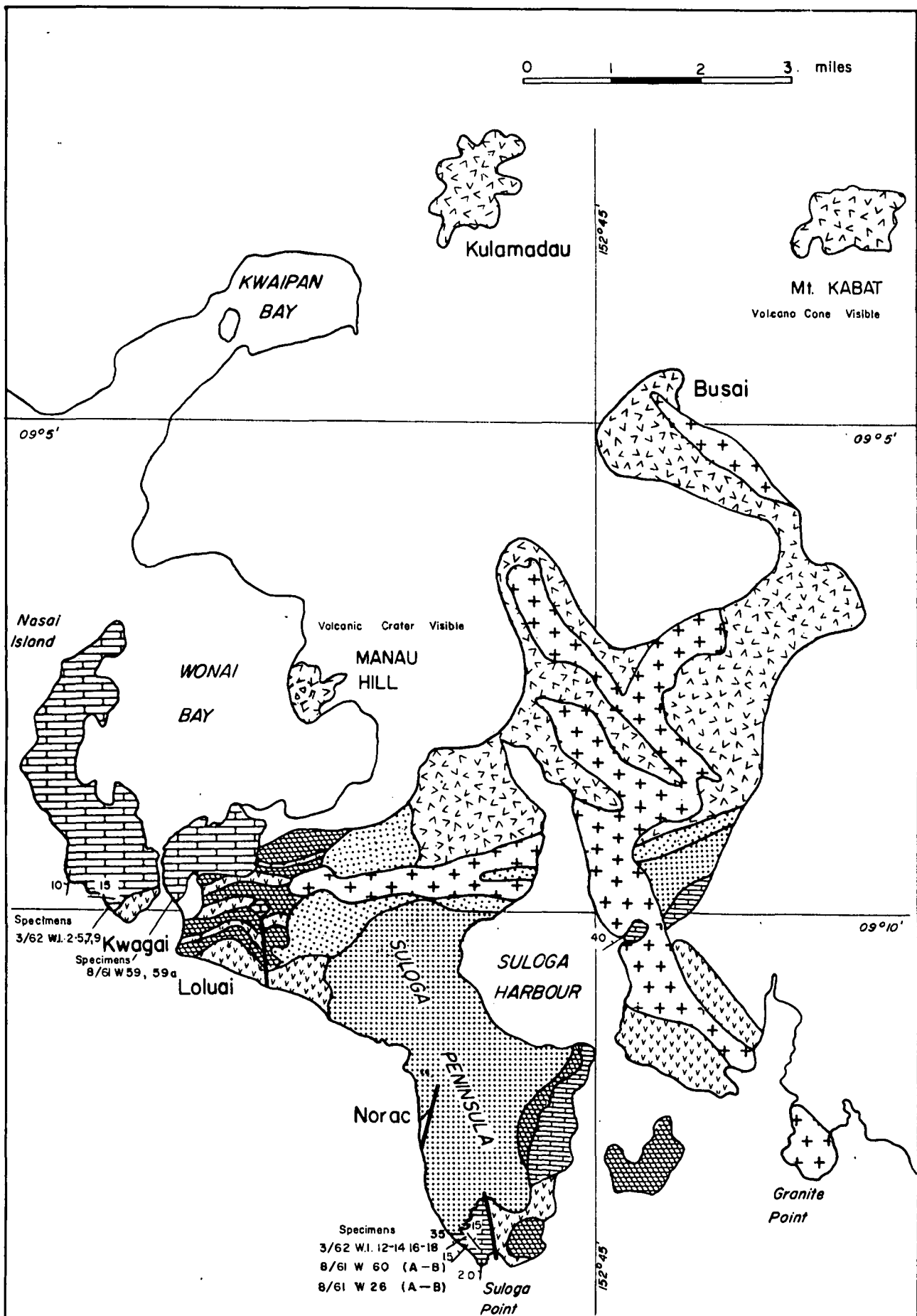
R 12164, T.S. 9009 Field No. 8/61 W26(A)

Fossiliferous limestone. This rock is a fine grained massive dark limestone; seen in thin section it consists of approximately 60 - 70% carbonate, with the remainder principally of pale yellow chlorite. Lesser amounts of very fine black iron oxide and albite and quartz occur. The fossiliferous fragments are made up of very fine grained carbonate, though in some cases it has recrystallized to larger, lighter coloured interlocking anhedral.

However this recrystallization has been very localized. The chlorite forms irregular, subparallel veins, and also rounded to sub angular pockets up to .3 mm. across. The chlorite itself is very finely crystalline; it is probably derived from claystone fragments, and broken up shale laminae.

R 12165, T.S. 9010, Field No. 8/61 W26(B)

Fossiliferous limestone. This rock is very similar to R 12164 except that it contains hydrated iron oxide rather than black iron oxide and also contains (?) epidote. The quantity of epidote and albite in the rock is extremely small and very fine grained, but the two minerals are certainly secondary, and not original constituents of the rock.



FOSSIL LOCALITY MAP, WOODLARK I.

