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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1973/101

RESULTS OF PALAEONTOLOGICAL WORK, BLUCHER RANGE 1:250 000 SHEET AREA, PAPUA NEW GUINEA

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CONTENTS

SUMMARY

Palaeontological work on samples from 196 localities in Blucher Range 1:250 000 Sheet area, Papua New Guinea, indicate that rocks of Jurassic, Cretaceous, Paleocene, Eocene, Oligocene, Miocene, and Pliocene age are present.

INTRODUCTION

This report seeks to compile the available palaeontological information on Blucher Range 1:250 000 sheet area, Papua New Guinea. The large volume of data collected precludes their incorporation into the Blucher Range Explanatory Notes and so they are presented here as a separate Record. Most of the samples discussed were collected by the Bureau of Mineral Resources (BMR) 1971 and 1972 West Sepik surveys, and the geology of the area has been described by Davies & Norvick (in press). Palaeontological results of an earlier reconnaissance survey by Smit (1968) in the Star Mountains and Telefomin areas are also included. In addition, certain information is quoted on localities examined by geologists of BP Petroleum Development, Island Exploration Co., and Australasian Petroleum Co.

The positions of 196 palaeontological localities are shown on figure 2; they are numbered from west to east by 20 km grid squares. In the tables which follow, samples collected during the 1971 and 1972 West Sepik surveys are prefixed 7152-. Invertebrate macrofossils were determined by S.K. Skwarko (Geological Survey of Papua New Guinea) with some assistance from G.E.G. Westermann (McMaster University, Canada) and J.A. Jeletzky (Geological Survey of Canada). Invertebrate microfossil assemblages (chiefly Foraminifera and a few Ostracoda) were studied by D.J. Belford with some help from M. Norvick, M. Owen, and C.G. Adams (British Museum, London). Calcareous nannoplankton, which are included with other microfossils on the locality map, were examined by H. Hekel (Geological Survey of Queensland). Palynology was by D. Burger and M. Norvick. M. Plane examined reptilian bone specimens from the single vertebrate locality. Terpstra (1968) and Binnekamp (1970) provided micropalaeontological control for the reconnaissance survey of Smit (1968).

Micropaleontological determinations on samples collected by Osborne (1945) and by Chawner (1939), both of Island Exploration Co., were made by M.F. Glaessner. Glaessner (1945) later published details of the foraminiferal, bivalve, and belemnite faunal assemblages collected by these two authors. Subsequent field operations in the area by the Australasian Petroleum Co. (see Davies & Norvick, in press, for full list) was aided by micropalaeontological work by F.T. Banner. Palaeontological control for the recent surveys of Jenkins & White (1970) and White (1972) was provided by S.F. Schuyleman and R.A. Field, respectively.

Where possible, Mesozoic samples have been placed in the standard European stratigraphic stages. Planktonic foraminifera proved the most valuable diagnostic fossils in Upper Cretaceous formations. More reliance was placed on ammonites, and to a lesser extent bivalves and belemnites, in the Jurassic and Lower Cretaceous. Palynology, which has been applied very successfully to the Mesozoic of Australia, gave generally very disappointing results. During the BMR 1971 West Sepik survey, over 100 samples were collected from Mesozoic formations specifically for palynology. Only 17 of these yielded recognizable assemblages of organic walled plant microfossils (chiefly pollen, spores, and dinoflagellate cysts). This low productivity may be due to deep weathering or to excessive diagenesis (eometamorphism).

The dating of Cainozoic sediments rests largely on evidence from foraminiferal faunas, but some additional data were obtained from calcareous nannoplankton (coccoliths and discoasters). Larger benthonic Foraminifera were used to date limestone samples, and these were zoned according to the East Indian letter stage nomenclature, as applied by Adams (1970). Clastic rocks and some limestones were dated by planktonic Foraminifera. The biostratigraphic scheme of Blow (1969)was used for Neogene microfaunas (N zones). Correlation between planktonic and larger benthonic zones is after Clarke & Blow (1969), and epoch boundaries are those of Adams (1970) (see fig. 1).

RESULTS

Abbreviations:

Assemblage type:

M	Macrofossil locality.
F	Microfossil locality (Foraminifera, nannoplankton).
P	Palynological locality (pollen, spores, microplankton).
L	Plant macrofossil locality.
W	Fossil wood locality.
V	Vertebrate fossil locality.

Diagnostic Fossils:

Fp	Planktonic Foraminifera.
Fb	Larger benthonic Foraminifera.
Fs	Smaller benthonic Foraminifera.
Nn	Calcareous nannoplankton (coccoliths, discoasters).
Am	Ammonites.
Bv	Bivalves.
Bl	Belmnites.
Ps	Pollen and spores.
Dn	Organic walled microplankton (dinoflagellates, acritarchs).
Os	Ostracoda.

Sample Type:

Oc	In situ outcrop sample.
Fl	Float sample; river or colluvial boulder derived from outside immediate vicinity.

C1 Block or boulder from close to outcrop; origin in immediate vicinity.

N.B. All samples are prefixed 7152-, unless otherwise stated.

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
1	1980	Tr	L. or m.Miocene	U.Te/l.Tf	F	Fb	Fl	Fragmental biomicrite	Headwaters of Fatik R, Star Mts
2	6869-1644A	Tr	U.Olig./l.Miocene	Te	F	Fb	Oc		Bun R., Star Mts; coll.by Smit (1968), palaeont. by Binnekamp (1970)
	6869-1644B	"	L. or m.Miocene	U.Te/l. Tf	F	Fb	Oc		
3	6869-1643B	Tr	L.Miocene	U.Te	F	Fb	Oc		Bun R., Star Mts; coll. by Smit (1968), palaeont. by Binnekamp (1970)
	6869-1643C	"	L.or m.Miocene	U.Te/Tf	F	Fb	Oc		
4	6869-1642B	Tr	U. Olig./l.Miocene	Te	F	Fb	Oc		Bun R., Star Mts; coll. by Smit (1968), palaeont. by Binnekamp (1970)
5	1357	KTf	U.Cretaceous	Cenomanian	F	Fp	Oc	Foraminiferal micrite	Migiam landslide, 28 km WNW of Telefomin
	1358	"	U.Cretaceous	U.Cenom./Turonian	F	Fp	Oc		
	1047	Tr	U.Olig./l.Miocene	Te	F	Fb	Fl	Foraminiferal biomicrite	
	1048	"	M.Miocene	L.Tf	F	Fb	Fl	Foraminiferal biomicrite	
	4101-12	KTf	U.Jur./L.Cret.	part Aptian	M	Bv	Oc		
	1052, 55	"	?		M	Bv	Oc	Sandstone	
	1352-53, 55	"	L.Cretaceous	prob. Albian	M	Bv	Oc	Sandstone, siltstone	
6	0624	Tr	L.Miocene	prob. u.Te	F	Fb	Cl	Foraminiferal-algal biomicrite	Sik R, 23 km WNW of Telefomin
7	0622-23	KTf	?U. Cretaceous		F	Fs	Oc	Dark grey siltstone	Sik R, 23 km WNW of Telefomin
8	0512-13	Jo	M.or ?U. Jurassic	U. Bajoc./?Oxf.	M	Am,Bv	Fl	Shales and quartzite	S tributary of Elip R
9	0510-11	Jo	M. or ?U. Jurassic	U.Bajoc./?Oxf.	M	Am	Fl	Shale and quartzite	S tributary of Elip R
10	0492-0500	Jo	M.or U. Jurassic	U. Bajoc./Tithon.	M	Am	Fl		S tributary of Elip R
	0514-15	"	M. or U. Jurassic	?Bathon./l. Callov.	M	Am, Bv	Fl		
11	0516-0553	Jo	M. or U. Jurassic	U.Bajoc./Tithon.	M	Am,Bv,Bl	Fl	Dark shales	S tributary of Elip R
	4070-4100	"	U. Jurassic	?Oxf./Tithon.	M	Am	Fl	Dark shales	
12	3087,90-92	Jo	prob. Jurassic		M	Bv,Am	Fl		Elip R, 5 km W of Eliptamin
13	4200-28	Jo	U. Jurassic	Oxf.& Kimm./Tithon.	M	Am.	C.		S tributary of Elip R
14	0654	KTf	U. Cretaceous		F	Fp.	Oc	Dark grey calcareous shale	Eliptamin
15	4300-07	Jo	U. Jurassic	L.Callov./Oxf.	M	Am,Bl	Cl		5 km N of Eliptamin
16	0602	Jo	M.Jurassic	?U. Bajocian	M	Am	Fl		Abum Cr. 5 km NE of Eliptamin
	0603,05-19	"	U. Jurassic	L.Callov./?u.Oxf.	M	Am,Bl	Oc	Black shale with concretions	
17	5211-13	Jo	U.Jurassic	L.Callov./Oxf.	M	Am	Fl	Siltstone	Amin R,headwaters of Ok Om
18	5214	Jo	U.Jurassic	L.Callov./Oxf.	M	Am	Fl	Shale	Amin R,headwaters of Ok Om
19	5215-30	Jo	M.& U.Jurassic	U.Bajoc. & Oxfordian	M	Am,Bv,Bl,	Fl,Oc.	Dark grey micaceous shale	Amin R,headwaters of Ok Om
20	5231-32	Jo	U. Jurassic	Oxfordian	M	Am	F.	Dark grey micaceous shale	Ammonites obtained from villagers, believed to come from Amin R,headwaters of Ok Om

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
21	0353	Jo	U.Jurassic	Oxfordian	M	Am	Fl	Black pyritic shale	Kwep R,N tributary of Ok O
22	0356,58-61,63-66	Jo	U.Jurassic	Oxfordian	M	Am	Fl	Black pyritic shale	Kwep R,N tributary of Ok O
23	1610-14	Jo	U.Jurassic	L.Callov.(?+Oxf.)	M	Am	Oo	Siltstone with chert	Ok Om nr Ok Fu junction
24	1981	Tmi	Miocene (general)		P	Fp,Fs	Oo	Grey mudstone	Bun R, Star Mts
25	1636,39-40	Tr	L. or m.Miocene	U. Te/l. Tf	P	Fb	Cl,Fl	Coral and algal biomicrites	Kauwol R
	1641	"	L. Oligocene	Te	P	Fb	Fl	Calcareous silty sandstone	
26	1648	Tmi	Late l. Miocene	N.8	P	Fp	Oo	Grey siltstone	Kauwol R
27	6869-1639	Tmi	L. or m. Miocene	U.Te/Tf	P	Fb	Oo		Kauwol R;coll. by Smit(1968) palaeont.by Binnekamp (1970)
28	6869-1645	Tr	Tertiary (general)		P	Fb	Oo		Krom Ck.;coll. by Smit(1968) palaeont.by Binnekamp(1970)
29	6869-1640 B,E,F	?Tr	L.or m.Miocene	U.Te/Tf	P	Fb	?Fl		Kauwol R;coll.by Smit(1968) palaeont.by Binnekamp(1970)
30	1632	Tmi	M.Miocene or younger	No.9 or younger	P	Fp	Oo	Very fine quartz sandstone	Kauwol R
	1631	Tr	L. or m.Miocene	U.Te/l.Tf	P	Fb	Cl	Fragmental algal biomicrite	
31	1658	?Tr	U.Olig./m.Miocene	L.Te-l.Tf	P	Fb	Fl	Fragmental coral biomicrite	N tributary of Kwirok R
	1659	Tmp	M.Miocene or younger	N.9 or younger	P	Fb	F.	Grey siltstone	
32	1654	?Tr	M.Miocene	L.Tf	P	Fb	Fl	Foraminiferal micrite	Kwirok R, W of Tabubil
	1655	"	L. or m. Miocene	U.Te/l.Tf	P	Fb	Fl	Fragmental coral biomicrite	
33	6869-1638B	Tmp	L. or m.Miocene	U.Te/Tf	P	Fb	Oo		Kwirok R;coll.by Smit (1968) Palaeont.by Binnekamp(1970)
34	1651	Tmr	Late l.or m.Miocene	Top u.Te/l.Tf	P	Fb	Cl	Foraminiferal-coral biomicrite	S side of Kwirok R
35	6869-1647A	?Tr	U.Olig./l.Miocene	Te	P	Fb	Fl		Headwaters of Kauwol R coll.by Smit (1968) palaeont by Binnekamp(1970)
36	1982	Kue	U. Cretaceous	?L.Turonian	P	Fp	Oo	Dark grey siltstone	Kauwol-Bugum R junction
37	1642	Tmi	M.Miocene or younger	N.9 or younger	P	Fp	Oo	Brown sandy siltstone	SW of Mount Ian
	1643	"	M.Miocene	N.9-14	P	Fp	Oo	Grey siltstone	
	1644	Tr	U.Olig./l.Miocene	Te	P	Fb	Fl	Foraminiferal biomicrite	
38	1681	Tr	L.or m.Miocene	U.Te/l.Tf	P	Fb	Cl	Fragmental biomicrite	W of Pubilan
39	6869-1621	Tmp	L.or m.Miocene	U.Te/Tf	P	Fb	Oo		Headwaters of Ok Oilor, 12 km NW of Tabubil; coll. by Smit (1968), palaeont. by Binnekamp (1970)
40	6131K	Tr	L.Oligocene	Te	P	Fb	Cl	Nummulitic biomicrite	SE side of hill of Gundagai helipad,Pubilan

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
41	1986	Tr	U.Olig./l.Miocene	Te	F	Fb	Fl	Algal-foraminiferal biomicrite	S of 'Yass' helipad, Fubilan
42	1228	JKt	?L.Cretaceous		F,M	Fs,Bl	Oc	Grey siltstone	W side of Ok Tedi headwaters
	1219-27,29-30	"	?		M	Bl	Cl	Sandstone	
43	6135	Tmp	M.Miocene	M. 9-14	F	Fp	Fl	Grey siltstone	Sulphide Cr,E of Fubilan
44	6869-1622 B,C	?Tr	L.Miocene	U.Te	F	Fb	Fl		Ok Ningi nr. Ok Tedi junction coll.by Smit (1968), palaeo.by Binnekamp (1970)
45	0010,1682	Tr	U.Olig./l.Miocene	Te	F	Fb	Fl	Fragmental biomicrite	Old Ok Tedi base camp
	1684	"	L. or m.Miocene	U.Te/l.Tf	F	Fb	Fl	Dolomitic bryozoan-foraminiferal biomicrite	
46	3456	Jn	U.Jurassic	?Oxf-Kimm.	M	Bv	Fl		Junction of Ok Tedi and Atem R
	3470	"	U.Jurassic	?Callovian	M	Bv	Fl		
47	3459	Jn	U.Jurassic		M	Am	Fl		Giungerum R, headwaters of Ok Tedi
	3462,65	Jui/Jkt	?U.Jurassic		M	Bl	Fl		
	3464	?JKt	L.or M.Cretaceous		M	Am	Fl		
	3466-67	Jui	U.Jurassic	Oxfordian	M,P	Bv,Dn	Oc	Dark grey silty shale	
48	6869-1651 B,C	?Tr	U.Olig./l.Miocene	Te	F	Fb	Fl		Headwaters of Ok Tedi; coll.by Smit (1968), palaeont. by Binnekamp (1970)
49	6869-1649	?Tr	U.Olig./m.Miocene	Te/l.Tf	F	Fb	Fl		Kam R., headwaters of Ok Tedi; coll.by Smit (1968) palaeont.by Binnekamp (1970)
	6869-1650 A	"	L.or m.Oligocene	Tc/Td	F	Fb	Fl		
50	1583	Tr	M.Oligocene	Td	F.	Fb	Oc	Limestone clast from conglomerate	D.D.H., Tifalmin Cu prospect
51	1031,33,36-38, 40-41	Tr	L.Miocene	U.Te	F	Fb	Oc	Algal-foraminiferal biomicrites	Section on N side of Tifalmin valley
	1032,34	"	U.Olig./l.Miocene	Te	F	Fb	Oc	Foraminiferal biomicrites	
	1035,39	"	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Fragmental dolomitic biomicrite	
	1042	"	Miocene (general)		F	Fb	Oc	Algal-coral biomicrite	
52	1043	Tr	U.Olig./l.Miocene	Te	F	Fb	Fl	Lepidocyclina biomicrite	Sram R near Tifalmin
53	5034	Tmt	late l.Miocene	M.8 or basal M.9	F	Fp	Oc	Pale grey mudstone	Between Nong R & Tifalmi -immediately overlying 5034
	5035-36	Tr	M.Miocene	L.Tf	F	Fb	Oc	Algal-foraminiferal biomicrite	
54	5037	Tr	L.or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Fragmental biomicrite	Nong R, SW of Telefomin
55	0857,61,69	KTf	U.Palaeocene/l.Eocene		F	Fp	Oc	Petroliferous limestone, grey siltstone	Section on N side of Nong R
	0864,65	Tr	U.Olig./l.Miocene	Te	F	Fb	Oc	Coral-molluscan biomicrite	
	0859,66	"	L.Miocene	U.Te	F	Fb	Oc	Algal foraminiferal biomicrite	
	0858,60,62-63	"	L.or m.Miocene	U.Te/l. Tf	F	Fb	Oc	Fragmental foraminiferal and bryozoan biomicrite	
56	7045	Ktf	U.Cretaceous	?U.Cenomanian	F	Fp	Fl	Fine grained, green-grey streaky limestone	6 km NW of Telefomin
57	0657	KTf	?		M	Bl	Oc	Micaceous siltstone	4 km SW of Eliptamin
58	0661	KTf	prob. Eocene		F	Fp	Cl	Dark grey calcilutite	4 km NNE of Telefomin
59	04NG-1008	Tr	U.Olig./l.Miocene	Te	F	Fb			3 km N of Telefomin
60	04NG-1009	Tr	U.Olig/l.Miocene	Te	F	Fb			Sol R.at Telefomin

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage type	Diagnostic Fossils	Sample type	Lithology	Location
61	1571	?KTf	?U.Jurassic	?Tithonian	M	Am	Fl		Obtained from villagers; reported locality Sol R near junction with Sepik R
62	1530	Tmt	M.Miocene	M.9-14	F	Fp	Oc	Mudstone	Sepik R SSW of Telefomin
63	1835	Tmt	Late l.Miocene	M.8	F	Fp	Oc	Grey shale	Sepik R Below Feramin
64	3007	KTf	?L.Cretaceous		F	Fs	Oc	Dark grey shale	Sol R sections ENE of
	3010	"	U.Cretaceous	Turonian	F	Fp	Oc	Dark grey shale with plant hash	Telefomin
65	3053	KTf	U.Cretaceous	Senonian	F	Fp	Oc	Sheared grey silty mudstone	Sol R sections, ENE of Telefomin
	3057	"	U.Cretaceous	?Cenomanian	F	Fp	Oc	Dark grey silty shale	
	3058	"	U.Cretaceous	L.Turonian	F	Fp	Oc	Dark grey silty mudstone	
66	3062-73	KTf	Cretaceous		M	Bv,Bl	Fl	Micaceous sandstone	SolR NE of Telefomin
67	8016	KTf	U.Cretaceous	?L.Turonian	F	Fp	Oc	Grey siltstone	S tributary of Sol R E of Telefomin
68	04NG-101	Tmt?	Eocene		F				8 km SE of Telefomin
69	04NG-1010	Tmt?	L. or m.Miocene	U.Te/l.Tf	F				2 km E of Feramin
70	4001-14	Jo	U.Jurassic	?Callov.& m.Kimm. Tithonian	M	Bv	Cl	Black shale with chert	headwaters of Ok Om
	1067-69	?Jo	L.Cretaceous		M	Bv	Cl	Black shale with chert	
	0206-52	Jo	U.Jurassic	U.Oxfordian	M	Am,Bv	Cl	Black shale with chert	
71	0906,08-14,17-19,21-22	Jo	U.Jurassic	M.Kimm.l.Tithonian	M	Bv,Am	Oc		Anamen Cr.,headw. of Ok Om
	2090,83	"	U.Jurassic/L.Cretac.	Tithonian/Valanginian	M	Am	F.		
	2081	?KTf	U.Cretaceous		F	Fp	Fl	Calcareous siltstone with shale clasts	
72	0133-35	Tr	M.or?Late l.Miocene	L.Tf or ?Top u.Te	F	Fb	Oc	Foraminiferal biomicrites	Sepik R headw,E of
	1036-38	Tmt	Late l.Miocene	M.8	F	Fp	Oc	Siltstone	Feramin
	0139	Tr	L.Oligocene	Te	F	Fb	Fl	Nummulitic biomicrite	
73	0130	Tmts	?U.Miocene or Pliocene		F	Fp,Bm	Oc	Silty limestone	Sepik R headw,E of Feramin
74	5101	KTf	U.Cretaceous	Cenomanian	F	Fp	Cl	Pale grey calcareous siltstone	Afi R, S tributary of Ok Om
75	5098	KTf	U.Cretaceous		F	Fp	Oc	Grey siltstone	Afi R, S tributary of Ok Om
	5100	"	U.Jurassic/L.Cretaceous		F	Fs	Oc	Dark grey micaceous siltstone	
76	5106,08	KTf	?L.Cretaceous		F	Fs	Fl,Oc	Grey micaceous siltstone	Afi R,S tributary of Ok Om
77	1826	KTf	U.Cretaceous	U.Senton.l.Maast.	F	Fp	Oc	Siltstone	S Tributary of Ok Om
	1828	Tr	M.Miocene	L.Tf	F	Fb	Fl	Coral-foraminiferal biomicrite.	
78	0752,0681	Jo	?U.Jurassic	?M.Tithonian	M	Am	Fl		Bi R, S tributary of Ok Om
79	0663	KTf	?L.Cretaceous		F	Fs	Oc	Dark grey siltstone	Bi R, S tributary of Ok Om
	0665,74,76,78,82	"	U.Cretaceous		F	Fp	Oc	Glauconitic sandstones	
80	0755	KTf	U.Cretaceous		F	Fp	Oc	Dark grey shale and sandstone	Bi R,S tributary of Ok Om
	0756	"	U.Palecocene/l.Eocene		F	Fp	Oc	Dark grey shale with concretions	

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
81	0759	?Jo	?U.Jurassic	?M.Tithonian	M	Am	Fl		Bi R, S tributary of Ok Om
82	0124,26-29	KTf	prob. Cretaceous		M	Am	Fl		Bi R, S tributary of Ok Om
83	0763	Jo	M.Jurassic	U.Bajocian	M	Am	Cl	Dark grey concretionary shale	Bi R, S tributary of Ok Om
84	3359	Tmt	Late l.Miocene	M.8	F	Fp	Oc	Blue mudstone	Yamma R, W of Tekin
	3361	Tr	M.Miocene	L.Tf	F	Fb	Fl	Foraminiferal-coral biomicrite	
85	3351,53	Tr	L.or m.Miocene	U.Te/l.Tf	F	Fb	Fl	Algal-foraminiferal biomicrite	Tekin R, 8 km WNW of Tekap
	3355	"	U.Oligocene	U.Te	F	Fb	Fl	Foraminiferal biomicrite	
	3354	"	L.Oligocene	Te	F	Fb	Fl	Nummulitic biomicrite	
86	5077	KTf	U.Cretaceous	U.Cenom./l.Turon.	F	Fp	Oc	Calcareous siltstone	Cr.W of Kutik R, S trib. of Ok Om
87	5073-76	?Jo	U.Jurassic	M. Kimm./Tithonian	M	Am,Bv	Fl	Dark grey concretionary siltstone	Cr.W of Kutik R,S trib. of Ok Om
88	1814	KTf	U.Cretaceous	Turon./Coniacian	F	Fp	Oc	Grey siltstone	W branch of Kutik R
89	3410	Tr	U.Eocene	Tb	F	Fb	Fl	Sandy glauconitic nummulitic discocyclina biomicrite	N Tekin section, 2nd thrus sheet
	3411	"	L.Oligocene	Te	F	Fb	Oc	Sandy nummulitic biomicrite	
	3412-14,16	"	U.Oligocene	L. Te	F	Fb	Oc Cl	Lepidocyclina and foraminiferal biomicrite	
	3415	"	U.Olig./l.Miocene	Te	F	Fb	Cl	Algal-foraminiferal biomicrite	
	3417,19,22-24	"	L.or m.Miocene	U.Te/l. Tf	F	Fb	Oc Cl	Algal and foraminiferal biomicrites	
90	3426,28-31	Tr	M.or u.Eocene	Ta/Tb	F	Fb	Fl	Discocyclina biomicrites, biosparites & pelsparites	Derived from central
	3432-36	"	L.Oligocene	Te	F	Fb	Fl	Sandy nummulitic biomicrites and pelsparites	Tekin thrust sheet
	3427	"	U.Olig./l.Miocene	Te	F	Fb	Fl	Algal-lepidocyclina biomicrite	
91	1029	Tr	U.Olig./l.Miocene	Te	F	Fb	Oc	Algal-foraminiferal biomicrite	Top of central Tekin, thrust sheet
92	3337-38, 3444	Tr	L.Oligocene	Te	F	Fb	Oc	Nummulitic biomicrite	S Tekin section, 2nd thrus sheet
	3339,3439,42-43	"	U.Oligocene	L.Te	F	Fb	Oc	Lepidocyclina biomicrite	
	3340,3441	"	U.Olig./l.Miocene	Te	F	Fb	Oc	Foraminiferal-algal biomicrite	
	3438,40	"	L.or m.Miocene	U.Te/l.Tf	F	Fb	Oc Cl	" " "	
	3342,43	"	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	" " "	
	3437	"	M Miocene	L.Tf	F	Fb	Oc	" " "	
	3344	Tmt	Late l.Miocene	M.8	F	Fb	Oc	Grey siltstone	
93	3333-35,45	Tmt	Late l.Miocene	M.8	F	Fp	Oc	Grey mudstone	Type sec.Tmt:S Tekin secti
94	3346	Tmt	Late l.Miocene	M.8	F	Fp	Oc	Grey mudstone	Between Divana & Tomiana, Tekin Valley
95	3347	Tr	L. or m.Miocene	U.Te/l.Tf	F	Fb	Fl	Bryozoan micrite	Between Tekap & Divana, Tekin Valley
96	3029	Tr	l.or m.Miocene	U.Te/l.Tf	F	Fb	Fl	Algal-foram. biomicrite	Kutik R,S trib. of Ok Om
97	3032	?Jo	?U. Jurassic	?M.Tithonian	M	Am	Fl	Ku	Kutik R,S trib. of Ok Om
98	3017	Tr	L.Oligocene	Te	F	Fb	Fl	Nummulitic-alveoline biomicrite	Kutik R,S trib. of Ok Om
	302.	"	U.Oligocene	L.Te	F	Fb	Fl	Algal-foraminiferal biomicrite	
99	0331	KTf	Early U.Cretaceous		F,P	Fp,Fs,Dm.	Oc	Black shale	E branch of Kutik R
	0329	"	L. Cretaceous		F	Fs	Oc	Shale	
100	3407,08	Tr	L.or m.. ..ene	U.Te/l.Tf	F	Fb	Fl Oc	Fragmental foraminiferal biomicrite	N side of Ariga R, N Tekin valley

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
101	3332	base Tmt	Late l.Miocene	N.8	F	Fp	Oc	Grey calcareous siltstone	Oksapmin-Tekin Road
102	3330	Top Tr	Late l.or m.Miocene	Top u.Te/l.Tf	F	Fb	Oc	Algal foraminiferal biomicrite	Oksapmin-Tekin Road
103	3328	top Tr	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Algal foraminiferal biomicrite	Oksapmin-Tekin Road
	3329	" "	prob.late l.Miocene	prob.top u.Te	F	Fb	Oc	Coral foraminiferal biomicrite	
104	3321-22	base Tmt	Late l.Miocene	N.8	F	Fp	Oc	Grey calcareous siltstone	Near Oksapmin
105	0407	Jo	?		M	Am	Fl		Ok Om-Lagaip R Junction
106	1014-15,17 25,27-28 4033-66	Jo	Early U.Jurassic	L.Callovian	M	Am	Oc	Black siltstone and shale	Ok Om-Lagaip R junction; type locality of Jo
	1026	"			W		Oc		
107	0489-91	Jo	U.Jurassic	Oxfordian	M	Bv,Bl	Oc	Black shale	Strickland R, below Om-Lagaip Jn
108	0459	Tr	M.Miocene	L.Tf	F	Fb	Fl	Algal-bryozoan biomicrite	Sabum Cr, S trib. Lagaip R
109	0461-63	Jo	U.Jurassic	Oxfordian/ l.Callovian	M	Am	Cl	Black micaceous shale	Sabum Cr, S Trib.Lagaip R
110	0122	Jom	?		M	Bv	Fl	Chert nodule from black phyllite	Nene R, N trib.of Lagaip R
111	1679	Tmp	? Miocene		F	Fs	Oc	Shelly mudstone	Ok Awut,W trib.of Alice R
112	6869-16270	Tmp	L.or m.Miocene	U.Te/Tf	F	Fb	Oc?		Ok Mani headw,W of Tabubil; coll.by Smit(1968),palaeont. by Binnekamp(1970)
	6869-1628	Tmp?	U.Miocene	U.Tf	F	Fb	Oc?		
113	6127	Tmp	Mid.m.Miocene	N.10-12	F	Fp	Oc	Sandy siltstone	N trib.of Ok Mani,W of Tabubil
	6123,25-26,30	"	M.Miocene or younger	N.9 or younger	F	Fp	Oc	Sandy siltstone	
	6129B	"	L.or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Marly limestone	
114	1998	Tmp	M.Miocene or younger	N.9 or younger	F	Fp	Oc	Shale	W of Tabubil in Ok Tedi
115	1805-06	Tmr	?Late l.or m.Miocene	?N.8-9	F	Fp,Mn	Oc	Marl with shelly concretions	Ok Tedi, S of Tabubil
116	1807	Tmr	?Late l.or m.Miocene	?N.8-9	F	Fp,Mn	Oc	White marl	Ok Tedi, SE of Tabubil
117	6869-1637	Tpb	Pliocene or younger		F	Fs	Oc?		Ok Tedi,S of Tabubil; coll. by Smit(1968), palaeont. by Binnekamp (1970)
118	1853-54	Tmp	M.Miocene or younger	N.9 or younger	F	Fp	Oc	Grey siltstone and pyritic mudstone	10 km SE of Tabubil
119	1846	Tmr	M.Miocene	N.12	F	Fp	Oc	Glauconitic shelly mudstone	Ok Tedi, SE of Tabubil
	1845	"	M.Miocene or younger	N.9 or younger	F	Fp	Oc	Glauconitic shelly sandstone	
120	1236	Kui	L.Cretaceous		F	Fs	Oc	Pale grey glauconitic sandstone	Below Hindenberg Wall 12 km ENE of Tabubil
121	1992	Kue	U.Cretaceous		F	Fs	Oc	Grey shale with bivalves	Ok Menge,SE of Tabubil
	1993	"	?Cretaceous		M	Bv	Oc		
122	6869-1636B	?Tr	U.Olig./m.Miocene	Te/l.Tf	F	Fb	Fl		Ok Arip,SE of Tabubil;Coll. by Smit (1968), palaeont. by Binnekamp (1970)

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
123	1690	?Tr	L. or m.Miocene	U.Te./l.Tf	F	Fb	Fl	Shelly limestone conglomerate	Ok Gamik, W of Andi Range
	1688	Tmpl	prob. m. Miocene	prob. l.Tf	F	Fb	Oc	Fragmental coral-foraminiferal biomicrite	
	1687	Tmp	M.Miocene	M.9-14	F	Fp	Oc	Sandy siltstone	
124	1231	Tr	L.Miocene	Te	F	Fb	Fl	Cream limestone and some	Hindenberg Wall at head of
	"	"	M.Miocene	L.Tf	F	Fb	Fl	shelly biomicrite	Wok Wunik
125	1191	Kui	Mesozoic (general)		F	Os	Oc	Glauconitic sandy limestone	Head of Wok, Feneng, below
	1195	Tr	L. Oligocene	Te	F	Fb	Oc	Nummulitic pelsparite	Hindenberg Wall
	1193	"	prob. l.Miocene	prob. u.Te	F	Fb	Oc	Coral-foram. biomicrite	
126	1217	Tr	Miocene (general)		F	Fs	Fl	Brown calcareous siltstone	Head of Wok Feneng
127	6869-1634A,B.	Tr?	U.Olig./l.Miocene	Te	F	Fb	Fl		Head of Wok Feneng; coll.by Smit (1968), palaeont. by Dinnekamp (1970)
128		Kui	U.Cretaceous	Cenomanian	F	Fp	Oc	Blue-grey mudstones, silty mudstones and glauconitic sandstones	Wok Feing, W of Olsobip; after Osborne (1945), Glaessner (1945) (samples M.224-5, 235-8).
129		?Kui	L. Cretaceous	U.Albian	M,F	Bv,Fs	Oc	Dark grey mudstone and shale	Wok Bok, W of Olsobip; after Osborne (1945), Glaessner (1945)(sample M.239)
130		?JKt	L. Cretaceous	U.Albian	M,F	Bv,Bl Fs,Fp	Oc	Dark shale	Wok Feneng-Wok Wunik junction,S of Olsobip; partly after Osborne (1945) Glaessner (1945)(sample M. 210)
	3141,46	Tr	?U.Olig./l.Miocene	?Te	F	Fb	Fl	Coral biomicrite and limestone conglom	
131		Jb	M.or U.Jurassic	Bathon, Oxfordian	M	Bv	Oc	Dark grey shale	Wok Feneng above junction with Bol R, N of Olsobip; after Osborne (1945), Glaessner (1945)(sample M.252)
132		Ja	U.Jurassic	Oxfordian	M	Bv,Bl	Oc	Dark shale and thin sandstones	Wok Feneng between Bol & Wunik junctions, E of
		Jui	U.Jurassic	Oxf./?Tithon.	M	Bv,Bl	Oc	Dark grey silty shales	Olsobip after Osborne(1945) Glaessner(1945)(samples M.215,19,13)
133	3127	Tr	U.Olig./l.Miocene	Te	F	Fb	Fl	Fragmental coral-miliolid biomicrite	W of Bolivip
134	3110	Tr	U.Olig./l.Miocene	Te	F	Fb	Oc	Fragmental foraminiferal biomicrite	Landslide above Bolivip Mission
	3114	"	L.Miocene	U.Te	F	Fb	Fl	Fragmental foraminiferal biomicrite	
135	6053-55,57	Tr	L.Oligocene	Te	F	Fb	Oc,Cl	Sandy foraminiferal-algal biomicrite	Landslide at head of Wongop R,4km ENE of Bolivip Missio
	6056	"	U.Olig./l.Miocene	Te	F	Fb	Cl	Foraminiferal biomicrite	
136	1202	?Jaki	U.Jurassic	prob.Callovian	M	Bv	Cl	Grey sandy siltstones	Head of small tributary of
	"	"	L.Cretaceous		F	Fs	Cl	Grey sandy siltstone	Wok Lump
	1197	?JKt	L.Cretaceous		F	Fs	Cl	Dark brown micaceous siltstone	
	1199,1201	"	L.Cret./U.Jurassic		F	Fs	Cl	Brown micaceous siltstone	

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
137	1338	Tr	U.Olig./l.Miocene	Te	F	Fb	Oc	Algal-foraminiferal	Hindenberg Wall SW of Feramin Altimeter section and float from base of cliff
	1343,45	"	L.Miocene	U.Te	F	Fb	Oc	" biomicrite	
	1335,40	"	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	" "	
	1337	"	Miocene (general)		F	Fb	Oc	" "	
	3097	"	L.Miocene		F	Fb	Fl	" "	
	3098	"	?U.Olig./l.Miocene	?Te	F	Fb	Fl	" "	
138	3101	Kue	Cretaceous (general)		F	Fs	Cl	Silty mudstone	Base of Hindenberg Wall, nr. Yoliptigin
139	3105	Tr	L.Oligocene	Te	F	Fb	Fl	Dolomitised nummulitic biomicrite	Base of Hindenberg Wall, Ogop R trib
140	3107	Kui	Early U.Cretaceous	?Turonian	F,P	Fb,Ps Dn	Oc	Silty mudstone	Base of Hindenberg Wall, N of Mohamdangabip
141	6045	Tmt	M.Miocene or younger	M.9 or younger	F	Fp	Oc	Grey sandy siltstone	Bimin village, Tukin valley
142	6031	Kui	U.Cretaceous		F	Fp	Fl	Glauconitic quartz sandstone	Tukin valley, Ne of Bimin
143	6021,26-27	Kue	?Cretaceous		M	Bv	Fl		Tukin valley, E of Bimin
144	6018,22	Tr	L. or m.Miocene	U.Te./l.Tf	F	Fb	Cl	Algal and foraminiferal biomicrites	Ridge between Bak and Tukin valleys
	6019,23	"	M.Miocene	L.Tf	F	Fb	Cl	Fragmental coral and algal biomicrites	
	6020	"	Younger Tertiary.		F	Fb	Cl	Fragmental coral biomicrite	
145	6015	Tmt	prob. late l.Miocene	prob.m.8	F	Fp	Oc	Grey sandstone	Bak valley near Kweptanap
146	6010-11	Tr	U.Olig./l.Miocene	Te	F	Fb	Oc	Fossiliferous micrite and miliolid biomicrite	Ridge between Tekin and Bak valleys
147	1282-84	Kui	?		M	Bv,Bl	Oc		NW trib. of Strickland R
148	0186-88,90-93, 4067-93	Jk	U.Jurassic	M.Kimm./Tithonian	M	Am,Bv Bl	Cl		Strickland R from sandstone immediately overlying Ps
	0189	"	L.Jurassic	Toarcian	M	Am	Cl		
149	1809	Tmt	?L. or m.Miocene		F	Fs	Oc	Shelly siltstone	Tukin valley below Bimin
150	1810	Tmt	M Miocene or younger	M.9 or younger	F	Fp	Oc	Silty sandstone	Tukin valley below Bimin
	1811	Tr	L. or m.Miocene	U.Te./l.Tf	F	Fb	Oc	Coral-foraminiferal biomicrite	
151	2320	?Kui	?L. Cretaceous		F	Fs	Oc	Grey siltstone	NW tributary of Strickland
152		JKt	U.Jurassic	Oxf. or post Oxf.	M,P	Bv,Dn	Cl	Sandstone-shale succession	NW tributary of Strickland R; after Jenkins & White (1970), (sample MND.147)
153		Kui	?L. to U.Cretaceous	?Albian, Cenom. to Campanian	F,P	Fp,Ps Dn	Oc	Mudstone-sandstone succession	E.Trib. of Strickland R., after Jenkins & White(1970) type section Kui.
154	0199	Tmt	Early l.Miocene	M.8	F	Fp	Oc	Grey siltstone	6 km SE of Oksapmin
155	0200	Tr1	L.Oligocene	Te	F	Fb	Oc	Nummulitic biomicrite	'Hills Rock' u.Strickland Gorge
156	2395-96	Tmts	M.Miocene or younger	M.9 or younger	F	Fp	Oc	Micaceous siltstone	4 km W of Lake Kopiago
157	2399	Tmts	M.Miocene or younger	M.9 or younger	F	Fp	Oc	Fine micaceous sandstone	3 km WSW of Lake Kopiago

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
158	3278,80	Tr	L or m.Miocene	U.Te./l.Tf	F	Fb	Fl	Algal biomicrites	2 km NW of Lake Kopiago, blocks derived from Mt Aiago synoline
	3282	"	prob. m.Miocene	prob. l.Tf	F	Fb	Fl	Coral-algal biomicrite	
159	1988	Tpb	Miocene (general)		F	Fp	Oc	Grey shale	Korebon, N of Ningerum
160	1989	Tmr	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Silty limestone	Ok Gamik, SW of Andi Range
	1990	Tmp	U.Miocene		F	Fp	Oc	Grey shale underlying Tmw	
161	1789, 90	Tmpl	M.Miocene or younger	M.9 or younger	F	Fp	Oc	Silty mudstone and marl	Wok Feneng below limestone gorges
	1792	"	Miocene (general)		F	Fp	Oc	Calcareous siltstone	
	1794	"	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Marly limestone	
162	1787	Tmr	M.Miocene	L.Tf	F	Fb	Oc	Foraminiferal biomicrite	Wok Feneng below limestone gorges
163		Tr	L. or m.Oligocene	To/Td	F	Fb	Oc	Nummulitic limestones	N slopes Mt Mabion after Chawner (1939)
164		Tr	L. or m.Oligocene	To/Td	F	Fb	Oc	Nummulitic limestones	NW slopes Mt Karik; after Zehnder & de Caen (1955)
165	1777	Tr	Miocene (general)		F	Fb	Oc	Fragmental foraminiferal biomicrite	Wok Luap Gorge
	1779-81	Kui	?Mesozoic		F	Fs	Oc	Sandy mudstone and siltstone	
166		Kui	U.Cretaceous	Cenomanian L. Turonian	F	Fp	Oc	Interbedded shales, siltstones, fine sandstones	Wok Luap - Wok Tungum section after Zehnder & de Caen (1955)
167	3034	Kui	U.Cretaceous	Cenomanian	F	Fp	Oc	Glauconitic sandy siltst.	Blucher Range section
	3035,36,41	"	U.Cretaceous	U.Cenomanian (?L.Turon.)	F,P	Fp,Fs,Ds	Oc	Mudstone and glauconitic Siltstone	
	3033,37-39,34 72	"	U.Cretaceous	?Cenom./Turon.	F,P	Fs,Fs,Ds	Oc	" " "	
	3481-97	"	U.Cretaceous	Cenom./Turon.	M	Am,Bv	Fl		Float from landslide debris
	3498	Tr	U.Olig./l.Miocene	Te	F	Fb	Fl	Foraminiferal-algal biomicrite	
	3475-80	"	Miocene (general)		F	Fb	Fl	" " "	Limestone blocks at base of Tr cliff
168	6077,81,83,90	Jn	?M.Jurassic	?Bajocian	M	Am,Bv	Cl		Wongop tributary section
	6105	"	M. or U.Jurassic	M.Bajoc./U.Jurassic	M	Am	Cl		
	6102	?Jn	prob.L.Cretaceous		M		Cl	Asteroid	
169	1774-76	Tr	Miocene (general)		F	Fb	Cl	Foraminiferal biomicrite	Cliff W of Wongop R
170	1267	Kui	U.Cretaceous	U.Cenomanian	F,P	Fp,Fs,Ds	Oc	Grey siltstone	Wongop R,E of Blucher Range
171	1132-34	Tr	Miocene (general)		F	Fb	Oc	Fragmental biomicrite	Wongop R,E of Blucher Range
172	1171,73-78	Jui	?		M	Bv,Bl	Oc	Quartz sandstone	Strickland R at Balalo R junction
173	1169	?JKt	?Cretaceous		F	Fs	Oc	Grey to brown siltstone	Strickland Gorge
174	1168	JKt	?L. Cretaceous		F	Fs	Oc	Grey siltstone	Strickland Gorge
175		JKt	U.Jurassic to L.Cretadeous	Partly Neocom.-Aptian, ?Albian	F,P,M	Fs,Fs,Ds, Bl,Bv	Oc	Sandstone-shale succession	W slopes Mt Toro; after Jenkins & White (1970), type section JKt
176	1703-04	?Jk	U.Jurassic	L.Callovian	M	Am,Bv	Oc	Grey shale	Balalo R,N. Trib. of Strickland R

Locality Number	Sample No.	Formation	Age	Stage or Zone	Assemblage Type	Diagnostic Fossils	Sample Type	Lithology	Location
177	1701	Jui	?U.Jurassic		P	Dn	Oc	Grey siltstone	Balalo R,E trib.Strickland R
178	1578	?Tmts	M.Miocene or younger	N.9 or younger	F	Fp	Fl	Grey siltstone	Headwaters of Tumbudu R
179	1602	Tr	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Fragmental biomicrite	Muller Ra 19 km NNW Mt Karoma
180	3266	Tr	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Partly recrystallised biomicrite	Lake Kopiago to Tumbudu road
	3269-70	"	M.Miocene	L.Tf	F,M	Fb	Oc	Sandy biomicrite with gastropods	
	7000-01	"	M.Miocene	L.Tf	F	Fb	Oc	Sandy foraminiferal biomicrite	
181	3261	Tr	L. or m.Miocene	U.Te/l.Tf	F	Fb	Oc	Coral-foram. biomicrite	Lake Kopiago to Tumbudu road
	3264	"	M.Miocene	L.Tf	F	Fb	Oc	Foraminiferal biomicrite	
182	3259	Tmts	Miocene (general)		F	Fp	Oc	Sandy siltstone	Lake Kopiago to Tumbudu road
183	7003	Tmts	M.Miocene or younger	N.9 or younger	F	Fp	Oc	Foraminiferal biomicrite	Tumbudu valley,SW of Lake Kopiago
184	7006	Tr	L. or m.Miocene	U .Te/l.Tf	F	Fb	Oc	Sandy biosparite	Tumbudu valley, S of Lake Kopiago
185	7007	Tr	M.Miocene or younger	N.9 or younger	F	Fp	Fl	Foraminiferal biomicrite	" " " "
186	1210	Tr	Younger Tertiary (gen.)		F	Fs	Oc	Limestone	Wok Luap gorge
187	1161-65,4015-32	Kui	Late L.Cretaceous	Albian	M	Am,Bv	Oc	Siltstone	South Strickland R section
	3366, 91	"	Early U.Cretaceous	Lowermost Cenoman.	F	Fp	Oc	Mudstone	
	3370-71,73	"	Early U.Cretaceous		F,P	Fp,Dn,Fs	Oc	Mudstone and siltstone	
	3384	"	Early U.Cretaceous	L.Cenomanian	F,P	Fp,Dn	Oc	Mudstone	
	3393-94	"	Early U.Cretaceous	Cenomanian	F	Fp	Oc	Mudstone	
	3396	"	Early U.Cretaceous	U.Cenomanian	F	Fp	Oc	Mudstone	
	3405	"	Early U.Cretaceous		F	Fs,Dn	Oc	Mudstone	
	3406	"	U.Cretaceous	?Turon./Senonian	F	Fp	Oc	Silty mudstone	
	3372	"	?		V		Cl	?Plesiosaur vertebrae	
	3364,88,3402	"	?		M	Am	Fl		
	3374-76,3398-3400	"	?		M	Am,Bv	Oc,Cl	Shale with concr. nodules	
	1369, 73-79	"	?		M	Am	Cl		
	1161	"	?Cretaceous		F	Fs	Oc	Sandstone	
	1156	Tr	U.Olig./l.Miocene	Te (?U .Te)	F	Fb	Fl	Foraminiferal biomicrite	
188	1149-52	Tr	?U.Olig./l.Miocene	?Te	F	Fb	Oc	Foraminiferal biomicrite	Strickland Gorge
189	1148	Tr	M.Miocene or younger	N.9 or younger	F	Fp	Oc	Light grey calcareous siltstone	Strickland Gorge
190		Tpw	?		L		Oc	Green to black silty sandstone	Burnett R
191	1605	Tpw	Pliocene or younger		F	Fs	Oc	Glauconitic sandstone	Burnett R
	1608	Tma	M.Miocene	N.11	F	Fp	Fl	Shelly siltstone	
192	1693	Tma	Prob. m. or u.Miocene		F	Fp	Oc	Glauconitic shelly sandy siltstone	Burnett R
	1695	?Tpw	Neogene (general)		F	Fb	Cl	Coral biomicrite	
193	1140	Tma	?L.Miocene	Te(?U .Te)	F	Fb	Oc	Foraminiferal biomicrite	Cecilia Anticline,Strickland R
194		Tma	U.Miocene	N.14-17	F	Fp	Oc	Calcareous mudstone with shelly horizons	Headwaters of Carrington R; after White (1972)
195	6111	Tr	L. or m.Miocene	U.Te/l. Tf	F	Fb	Fl	Foram.-molluscan biomicrite	Magnetite Cr., Fubilan
196	6120D	Tr	M.Miocene	L. Tf	F	Fb	Fl	Silty lepidocycline biomicrite	Magnetite Cr. Fubilan

REFERENCES

ADAMS, C.G., 1970 - A reconsideration of the East Indian letter classification of the Tertiary. Bull. Br. Mus. nat. Hist. (Geol.), 19(3); 137 pp.

BINNEKAMP, J.G., 1970 - Foraminifera and age of samples from the Star Mountains, Territory of Papua & New Guinea. Bur. Miner. Resour. Aust. Rec. 1970/14 (unpubl.).

BLOW, W.H., 1969 - Late Middle Eocene to Recent planktonic foraminiferal stratigraphy. Proc. 1st Internat. Conf. Planktonic Microfossils, Geneva, 1967, 1; 199-421.

CHAWNER, W.D., 1939 - Report on geological reconnaissance in Permit 4 area during 1937 and 1938. Island Expl. Co. Pty Ltd (unpubl.).

CLARKE, W.J., & BLOW, W.H., 1969 - The interrelationships of some late Eocene, Oligocene and Miocene foraminifera and planktonic biostratigraphic indices. Proc. 1st Internat. Conf. Planktonic Microfossils, Geneva, 1967, 2; 82-97.

DAVIES, H.L., & NORVICK, M., (in press) - Explanatory notes to accompany Blucher Range geological map. Bur. Miner. Resour. Aust.

GLAESSNER, M.F., 1945 - Mesozoic fossils from the central highlands of New Guinea. Proc. Roy. Soc. Victoria, 56, 151-168.

JENKINS, D.A.L., & WHITE, M.F., 1970 - Report on the Strickland River survey, Permit 46, Papua. BP Petroleum Devel. Aust. (Unpubl.).

OSBORNE, N., 1945 - The Mesozoic stratigraphy of Fly River headwaters, Papua. Proc. Roy. Soc. Victoria, 56; 131-148.

SMIT, J.A.J., 1968 - Telefomin area reconnaissance geology. GSPNG invest. Note, 67302.

TERPSTRA, G.R.J., 1968 - Micropalaeontological examination of samples from Papua New Guinea. Bur. Miner. Resour. Aust. Rec., 1968/33 (Unpubl.).

WHITE, M.F., 1972 - Report on the Muller Range geological survey. BP Petroleum Devel. Aust. (unpubl.).

ZEHNDER, J.O., & de CAEN, R.F.B., 1955 - Report on the Palmer River reconnaissance survey. Australasian Petroleum Co. Pty Ltd (unpubl.).

Fig. 1

CAINOZOIC TIME SCALE

RADIOMETRIC TIME SCALE

ADAMS 1970* | CLARKE AND BLOW 1969, BLOW 1969

Epoch	Tertiary Letter Stage	Planktonic Foram Zone	Tertiary Letter Stage	Epoch	Papuan Stage	m.y.
Pleistocene		N 23		Pleistocene		
		N 22				Pleist. / Plio. 1·85
Pliocene	Th	N 21	? ?			
		N 20	Th	Pliocene	late	
		N 19				
		N 18			Muruan	Plio. / Mio. 5·5
	Tg	N 17	Tg	late Miocene	early	
upper Miocene		N 16				
		N 15				Tg / Tf 9
	upper Tf ($\equiv f_3$)	N 14	upper Tf ($\equiv f_3$)	middle Miocene	Ivorian / Kikorian	
		N 13				upper Tf / lower Tf 12·5
middle Miocene	lower Tf ($\equiv f_{1-2}$)	N 12	lower Tf ($\equiv f_{1-2}$)		Taurian	
		N 11				
		N 10			?	
		N 9				lower Tf / upper Te 15
lower Miocene	upper Te ($\equiv e_5$)	N 8, N 7, N 6, N 5, N 4	upper Te ($\equiv e_5$)	early Miocene	? Kereruan	
						Mio. / Olig. 22·5
upper Oligocene	lower Te ($\equiv e_{1-4}$)	N 3	lower Te ($\equiv e_{1-4}$)	Oligocene	?	
		N 2				
		N 1				u Olig. / m Olig. 30
middle Oligocene	Td	P 19	Td		?	
		↑				m Olig. / l Olig. 32
lower Oligocene	Tc		Tc			
		P 18				Olig. / Eo. 36
upper Eocene	Tb	P 17, P 16, P 15	Tb	late Eocene		
		P 14	? ?	? ? ?		u Eo. / m Eo. 45
middle Eocene	Ta_3					
						m Eo. / l Eo. 49
lower Eocene	Ta_2					
? ? ?						Eo. / Paleo. 53·7
upper Paleocene	Ta_1					u Paleo. / l Paleo. 60
						Paleo. / Cret. 65

*Adams, C.G., 1970: A reconsideration of the East Indian Letter Classification of the Tertiary. Bull. Br. Mus. nat. Hist. (Geol.), 19(3), 137p.

Blow, W.H., 1969 – Late Middle Eocene to Recent planktonic foraminiferal stratigraphy. Proc. 1st Internat. Conf. Planktonic Microfossils, Geneva, 1967, v.1, 199–421.

Clarke, W.J., and Blow, W.H., 1969 – The inter-relationships of some late Eocene, Oligocene and Miocene Foraminifera and planktonic biostratigraphic indices: Proc. 1st Internat. Conf. Planktonic Microfossils, Geneva, 1967, v.2, 82–97.

*Adams (1970) has been adopted as the standard table for 1:250,000 series geological maps of Papua New Guinea

To accompany Record 1973/101

M(P)371

BLUCHER RANGE

SHEET SB 54-7

Figure 2

Reference

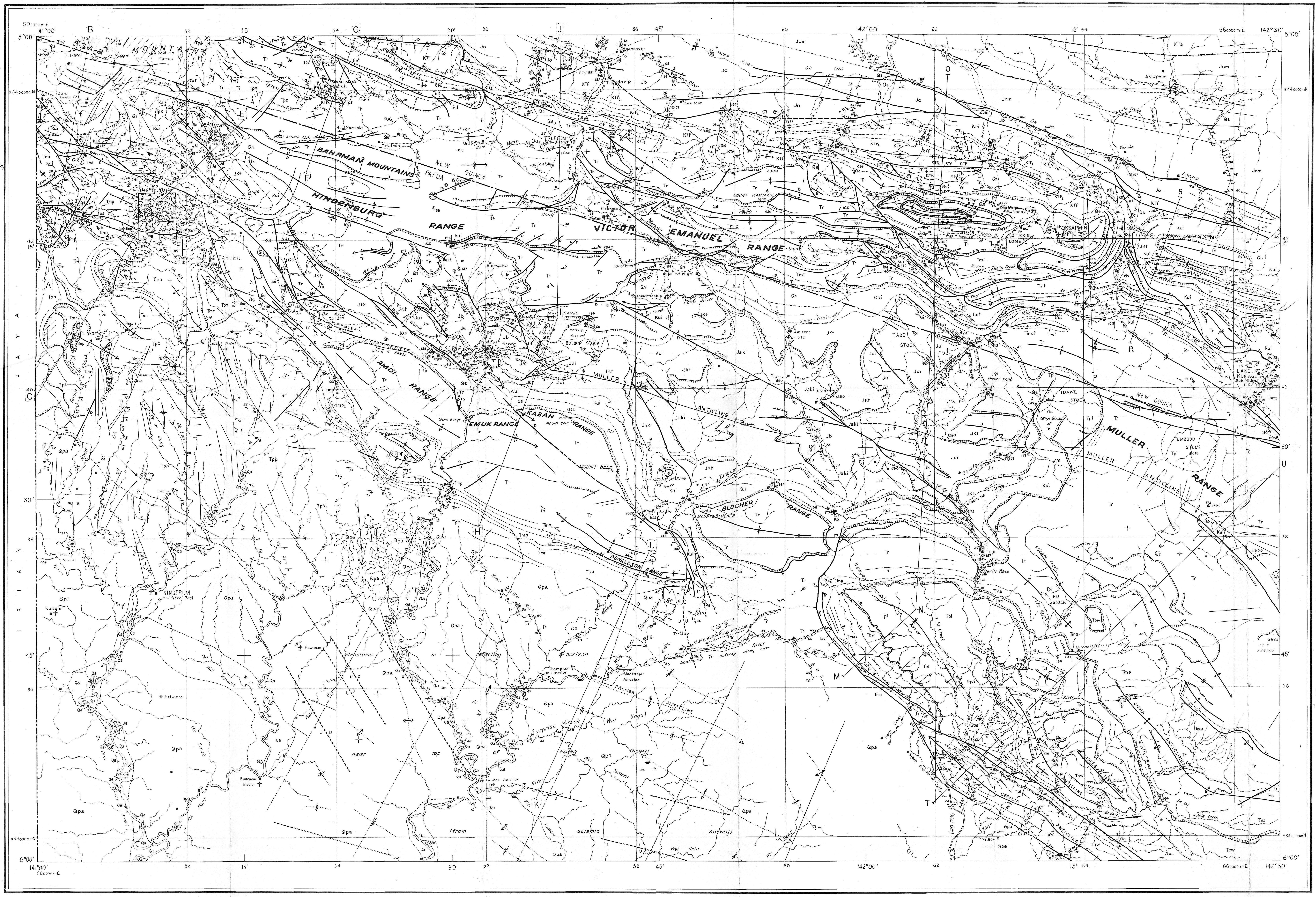
- Geological boundary
- Anticline, showing plunge
- Syncline, showing plunge
- Monocline
- Overturned anticline
- Overturned syncline
- Plunge of folds axes
- Fault (D, U. indicate relative movement down, up)
- Fault, low-angle thrust (T indicates upper plate; → indicates direction of plate movement in section)
- Fault showing relative horizontal movement

Where location of boundaries, folds and faults is approximate, line is broken; where inferred, queried; where concealed, folds are dotted, faults are shown by short dashes

- Shear zone
- Facies change (section only)
- Strike and dip of strata
- Strike and dip of strata, unmeasured
- Horizontal strata
- Vertical strata
- Strike and dip of overturned strata
- Strike and dip of overturned strata, unmeasured
- Dip 5°-15°
- Dip 15°-45°
- Horizontal strata
- Vertical strata
- Trend line
- Joint pattern
- Lineament
- Dip slope

(Dip 5°-15° to Dip slope: airphoto interpretation)

- Top of bed
- Strike and dip of joint
- Vertical joint
- Strike and dip of foliation
- Prevailing strike and dip of foliation
- Vertical foliation
- Macrofossil locality
- Microfossil locality (Foraminifera, nannoplankton)
- Palynomorph locality
- Plant fossil locality
- Fossil wood locality
- **Vertebrate fossil locality**
- Sample locality for age determination
- Type section
- Measured section
- Porphyry sill
- Gas seep
- Oil seep
- Minor mineral occurrence
- Prospect
- C Coal
- Cu Copper
- Pb Lead
- Zn Zinc
- Large sinkhole or cavern collapse
- Hot spring, sulphurous, trace of hydrocarbons
- Swamp
- Escarpment
- Cirque
- Vehicle track
- Track
- Landing ground
- Settlement
- Seismic traverse line
- Elevation in metres, approximate
- Position approximate

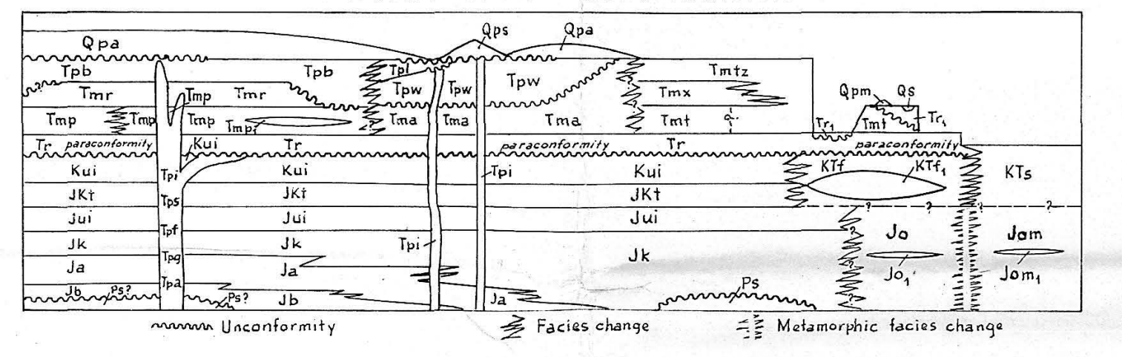


Reference

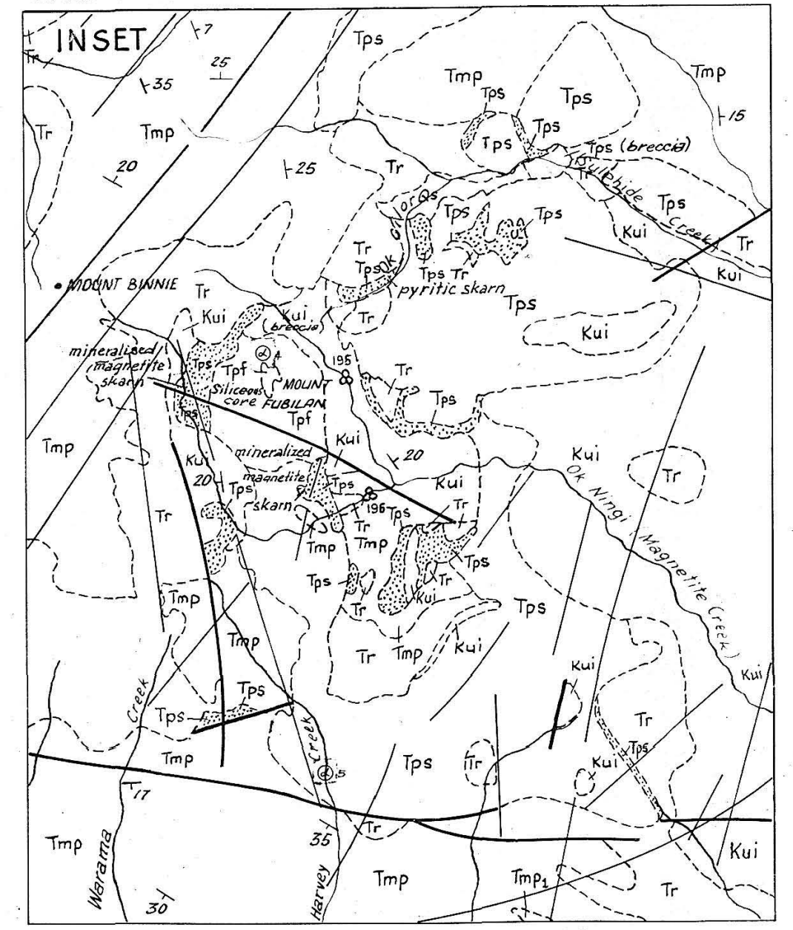
Era	Period	Age	Unit	Symbol	Lithology
CAINOZOIC	QUATERNARY			Qa	Gravel, sand, silt, mud: alluvium
				Qs	Chaotic deposits of angular rock fragments; slumped slate and shale; minor Qa: colluvium
				Qa_1	Weakly or moderately lithified conglomerate, sandstone, siltstone, mudstone: older alluvium, lake deposits and Qs
		PLEISTOCENE		Qpm	Glacial moraine
			Sisa Volcanics	Qps	Andesitic agglomerate and tuff
			Awin Formation	Qpa	Sandstone, conglomerate, siltstone, mudstone; minor thin lignite seams, sandy clay: mostly former alluvium
	TERTIARY	UPPER MIOCENE TO PLEISTOCENE	Star Mountains Intrusives	Tpi	Porphyritic micromonzonite and microdiorite
				Tps	Porphyritic micromonzonite, microdiorite, microgranodiorite; minor medium-grained equivalents
			Fubilan stock	Tpf	Quartz monzonite porphyry, quartz monzonite: mineralized
				Tps	Sulphide, magnetite and epidote-garnet skarn
			Mount Ian gabbro	Tpg	Gabbro
			Antares Monzonite	Tpa	Monzonite, granodiorite, adamellite, fine-grained equivalents; minor tuff, agglomerate, lava
		PLIOCENE	Birim Formation	Tpb	Sandstone, conglomerate, tuff, agglomerate, marl near base; minor lignite near top: mostly former alluvium
			Liddle Conglomerate	Tpl	Conglomerate; minor agglomerate, tuff, silty sandstone
			Wonqop Sandstone	Tpw	Greenish black sandstone; minor conglomerate, siltstone, grey shale; calcareous near base, lignite seams near top, partly tuffaceous
		MIDDLE? TO UPPER MIOCENE	Wai Asi Beds	Tma	Calcareous mudstone and siltstone; minor limestone, some glauconite
		MIDDLE MIOCENE		Tmx	Thin-bedded limestone, mudstone, siltstone and sandstone interbeds
		MIDDLE MIOCENE * lower Tf	Warre Limestone Member	Tmr	White fossiliferous limestone, partly tuffaceous with marl interbeds
			Pnyang Formation	Tmp	Soft grey calcareous mudstone and siltstone limestone interbeds
				Tmp_1	Limestone interbeds
		MIDDLE TO UPPER MIOCENE	Undivided Lai and Orubadi Formations	Tmtz	Greenish grey siltstone, grey silty mudstone and sandy siltstone, fine micaceous sandstone interbeds, porphyry sills
		LOWER TO MIDDLE MIOCENE		Tmt	Grey and blue mudstone and siltstone, fine calcareous sandstone
		LOWER TO MIDDLE? MIOCENE	Iwoer Formation	Tmi	Grey and black calcareous mudstone, siltstone, silty quartz sandstone; rare lignite
		UPPER EOCENE TO MIDDLE MIOCENE * Tb to lower Tf	Darai Limestone	Tr	Algal-foraminiferal biomicrite with sandy biomicrite and pelsparite near base; minor dolomite and rare chert
				Tr_1	Slumped limestone slab
		CRETACEOUS TO UPPER EOCENE * Tb	Salumei Formation	KTs	Weakly schistose green volcanolithic sandstone
MESOZOIC		LOWER CRETACEOUS TO UPPER PALEOCENE OR LOWER EOCENE	Feing Group	KTf	Grey fine sandstone, siltstone and shale, clean and muddy quartz sandstone and quartzite, partly glauconitic; rare limestone
				KTf_1	Quartz sandstone and quartzite, partly glauconitic
		UPPER CRETACEOUS	Feing Group: Ieru Formation	Kui	Greenish grey fine glauconitic quartzose sandstone and siltstone, recessive grey glauconitic mudstone and siltstone
		UPPER JURASSIC TO LOWER CRETACEOUS	Feing Group: Toro Sandstone	JKt	Glauconitic quartz sandstone; minor mudstone, siltstone, bioturbated micaceous sandstone
		UPPER JURASSIC	Kuabgen Group: Imburu Mudstone	Jui (Jaki; Jb & Jaki (section only))	Dark grey mudstone and siltstone, interbedded fine micaceous quartz sandstone
			Kuabgen Group: Koi-lange Sandstone	Jk	Micaceous quartz sandstone, quartz sandstone; minor arkose, siltstone, mudstone; rare ammonites
			Kuabgen Group: Atemin Shale	Ja	Dark grey shale, calcareous and sandy in part
		MIDDLE? TO UPPER JURASSIC	Kuabgen Group: Bol Arkose	Jb	Conglomeratic arkose, very coarse arkose; minor quartzose sandstone at top
		MIDDLE TO UPPER JURASSIC	Om Beds	Jo	Black carbonaceous siltstone and mudstone with concretions and black pyritic chert nodules and lenses; minor fine quartz sandstone, microdiorite dykes
				Jo_1	Fine lithic sandstone
				Jom	Black carbonaceous schist, phyllite and slate with pyritic chert nodules; minor fine quartzite
				Jom_1	Fine quartzite
PALAEOZOIC		UPPER PERMIAN?	Strickland Granite	Ps	Pink granite; chlorite, calcite and sericite alteration

* Tertiary letter stage

DIAGRAMMATIC RELATIONSHIP OF ROCK UNITS



MOUNT FUBILAN COPPER PROSPECT 1:50 000 scale



Geology after Kennecott Explorations (Australia) Pty Ltd

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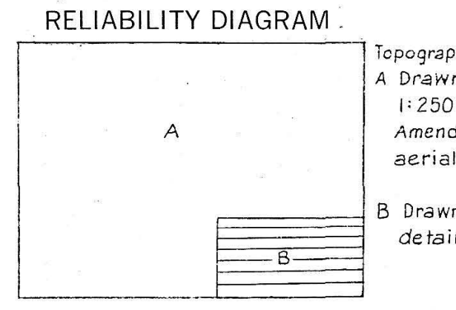
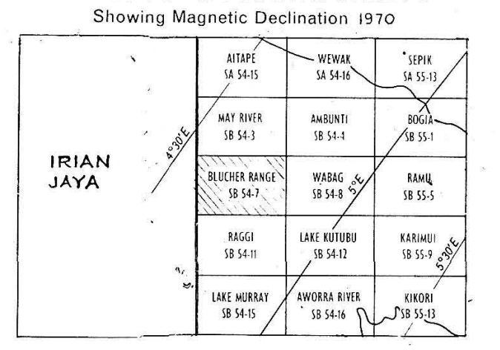
RELIABILITY DIAGRAM



Topography
A Drawn from Royal Australian Survey Corps base at 1:250 000 scale; not detailed, poorly controlled. Amendments from BMR field observations and aerial photography at 1:50 000 scale
B Drawn from BPPDA base at 1:100 000 scale; detailed, semi-controlled

INDEX TO ADJOINING SHEETS

Showing Magnetic Declination 1970



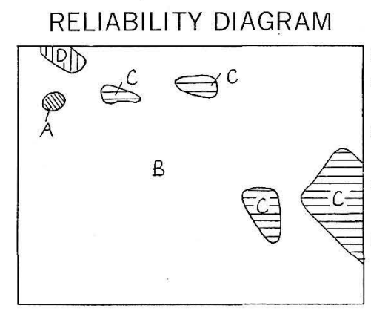
Scale 1:250,000

5 0 5 10 15 20 25 KILOMETRES

5 0 5 10 MILES

GREY NUMBERED LINES ARE 20 000 METRE INTERVALS OF THE AUSTRALIAN MAP GRID, ZONE 54
TRANSVERSE MERCATOR PROJECTION

RELIABILITY DIAGRAM



Geology
A Detailed mapping
B Detailed reconnaissance: numerous traverses, and airphoto interpretation
C General reconnaissance: some traverses, and airphoto interpretation
D Airphoto interpretation

Geology 1939-55 by W.D. Chawner, G. Sadler, G. Barrow, N.A. Osborne, G.A.V. Stanley, K. Roberts, K.M. Llewellyn, I. Gillespie, N.G. O'Halloran, J.O. Zehnder, S.V. Sykes, R.F.B. de Caen, M.F. Glaessner, F.T. Banner (Australasian Petroleum Company Pty. Ltd and Island Exploration Co. Pty. Ltd.)
1965 by M.J. Shepherd (University of Sydney)
1967-68 by J.A.J. Smit (BMR)
1968-72 by Kennecott Explorations (Australia) Pty Ltd
1970 by D.A.L. Jenkins, M.F. White (BP Petroleum Development (Australia) Pty. Ltd.)
1971 by D.A.L. Jenkins, M.F. White, R.A. Field, R.G. Dingwall, M.J. Marfleet (BPPDA); D.J. Belford, H.L. Davies, D.S. Hutchison, C. Maffi, M. Norvick, R.J. Ryburn, I.P. Sweet (BMR); P.E. Pieters, S.K. Skwarko (GSPNG)
1972 by H.L. Davies, D.S. Hutchison (BMR)
Seismic data 1971-72 from Texaco Overseas Petroleum Company
Compiled 1972 by H.L. Davies, M. Norvick, D.S. Hutchison, R.J. Ryburn, P.G. White
Cartography by Geological Branch, BMR
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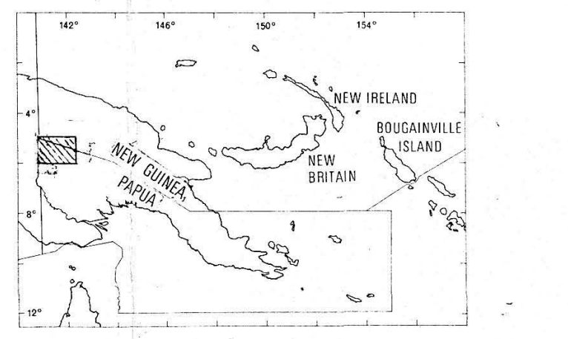
LOCALITY DIAGRAM

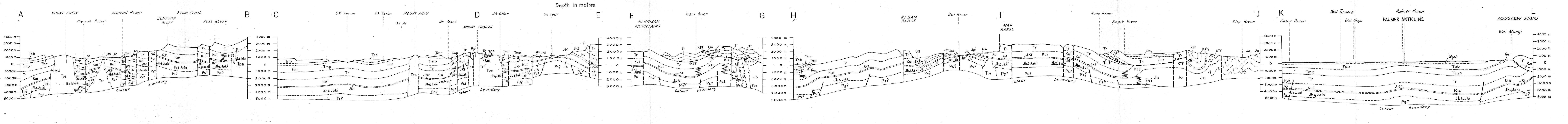


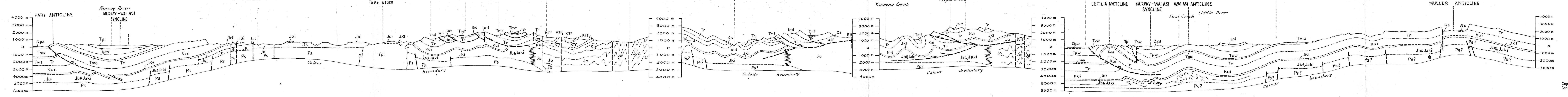
Sections

Some Qa and Qs omitted

Scale: $\frac{V}{H} = 1$

Depth in metres





FIRST EDITION 1973

BLUCHER RANGE

SHEET SB 54-7

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