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Seismicity of the New Guinea/Solomon Islands region, 1969

by I.B. Everingham

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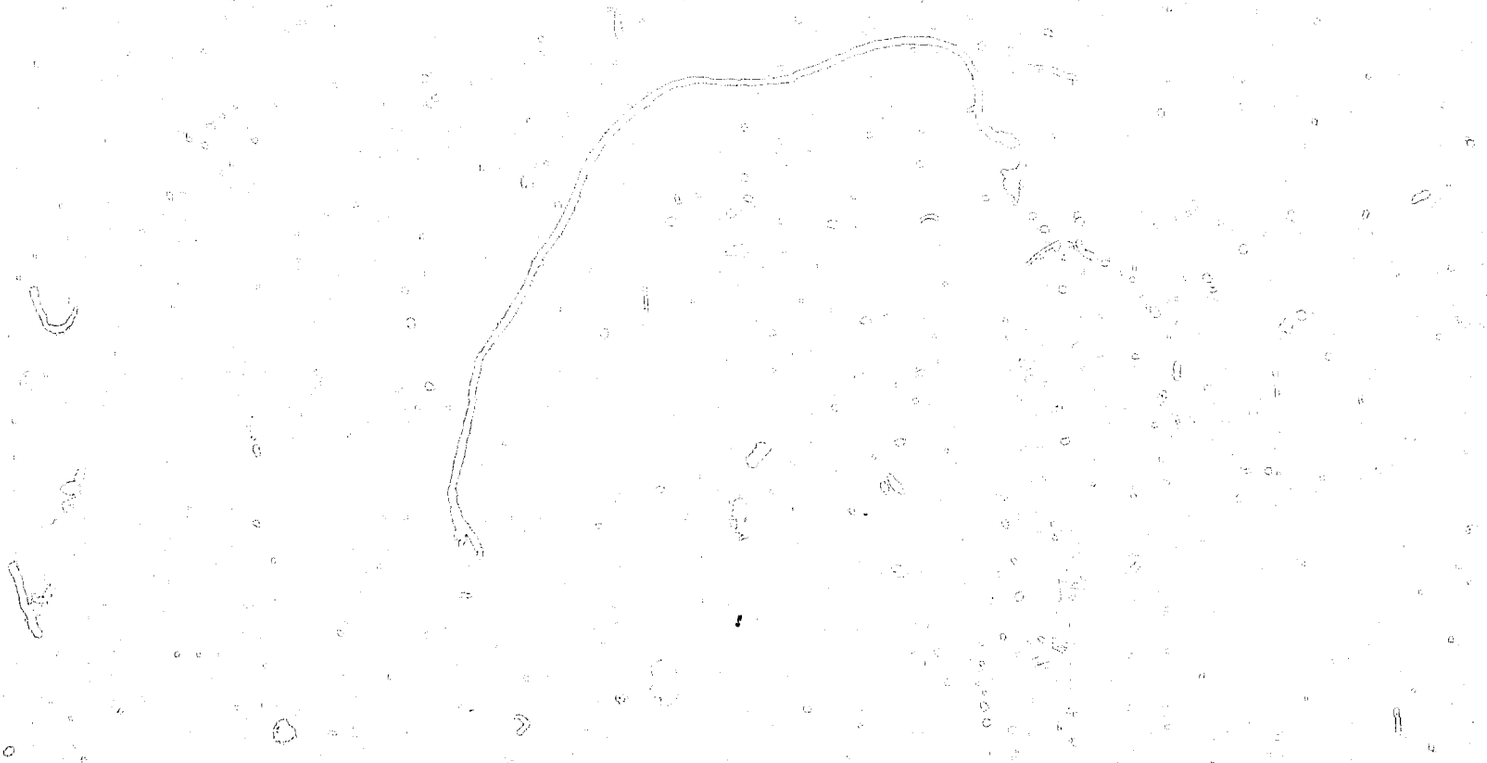

CONTENTS

TABLES

FIGURES

PLATE

SUMMARY

Earthquakes which occurred in the New Guinea/ Solomon Islands region, and intensity data for Papua New Guinea felt earthquakes are listed for 1969. The level of seismicity was relatively low compared with 1967 and 1968. One earthquake (in the Solomon Islands) had a magnitude greater than M 6.9, and fourteen earthquakes had magnitudes between 6 and 6.9.

The highest level of seismic activity was along the northern region of the Solomon Sea between 151° and 155° E. Four small isolated areas of relatively intense activity were recorded in the Solomon Islands. The Bismarck Sea seismic zone was relatively inactive, no earthquake being recorded from the central part of the Bismarck Sea.

Six earthquakes with depths greater than 300 km were recorded: five from the Benioff zone beneath New Britain and northern Bougainville, and one 533 km beneath the Solomon Islands near Santa Ysabel Island. The last provides further evidence of a contorted, possibly fragmented, near-vertical descending lithospheric slab beneath the Solomon Islands.

Isoseismal maps were drawn for the six strongest earthquakes in Papua New Guinea; maximum intensities for these events were only MM V-VI, and damage was negligible.

The magnitude/frequency relation for 1969 was

$$\log N = 7.67 - 1.08M$$

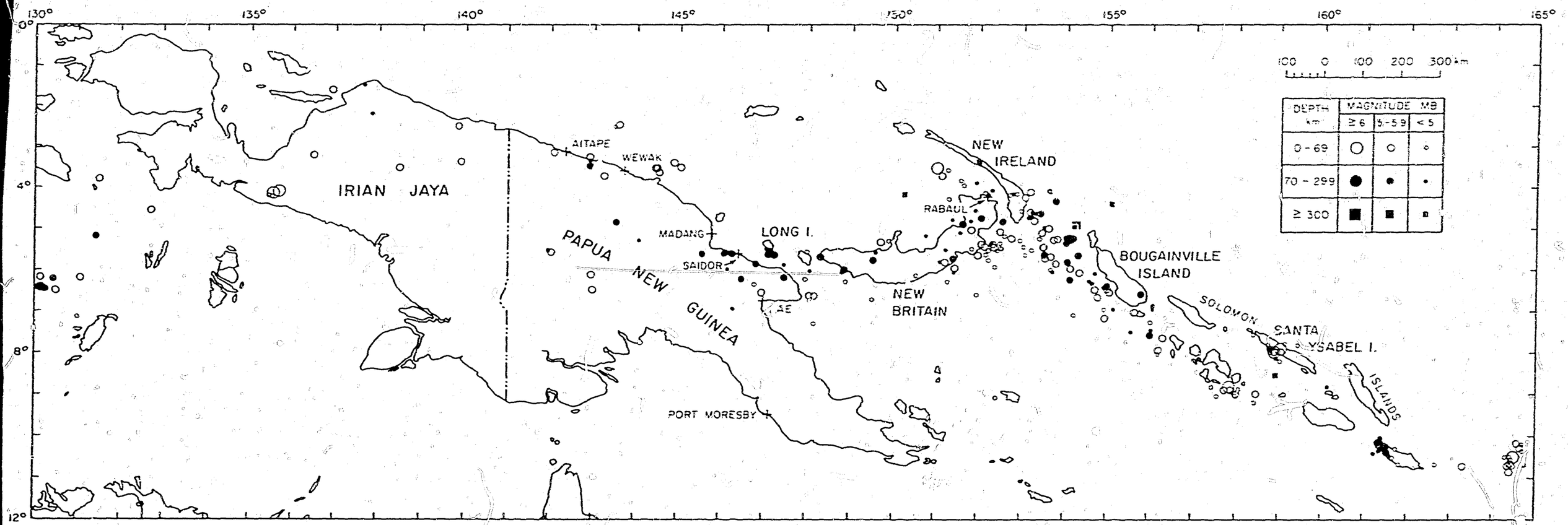

PLATE I 1969 EARTHQUAKE EPICENTRES (MB>4·5)

INTRODUCTION

The New Guinea/Solomon Islands region (lat. 0°–12°S, long. 130°–165°E) is in a zone of pronounced seismicity surrounding the Pacific Ocean, and each year the energy release from earthquakes in this region is between five and ten per cent of the Earth's total (Gutenberg & Richter, 1954).

In recent years the realization of the importance of the study of the seismicity of the region has led to a large increase in the number of seismograph and accelerograph stations installed. In order to provide up-to-date earthquake statistics and to keep abreast with the large amount of seismicity and earthquake intensity data being recorded, the Australian Bureau of Mineral Resources, Geology and Geophysics (BMR) makes extensive use of computerized storage and retrieval systems (e.g. Denham & Byrne, 1969) and produces annual reports containing analyses of the local seismicity, and descriptions of earthquake damage. This report describes seismic activity for the year 1969 and in general it follows the form taken by previous reports (Denham, 1971; Denham, 1974) which covered the same region for 1967 and 1968.

Data on seismicity of the region for other earlier periods can be found in Gutenberg & Richter (1954), Brooks (1965), Denham, Byrne, & Wilkie (1968), Rothe (1969), Curtiss (1973), Everingham (1974), and in routine publications of the U.S. Department of Commerce (CGS) and the International Seismological Centre (ISC).

Details of 1969 earthquake fault-plane solutions and accelerograph data are not presented here as they are discussed elsewhere (Denham, 1975; Denham, Small & Everingham, 1973; Ripper, in press). However, earthquakes for which these data are available are listed.

Because there are no facilities for BMR to gather felt reports or to study particular earthquakes in either Irian Jaya or the Solomon Islands, the coverage of the region is incomplete. Furthermore, as seismographs were not operating in Irian Jaya during 1969, the detection of earthquakes in that region is not as effective as wished. Because of these factors results from Papua New Guinea are emphasised.

There are two important reasons for the study of regional seismicity:

. The first concerns economic problems associated with earthquake risk. As a country develops, more money is invested in capital works. It is therefore important to know where earthquakes are likely to occur, and also what is the likely risk of damage from earthquakes so that steps can be taken to diminish that risk. In Papua New Guinea for example, the earthquake risk was small until the late 1950s because of the sparse population and the absence of any large buildings and structures likely to be seriously damaged by earthquakes. Until recently the only buildings of any significant value were single-storey Australian-type timber houses and small hospitals and churches, and earthquake-resistant designs were still not required by government regulations at the end of 1969. However, the situation is changing rapidly and considerable development is now taking place in areas of high earthquake risk, both on the New Guinea mainland and on the islands of Bougainville and New Britain. It is therefore highly desirable for the earthquake risk to be assessed quantitatively, so that it can be considered in the design and construction of buildings.

. The second is to assist in the understanding of the tectonic processes at work in the area. The zones where earthquakes occur identify the regions which are tectonically active and delineate such features as mid-ocean ridges, active faults, and dipping lithospheric slabs (Isacks, Oliver, & Sykes, 1968). Furthermore, it is possible to make some deductions about the properties of the crust and upper mantle by studying earthquake locations and how the energy is radiated from the source (Molnar & Oliver, 1969). Eventually it is hoped to be able to predict earthquakes, and reports such as this will provide basic data to achieve this end.

The structure and seismicity of the area are described by Thompson & Fisher (1965) and Denham (1969). Figure 1 shows the main tectonic units and the zones of shallow seismicity in which about 70 per cent of earthquakes happen.

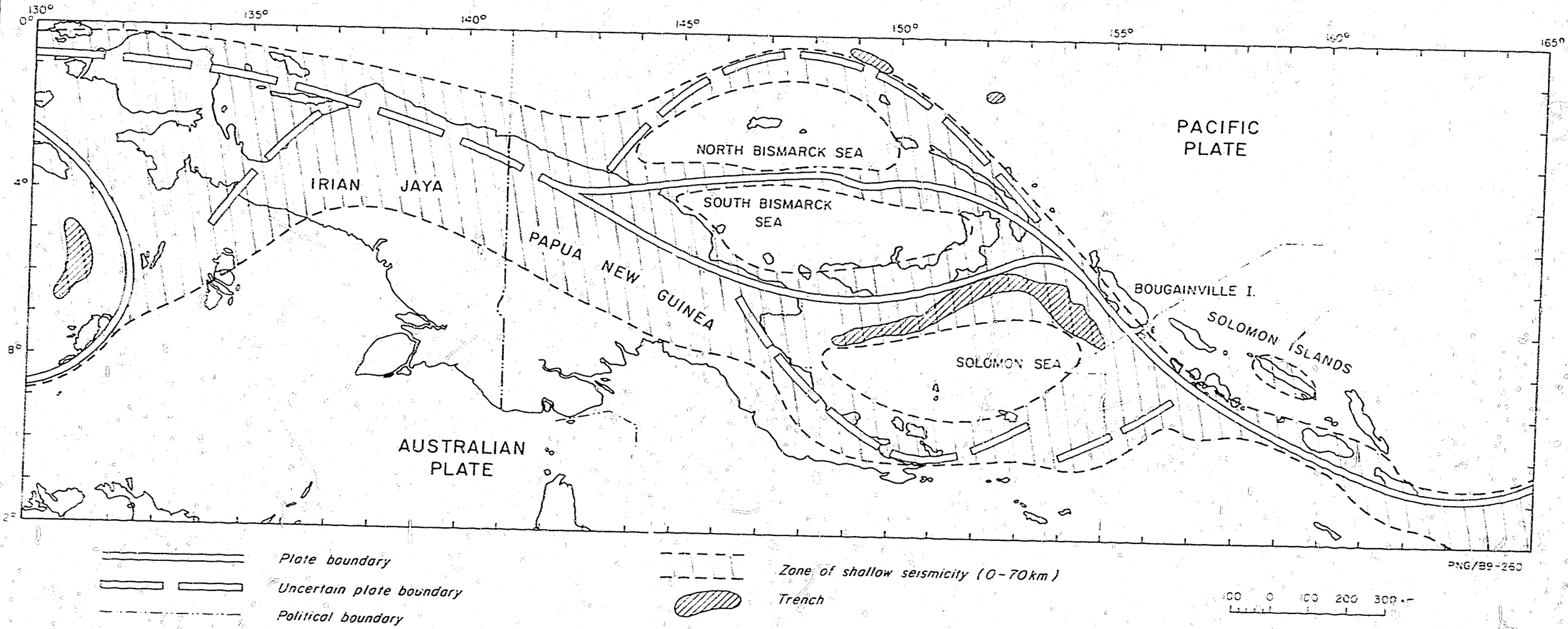

Fig. 1 TECTONIC UNITS AND ZONES OF SHALLOW SEISMICITY IN THE NEW GUINEA/SOLOMON ISLANDS REGION

TERMINOLOGY

Seismicity terms used in this report are briefly defined:

Hypocentre (or focus) - position of initial rupture causing the earthquake.

Epicentre - point on the surface vertically above the hypocentre.

Depth (DPH) - depth of hypocentre.

Magnitude - 'size' rating of earthquake independent of place of observation. MS - surface wave determination; MB - body wave (longitudinal wave) determination; ML - local (Richter) magnitude; M - unified surface wave magnitude derived from weighted average of MS and MB and ML converted to MS equivalent via standard formulas (Ripper & Smith, 1971). In this report values of MS and MB are obtained from CGS, and ML from Port Moresby Geophysical Observatory results.

Intensity - degree of shaking at a specified place, generally given on the Modified Mercalli (MM) scale).

Isoseismal lines - mapped boundaries between areas having successive intensity ratings.

Magnitude/frequency relation - usually given by the formula $\log N = A - bM$, where N is the number of earthquakes with magnitude equal to or greater than M for a given area in a given time; A indicates the level of activity and b relates the number of earthquakes with magnitude M to those with magnitude M + 1 (Fig. 3).

SEISMOLOGICAL INSTRUMENTS

Seismographs

Eighteen permanent seismograph stations were occupied in the New Guinea/Solomon Islands region in 1969. Six were controlled by the Port Moresby Geophysical Observatory (PMG, GRK, KDB, LAE, MOM, and WAB), one by the Geological Survey of the British Solomon Islands Protectorate (HNR), one by CRA (Bougainville Copper) at Kieta on Bougainville Island (KOA) and ten by the Volcanological Observatory at Rabaul (RAB, ESA, TBL, AGE, and the Rabaul local network stations RAL, SUL, TAV, VUL, WAN, and KEY).

Station descriptions are given in Table 1, details of station instruments in Table 2, and positions of the stations are shown in Figure 2.

The station at Wabag (WAB), which was installed late in 1968, operated usefully throughout the year; it was the most westerly station in the network.

The station at Momote (MOM) on Manus Island commenced operation in October 1969 and improved the network, being the only station to the north of the active zones (Figs. 1 and 2). The station at Kieta (KOA) commenced operations during August and it also improved the accuracy of hypocentral data, particularly in the Bougainville region.

Accelerographs

A second accelerograph was installed on hard rock at the Ramu hydroelectric site (Intake) in July 1969. This took the number of M02 accelerographs operating in Papua New Guinea to eight. Station details are listed in Table 3 (see also Fig. 2).

EARTHQUAKE DATA

CGS Earthquake Data Reports were the main source of hypocentral data used in this report. Because of the improved seismograph network it was found unnecessary to use the Observatory's computer program to obtain hypocentres (in previous years (e.g. Denham, 1971) it had been used, mainly for earthquakes with small magnitudes).

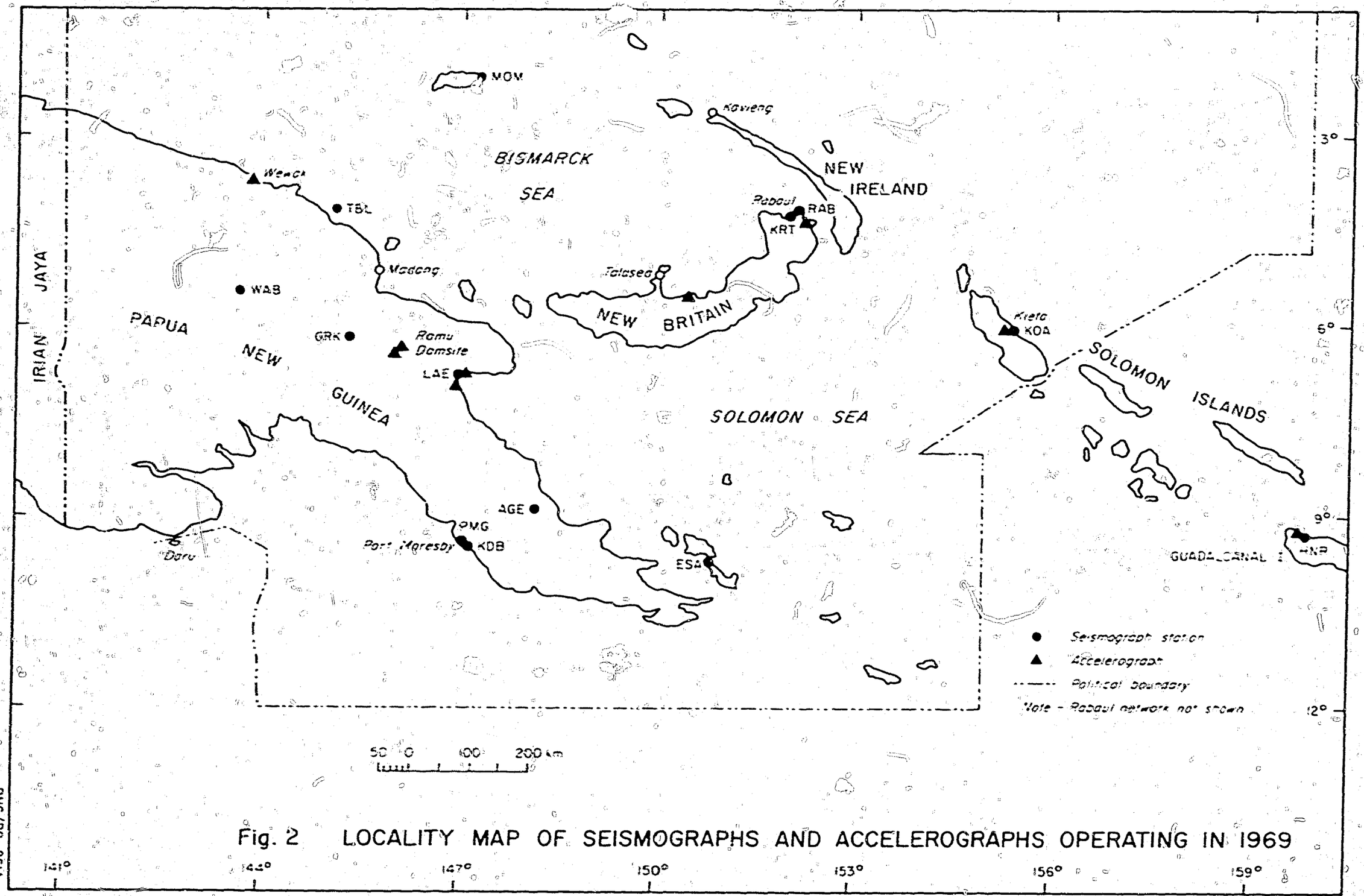

Fig. 2 LOCALITY MAP OF SEISMOGRAPHS AND ACCELEROGRAPHS OPERATING IN 1969

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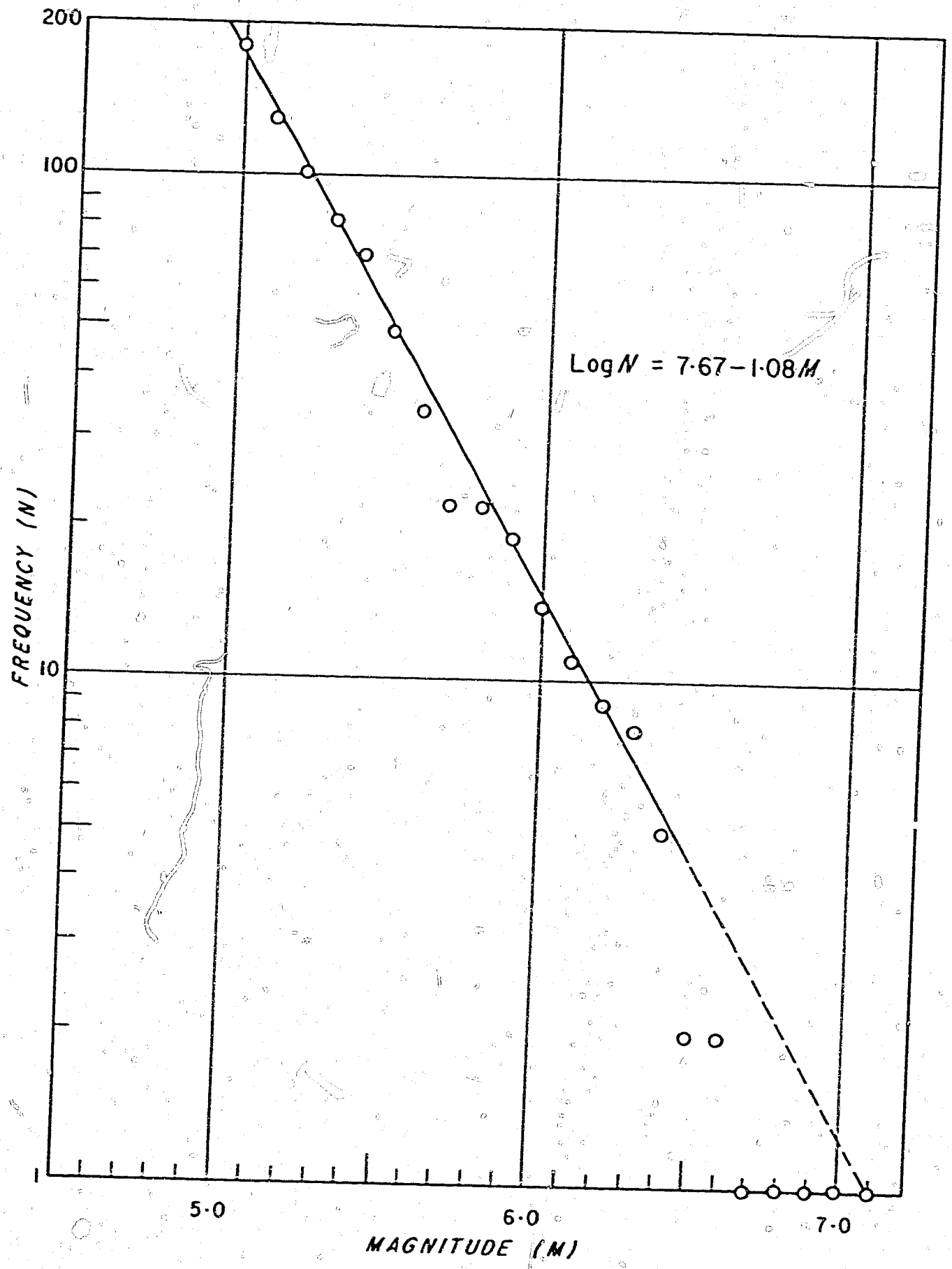

Fig. 3 MAGNITUDE / FREQUENCY RELATION 1969

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The instrumental earthquake data for the region were supplemented by felt-intensity reports from observers in a network established throughout Papua New Guinea by the Port Moresby Geophysical Observatory and the Rabaul Volcanological Observatory. Some of these reports were obtained from questionnaires completed whenever an observer felt an earthquake; other reports were obtained by means of questionnaires issued when a large earthquake occurred.

Table 8 lists parameters of the 332 earthquakes located in the New Guinea/Solomon Islands region during 1969, and Table 9 is a print-out of all the felt reports.

Table 4 lists the large, more important earthquakes for which unified surface wave magnitudes (M) of 6.0 or more have been estimated by Ripper & Smith (1971).

Table 5 gives hypocentral data for earthquakes for which isoseismal maps were drawn.

Table 6 lists earthquakes which triggered accelerographs, and the maximum accelerations found by Denham et al. (1973) from digitized accelerograms.

Table 7 tabulates earthquakes for which fault-plane solutions have been carried out by Ripper (in press).

Plate 1 is a plot of those earthquakes recorded by five or more stations and having a magnitude (MB) of 4.5 or greater. The plot is not complete for the magnitude ranges MB 4.5 to 5.0 because some earthquakes in this range were recorded by less than 5 stations, the number required by CGS to determine a solution.

Figures 4-8 show intensity data for the more important earthquakes in Papua New Guinea. The MM IV isoseismal has been drawn where possible in order that distance/intensity relations can be compared. However, other isoseismals are omitted because of the lack of data available from these relatively mild earthquakes.

EARTHQUAKE ACTIVITY 1969

The level of seismic activity during 1969 was low compared with 1967 and 1968. For example there were only 127 earthquakes with MB $\geq$ 5.0 during the year compared with 149 and 182 in 1967 and 1968 respectively. One major earthquake (MS 7.1) occurred on 5 January beneath Santa Ysabel Island but only slight damage was reported. Seriously damaging earthquakes did not occur in the New Guinea/Solomon Islands region.

The spatial distribution (Plate 1) of the earthquakes was similar to that of previous years, and all major earthquake provinces were represented. As usual the highest level of seismic activity was along the northern region of the Solomon Sea between 151° and 155° E. Four small isolated areas of relatively intense activity were recorded in the Solomon Islands. The Bismarck Sea Seismic Zone (Denham, 1969) was relatively inactive, and no earthquake was recorded from the central part of the Bismarck Sea.

Six earthquakes with depth greater than 300 km were recorded: five from the Benioff zone beneath New Britain and northern Bougainville, and one (13 July) 533 km beneath the Solomon Islands near Santa Ysabel Island. The last provides further evidence of a contorted, possibly fragmented, near-vertical descending lithospheric slab beneath the Solomon Islands (Denham, 1974).

A plot of magnitude versus frequency (Fig. 3), using Ripper & Smith's (1971) unified magnitudes, showed a 'b' factor of 1.08 in the magnitude range M = 5.0 to 6.4.

Everingham (1974) obtained somewhat different results for the interval 1900-1972 viz

MS 6.2	b = 0.5
MS 6.2-7.9	b = 0.97

There is no evidence in the 1969 data of such a change in b.

More important felt earthquakes will now be discussed. Local times are used in these discussions because of the relevance to observed effects, but the data in Table 8 are given in UT.

Solomon Islands, 5 January, 23 26 40 (150° EMT)
Focal depth 47 km MB 6.4, MS 7.1. The earthquake occurred just before midnight beneath Santa Ysabel Island. The area within which the seven recorded aftershocks occurred was a broad ellipse with its longer axis trending northwest over a distance of about 60 km. The Honiara Seismological Observatory Preliminary Bulletin (1/69) gave the following brief details:

> 'Slight damage at Santa Ysabel Island villages of Buala and Tasia. Also felt at Honiara with intensity 4. Ground cracked below sea-level.'

Ripper's (in press) fault-plane solution was normal dip-slip.

Long Island, 10 March, 16 54 18 (150° EMT). Depth 206 km, MB 5.8, ML 6.8. This earthquake, the largest of four noted in the region during the year, occurred during the late afternoon when many people had finished work for the day and were travelling or were active outdoors, so that the low intensities were generally not noted. Seventy-seven intensity questionnaires were answered and an isoseismal map was drawn (Fig. 4). It is difficult to position the isoseismals accurately because the earthquake was deep, and intensity effects were therefore diffused. The maximum intensity of MM VI was experienced at scattered localities up to about 200 km south and southwest of the epicentre. In the Lae/Kainantu/Huon Peninsula area, many observers were alarmed; however, only very slight damage was reported, e.g. broken crockery and minor splits in watertanks. At Okapa (6.3°S, 145.6°E) and Aseki (7.3°S, 146.2°E) minor earth falls were noted. Classroom buildings and teachers' houses visibly swayed slowly north-south at the Chivasing (6.6°S, 146.6°E) Primary T School, and some difficulty in maintaining balance was reported because of ground waves at Aiyure (6.3°S, 145.9°E). The intensity at Lae, MM IV to V, was sufficient to trigger the Lae Base accelerograph.

The poorly controlled isoseismals appear to be asymmetric about the epicentre, and the area of maximum intensities tends to be southwest of it. Similar displacements of the centres of isoseismal patterns have been noted previously for medium-depth earthquakes in Papua New Guinea (Observatory Staff, 1967), such displacements being controlled by the geometry of the subduction zone above the hypocentre.

Ripper's (in press) fault-plane solution was overthrust dip-slip.

Wewak/Aitape, 9 June, 16 51 16 (150° EMT). Depth 17 km, MB 5.2, MS 5.3. The earthquake occurred about 20 km offshore, half-way between Aitape and Wewak, during the afternoon. It was felt with intensity MM IV within a radius of about 100 km from the epicentre. At Dreikikir (3.6°S, 142.8°E) the highest intensity of V - VI was indicated by movement of small objects and breakage of dishes. Intensities are shown in Figure 5.

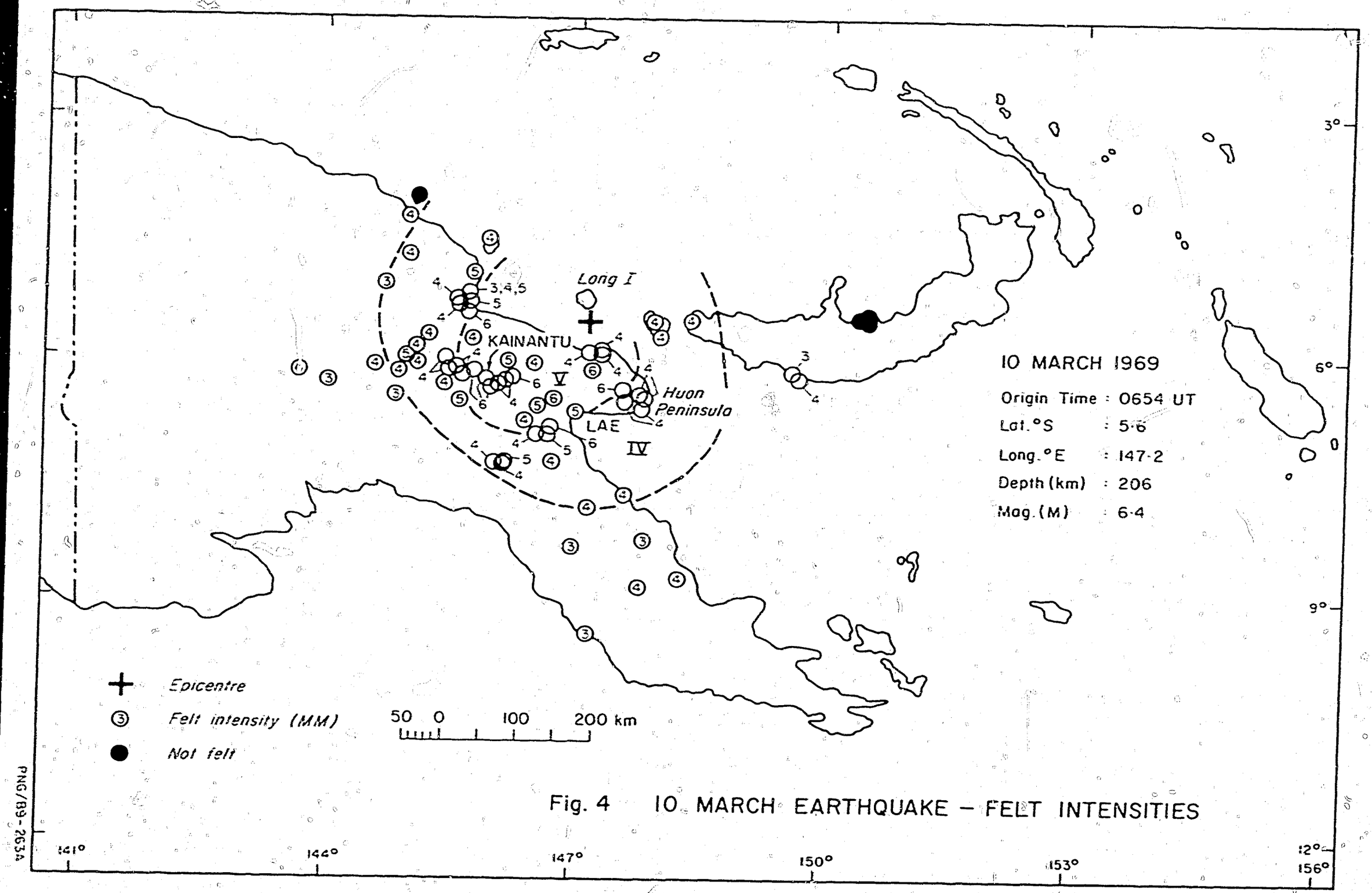

Fig. 4 10 MARCH EARTHQUAKE – FELT INTENSITIES

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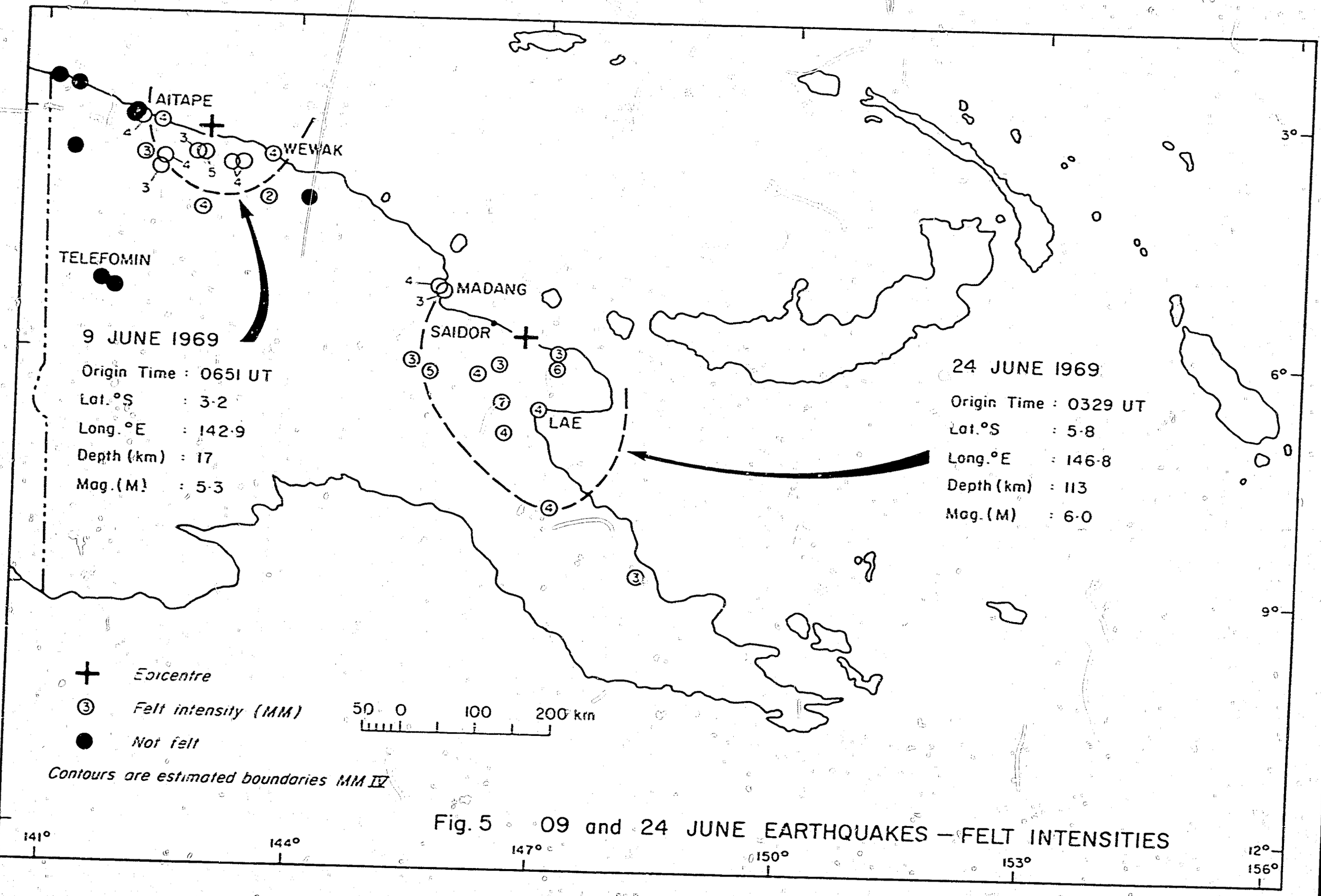

Fig. 5 09 and 24 JUNE EARTHQUAKES — FELT INTENSITIES

Saidor, 24 June, 13 29 17.3 (150° EMT). Depth 113 km, MB 5.6, ML 6.0. Questionnaires were not distributed for this earthquake; however, several completed forms and reports which were volunteered showed that damage was very restricted. Intensities are shown in Figure 5. At the Chivasing Primary T School (6.6°S, 146.6°E), 20 visible cracks appeared in partly completed cement brick walls about 2.4 metres high, and a new concrete floor in one of the classrooms was cracked in three places. Pupils and teachers were alarmed and ran outside. Books, pictures, and groceries reportedly fell at Kabwum (6.2°S, 147.2°E); and minor landslides were observed at Garaina 250 km south of the epicentre.

Ripper's (in press) fault-plane solution is strike-slip.

Lae, 2 August, 14 30 29.2 (150° EMT). Depth 17 km, MB 5.3, ML 5.7. Although its magnitude was relatively small, the earthquake shook Lae noticeably (MM V) because of its proximity to the town. An aftershock, whose epicentre was not listed by CGS or ISC, and which occurred four minutes after the main earthquake, was felt in Lae with intensity MM 4. Both earthquakes triggered the accelerograph at the Lae Institute of Technology. Several unlisted aftershocks were recorded by the Lae seismograph during the first two days after the main earthquake; activity ceased during the third day. The S-P intervals of the aftershocks were about five seconds, which suggests that the aftershock zone was about 40 km from Lae.

The intensities for the main earthquake are shown in Figure 6. Damage did not occur, and residents were generally not alarmed. A minor sea wave at Lae (reported by a newspaper but not noted on any questionnaire) was probably generated by submarine slumping which, owing to seasonal influences on coastal sedimentation, is more readily triggered during August and September (Everingham, 1973).

Several questionnaire replies from the Rabaul area suggested that the first earthquake was felt there with intensity MM III-IV. However, in view of the large distance from the source, the fact that people much closer in western New Britain did not feel any effects, and Rabaul was shaken several times during the next few days (see below, 3 August), it seems highly probable that the reporters were confused about the date of the shaking and that they were referring to a different earthquake. Such confusion can arise because questionnaires are generally not received until about a week after an earthquake has happened.

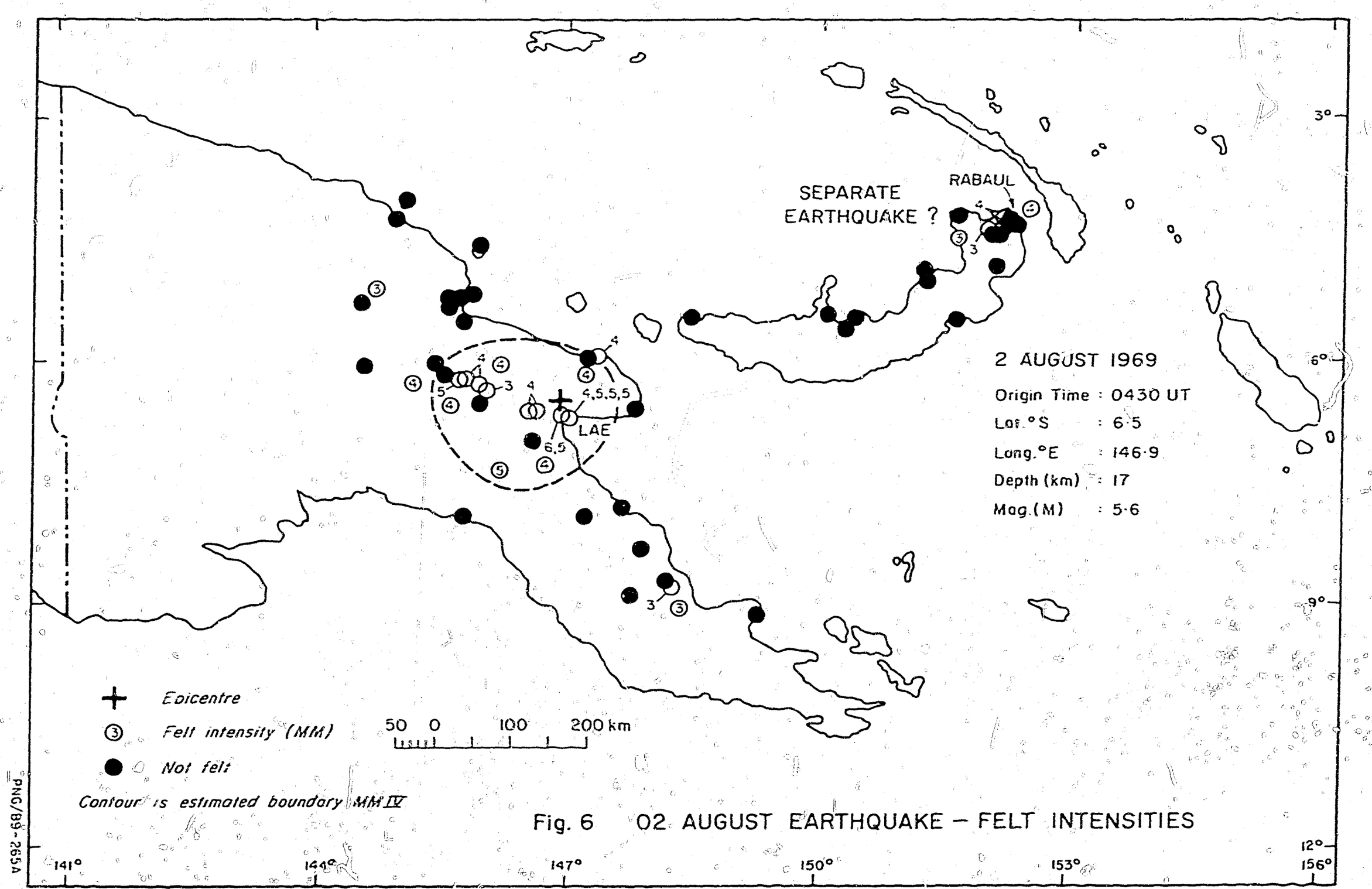

Fig. 6 02 AUGUST EARTHQUAKE – FELT INTENSITIES

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Southern New Ireland, 3 August, 10 22 32.0 (150° EMT). Depth 65 km, MB 5.3, ML 6.1. The earthquake was felt clearly (Fig. 7) in the Rabaul area (about 100 km west of the epicentre) and in the southern half of New Ireland. Intensities of V-VI were common, and only very slight damage was reported in both these areas. An exception was the Malabunga T School (about 30 km southwest of Rabaul) where unspecified 'considerable' damage to a brick structure was reported. At Lambon Island, off southernmost New Ireland, an observer reported that 'two full 1000 gallon tanks danced a tango.' The intensity at Panguna, MM IV, was not sufficient to trigger the accelerograph.

Five aftershocks were felt in Rabaul with intensities in the range MM II-IV during the 24 hours after the main earthquake; however, they were not large enough to be listed by CGS or ISC.

North Solomon Sea, 5 August, 02 32 25.8 (150° EST). Depth 69 km, MB 5.4, ML 6.7. The earthquake occurred beneath the Solomon Sea between southern New Ireland and northern Bougainville Island during darkness very early in the morning; people were awakened during various stages of the quaking; there was negligible damage, hence intensity data were difficult to assess, e.g. unless it was dangerously large a tsunami would not be observed. Intensities are shown in Figure 8. Within a radius of about 250 km from the epicentre, intensities of MM IV or more were experienced. The Rabaul and Kieta/Panguna intensities were about MM V; the accelerograph at Panguna was triggered but that at Rabaul was not. Later experience has shown that the reason for the non-triggering at Rabaul was that the instrument was sited in a flat low-lying area of the town where intensities are always lower than the average intensity in the area as a whole.

ACKNOWLEDGEMENTS

This report summarises information from many sources. In particular, the Rabaul Volcanological Observatory staff and numerous volunteer reporters are thanked for their assistance in providing information.

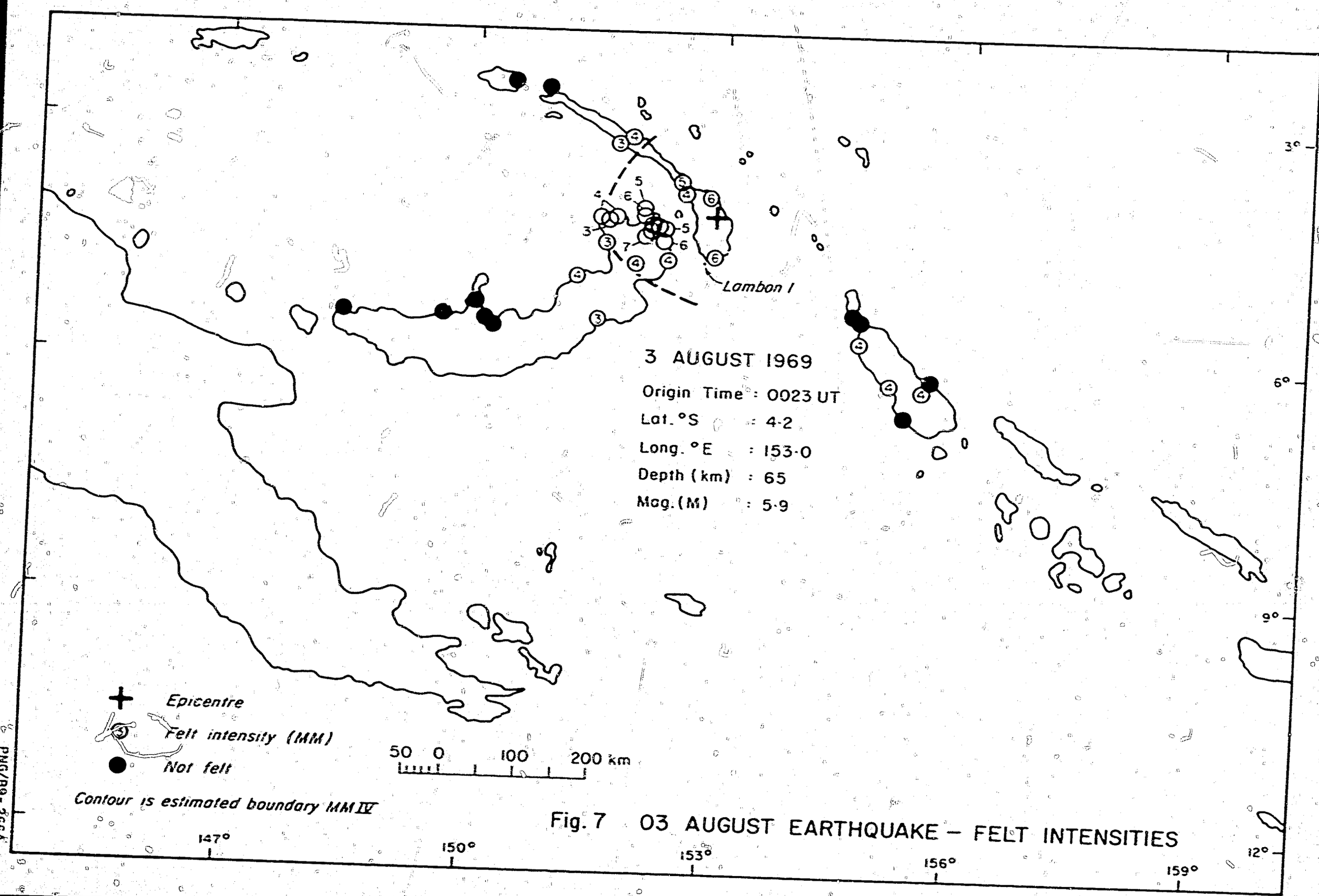

Fig. 7 03 AUGUST EARTHQUAKE – FELT INTENSITIES

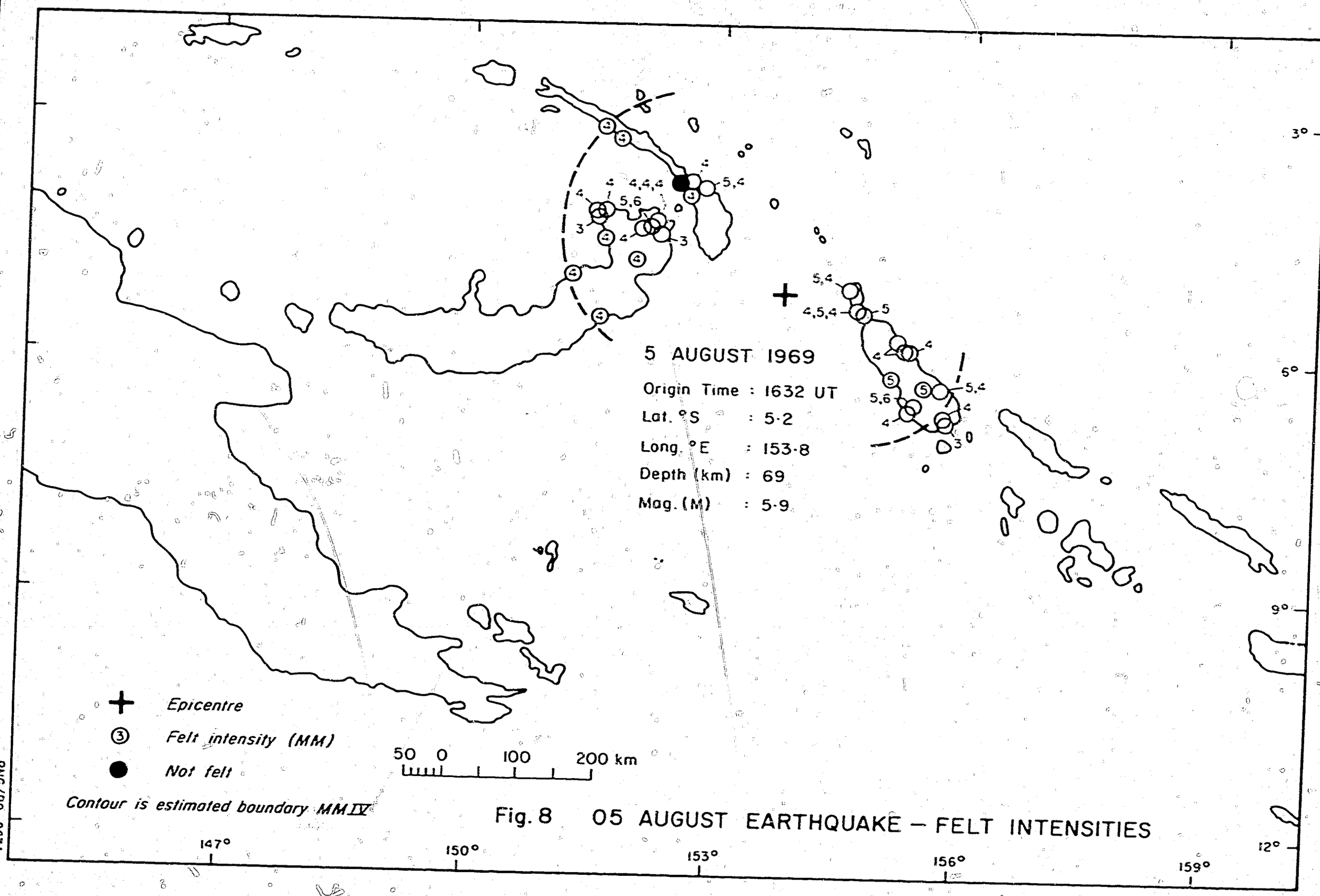

Fig. 8 05 AUGUST EARTHQUAKE – FELT INTENSITIES

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TABLE 1. DESCRIPTIONS OF SEISMOGRAPH STATIONS

Place	Code	Lat. °S	Long. °E	Elevation (metres)	Lithological foundation
Agenahambo (R)	AGE	08 48 49	148 05 56	303	Unconsolidated volcanic ash
Esa'ala (R)	ESA	09 44 18	150 48 51	46	Granite gneiss
Goroka (P)	GRK	06 04 32	145 23 43	1579	Alluvium
Honiara (WWSSN)	HNR	09 25 56	159 56 50	72	Coral reef
Konedobu (P)	KDB	09 28 23	147 09 11	35	Eocene chert
Keravat (R)	KET	04 19 59	152 02 11	20	Coastal alluvium
Kobuan	KOA	06 13 27	155 37 08	65	Andesite flow
Lae (P)	LAE	06 40 23	146 54 48	50	Alluvium
Momote (P)	MOM	02 04 28	147 24 41	10	Coral
Port Moresby (WWSSN)	PMG	09 24 33	147 09 14	67	Eocene chert
Rabaul (WWSSN)	RAB	04 11 29	152 10 11	184	Basalt flow
Rabalanakaia (R) (*)	RAL	04 13 13	152 12 07	91	Unconsolidated volcanic ash
Sulphur Creek (R) (*)	SUL	04 13 10	152 11 33	08	Unconsolidated volcanic ash
Tavurvur (R) (*)	TAV	04 13 52	152 13 13	27	Andesitic flow
Tabele (R)	TBL	04 06 05	145 00 41	180	Basalt flow
Vulcan (R) (*)	VUL	04 16 58	152 08 45	332	Unconsolidated volcanic ash
Wabag (P)	WAB	05 29 41	143 43 42	2032	Weathered limestone
Wanliss Street (R) (*)	WAN	04 11 40	152 10 32	25	Basalt flow

(WWSSN) Worldwide Standard Seismograph Network station
(*) Rabaul harbour network
(R) Operated by Rabaul Observatory
(P) Operated by Port Moresby Observatory (BMR)

TABLE 2. INSTRUMENTS AT SEISMOGRAPH STATIONS

Station	Seismometer			Recorder			System Magnification	Remarks
	Type	Comp	To (s)	Type	Speed mm/minute	Tg (s)		
AGE	Wil	Z	0.6	Wil photo	60	0.25	3000	Underdamped
ESA	Ben	Z,N,E	1.0	Ben. film	15	0.2	38000(Z),18000(N,E)	Critically damped
ESA	Ben	Z,N,E	1.0	UED photo	30	60	2000 at 1 s	Critically damped
GRK	W/L	Z	1.0	UED pen	60	-	5000 at 1 s	
HNR	Geotech	Z,N,E	1.0	UED photo	60	0.75	12500 at 1 s	World Standard SP
HNR	Spr	Z,N,E	15	UED photo	15	100	3000(Z),1500(N,E) at 20 s	World Standard LP
KDB	Wil	Z	1.0	UED pen	60	-	10000	
KET	Ben	Z,N,E	1.2	film	15	0.2	unknown	Critically damped
KOA	Wil	Z	1.0	Helicorder	60		40000	
LAE	Wil	Z	1.0	UED pen	60	-	5000	
MOM	Wil	Z	1.0	Photo drum	60	0.2	5000 at 1 s	Critically damped
PMG	Geotech	Z,N,E	1.0	UED photo	60	0.75	50000 at 1 s	World Standard SP
PMG	Spr	Z,N,E	15	UED photo	30	100	3000 at 20 s	World Standard LP
PMG	Gt	Z	1.0	Spr photo	30	1.7	10000	
PMG	W/A	N,E	0.8	Spr photo	30	-	2000	
PMG	PE	Z	15	Spr photo	30	15	700 at 15 s	Overdamped
PMG	Spr H	N,E	15	Spr photo	30	15	700 at 4.8 s	Overdamped
PMG	DTM	Z	4	Mag. tape	18 (ft/hr)		0-100 k	3 displacement chnls and 2 velocity chnls

TABLE 2 (continued)

Station	Seismometer			Recorder			System Magnification	Remarks
	Type	Comp	To (s)	Type	Speed mm/minute	Tg (s)		
RAB	Geotech	Z,N,E	1.0	UED photo	60	0.75	12500(Z),6200(N,E)	World Standard SP
RAB	Spr	Z,N,E	15.0	UED photo	15	100	750 at 20 s	World Standard LP
RAB	Ben	Z	1.0	Helicorder	180	-	4000 at 1 s	Critically damped
RAB	Omo	N,E	3.6	Smoked paper	24	-	12(N),10(E)	
RAB	W/A	N,E	0.8	Photo drum	60	-	2800	
RAL	Ben	Z	1.0	Helicorder	60	0.2	11400	Critically damped
SUL	Ben	Z	1.0	Helicorder	60	0.2	2850	Critically damped
TAV	Ben	Z	1.0	Helicorder	60	0.2	11400	Critically damped
TBL	Ben	Z	1.0	Photo drum	60	0.2	1350	Critically damped
VUL	Ben	Z	1.0	Helicorder	60	0.2	11400	Critically damped
WAB	Wil	Z	1.0	Photo drum	60	1.3	25000	
WAN	Ben	Z	1.0	Helicorder	60	-	11400	Critically damped

Wil = Wilmore; Ben = Benioff; W/L = Wilson-Lamison; Gt = Grenet; W/A = Wood-Anderson; Spr = Sprengnether ((H = horizontal); PE = Press Ewing; Omo = Omori; UED = United Electrodynamics; DTM = Seismograph system developed by Department of Terrestrial Magnetism.

TABLE 3. ACCELEROGRAPH STATIONS

Location	Number of instruments	Type	Lat-°S	Long-°E	Owner
Cape Hoskins	1	M02	05 28.2	150 25.8	Harrison & Crossfield Pty Ltd
Honiara	1	M02	09 25.9	159 56.8	Geological Survey of the British Solomon Islands
Lae	2	M02	06 42.8	146 59.4	Papua and New Guinea Institute of Technology, Lae
Panguna	1	M02	06 19.5	155 29.1	Bougainville Copper Pty Ltd (CRA)
Rabaul	1	M02	04 13.2	152 10.6	Commonwealth Department of Works
Ramu Damsite (Yonki, Intake)	2	M02	06 14.7	145 58.7	Commonwealth Department of Works
Wewak	1	M02	03 35.4	143 41.2	Commonwealth Department of Works

TABLE 4. LARGE EARTHQUAKES (M 5.9) IN THE NEW GUINEA/SOLOMON IS REGION, 1969

D	M	H	M	S (U.T.)	Depth (km)	Lat. °S	Long. °E	MB	M	Number of stations
05	Jan	13	26	39.9	047	08.0	158.9	6.4	7.1	095
09	Mar	13	47	59.4	014	04.1	135.5	5.5	6.3	041
09	Mar	14	39	04.2	033	04.1	135.6	5.5	6.0	048
10	Mar	06	54	17.6	206	05.6	147.2	5.8	6.4	077
16	Apr	01	22	47.5	039	05.5	151.0	5.7	6.4	070
18	Apr	12	32	03.4	033	04.5	132.7	5.5	6.0	060
28	Apr	19	39	05.5	077	07.9	158.8	5.7	6.3	081
31	May	23	56	21.6	403	04.9	154.2	5.5	6.1	126
14	Jun	03	22	56.8	062	07.9	159.0	6.0	6.6	111
24	Jun	03	29	17.3	113	05.8	146.8	5.6	6.0	107
26	Aug	16	58	02.3	059	05.8	151.2	5.6	6.3	093
06	Sep	14	49	55.9	015	08.8	157.8	5.8	6.2	066
06	Sep	17	08	03.2	010	08.9	157.9	5.8	6.4	069
07	Sep	03	06	02.2	033	08.9	157.7	5.6	6.1	057

TABLE 5. EARTHQUAKES WITH INTENSITY DATA

D	M	H	M	S	Depth (km)	Lat. °S	Long. °E	M	Max int. (MM)	Approx. MM IV radius (km)
10	Mar	06	54	17.6	206	5.6	147.2	6.4	V-VI	220
09	Jun	06	51	16.1	17	3.2	142.9	5.5	V-VI	100
24	Jun	03	29	17.3	113	5.8	146.8	6.0	V	150
02	Aug	04	30	29.2	17	6.5	146.9	5.6	V	120
03	Aug	00	22	32.0	65	4.2	153.0	5.9	VI	130±
05	Aug	16	32	25.8	69	5.2	153.8	5.9	V	270±

Note: Max. int. - this intensity or greater observed at three or more localities.

TABLE 6. ACCELEROGRAPH TRIGGERINGS, 1969

D	M	H	M	S	DPH (km)	Lat. °S	Long. °E	M	Station	Max acc mm/s^2
07	Jan	01	14	14.1	97	6.2	146.4	5.6	Yonki	140
07	Jan	01	14	14.1	97	6.2	146.4	5.6	Lae Base	
25	Feb	04	55	28.2	70	6.1	154.7	5.2	Panguna	
10	Mar	06	54	17.6	206	5.6	147.2	6.4	Yonki	400
10	Mar	06	54	17.6	206	5.6	147.2	6.4	Lae Base	
08	May	22	37	16.8	76	5.6	146.2	5.4	Yonki	
14	Jun	09	26	10.6	114	5.6	145.5	5.5	Yonki	
24	Jun	03	29	17.3	113	5.8	146.8	6.0	Yonki	630
24	Jun	03	29	17.3	113	5.8	146.8	6.0	Lae Base	
02	Aug	04	30	29.2	17	6.5	146.9	5.6	Lae Base	
02	Aug	04	34	33	-	Aftershock		-	Lae Base	
03	Aug	00	22	32.0	65	4.2	153.0	5.9	Rabaul	
24	Aug	12	39	30.1	39	7.3	148.1	4.6	Lae Base	
07	Sep	08	40	34.3	173	6.6	155.8	5.6	Panguna	590
12	Sep	12	59	38.1	165	5.8	147.4	4.2	Lae Base	
16	Nov	05	40	22.2	57	6.5	155.0	5.2	Panguna	390
16	Nov	05	44	01.6	63	6.5	155.0	5.2	Panguna	

TABLE 7. EARTHQUAKES WITH FAULT-PLANE SOLUTIONS, 1969
(in Ripper, in press)

D	M	H	M	S	Depth (km)	Lat. °S	Long. °E	M	Type
05	Jan	13	26	39.9	47	8.0	158.9	7.1	Dip-slip normal
10	Mar	06	54	17.6	206	5.6	147.2	6.4	Dip-slip overthrust
16	Apr	01	22	47.5	39	3.5	151.0	6.4	Strike-slip
31	May	23	56	21.6	403	4.9	154.2	6.1	Dip-slip normal
14	Jun	03	22	56.8	62	7.9	159.0	6.6	Strike-slip
24	Jun	03	29	17.3	113	5.8	146.8	6.0	Strike-slip
29	Jul	01	55	20.4	6	3.4	144.8	5.9	Uncertain
26	Aug	16	58	02.3	59	5.8	151.2	6.3	Dip-slip overthrust
06	Sep	14	49	55.9	115	8.8	157.8	6.2	Dip-slip overthrust
06	Sep	17	08	03.2	10	8.9	157.9	6.4	Dip-slip overthrust

TABLE 8. EARTHQUAKES IN THE NEW GUINEA/SOLOMON ISLANDS REGION, 1969

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES					STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES		RICHTER /LOCAL	
69	01	04	10	28	34.9	6.266S	148.849E	058	4.90				4.70 ML PMG	10
69	01	05	11	03	28.1	5.273S	149.862E	037	4.50				5.50 ML PMG	9
69	01	05	11	47	38.9	6.245S	146.466E	117	4.60					7
69	01	05	13	26	39.9	7.975S	158.909E	047	6.40	7.1	7.50 PAS			95
69	01	05	14	21	39.9	7.985S	158.788E	039	4.80					6
69	01	05	14	36	27.2	7.557S	158.387E	033	4.80					10
69	01	05	20	14	25.7	7.812S	159.419E	060	4.90					10
69	01	06	01	04	52.1	8.194S	159.008E	033	4.80					15
69	01	06	02	05	39.9	8.829S	157.441E	033	4.90					12
69	01	06	03	06	10.9	9.042S	157.560E	043	4.90					10
69	01	06	08	15	24.2	8.568S	157.539E	024	4.30					6
69	01	06	15	39	00.9	10.507S	164.466E	032	6.20	6.8	7.10 PAS			38
69	01	06	16	42	31.1	10.733S	164.486E	033	4.80					12
69	01	06	17	06	15.8	10.890S	164.373E	033	5.00					17
69	01	06	17	25	41.8	3.085S	139.478E	033						8
69	01	06	17	33	40.5	10.707S	164.383E	033	5.40					39
69	01	06	18	16	46.0	10.820S	164.270E	029						6
69	01	06	20	13	07.2	10.509S	164.402E	046	4.50					12
69	01	06	20	40	11.4	10.428S	164.582E	033	4.40					10
69	01	06	20	59	55.9	10.567S	164.433E	033	4.70					16
69	01	07	00	40	54.7	10.746S	164.393E	033						8
69	01	07	01	14	14.1	6.192S	146.444E	097	5.30				5.70 ML PMG	30
69	01	07	03	40	48.9	10.741S	164.493E	033	4.50					10
69	01	07	07	28	59.4	9.306S	157.462E	033						8
69	01	07	17	46	45.8	10.762S	164.413E	029	5.30					36
69	01	07	18	11	21.3	10.701S	164.510E	033	4.90					9
69	01	08	03	33	23.8	5.524S	152.419E	058	4.80				5.30 ML PMG	9
69	01	08	18	47	26.6	7.960S	159.012E	042	5.10					10
69	01	09	12	23	40.5	6.622S	148.124E	068	5.10				5.00 ML PMG	12
69	01	09	13	43	08.3	6.616S	148.022E	066	5.00				5.00 ML PMG	26
69	01	09	15	48	00.4	6.744S	148.119E	068	4.20				4.90 ML PMG	12

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES				STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES	RICHTER /LOCAL	
69	01	09	16	32	51.7	7.790S	158.745E	031	4.90				16
69	01	10	08	24	38.5	4.992S	153.576E	060	5.20				14
69	01	10	17	09	45.0	10.707S	164.406E	033	5.30				12
69	01	12	02	19	51.6	7.137S	146.265E	188					7
69	01	12	09	07	24.0	10.515S	164.303E	047	4.80				12
69	01	13	08	55	03.9	7.965S	158.883E	048	5.70				47
69	01	14	12	35	37.2	10.863S	164.405E	016	5.20				26
69	01	16	12	17	33.7	5.531S	141.936E	033	4.90				10
69	01	16	15	51	46.5	5.505S	153.214E	053	4.90			5.20 ML PMG	12
69	01	18	13	57	03.0	10.521S	161.685E	037	4.60				10
69	01	19	10	43	56.4	5.533S	147.960E	033	4.70			4.60 ML PMG	9
69	01	20	04	46	10.2	10.170S	164.544E	033	5.00	5.1			31
69	01	20	12	24	35.2	10.291S	164.626E	004	5.60	5.8			57
69	01	20	13	35	19.4	10.359S	164.690E	025	4.60				13
69	01	20	17	33	16.8	10.234S	164.659E	040	4.80				14
69	01	22	04	02	52.0	5.994S	153.661E	017	4.90				21
69	01	23	02	55	19.7	6.266S	151.269E	037	4.50				9
69	01	23	21	26	45.2	5.971S	153.468E	043					10
69	01	25	09	55	56.8	10.482S	164.827E	033	4.30				8
69	01	26	04	58	45.8	10.239S	161.487E	075	5.20				41
69	01	26	09	33	21.2	5.551S	149.569E	152	4.50			5.40 ML PMG	16
69	01	26	16	05	00.6	5.834S	153.750E	026	5.10				10
69	01	27	08	14	44.5	5.578S	148.856E	144				4.70 ML PMG	8
69	01	29	02	42	30.0	6.117S	147.386E	033				4.50 ML PMG	9
69	01	29	08	34	51.3	4.694S	153.209E	070	4.60			5.40 ML PMG	30
69	01	29	13	50	41.3	6.589S	151.942E	005	4.90				14
69	01	31	12	06	00.4	4.606S	153.293E	071	4.70			4.80 ML PMG	17
69	02	02	17	35	53.0	5.687S	153.835E	033					10
69	02	02	17	48	46.0	5.774S	153.487E	059					11
69	02	03	14	42	37.0	5.724S	153.528E	060	5.10				6
69	02	04	23	00	54.3	4.885S	153.294E	041					9

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES				STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES	RICHTER /LOCAL	
69	02	05	19	32	27.7	4.091S	153.158E	033	5.40		4.90 ML PMG		13
69	02	09	18	13	06.5	5.221S	133.712E	033					6
69	02	15	13	20	19.4	10.402S	161.241E	127	4.80				23
69	02	18	20	06	30.5	4.937S	153.191E	108	4.40				8
69	02	21	17	10	15.3	3.871S	151.927E	184	4.90				8
69	02	22	01	29	22.6	8.129S	158.911E	079	4.90				14
69	02	24	00	08	45.6	6.158S	131.032E	038	5.80	5.9			104
69	02	24	20	47	29.7	6.422S	130.187E	070	5.20				14
69	02	25	04	55	28.2	6.068S	154.698E	070	4.90		5.30 ML PMG		39
69	02	28	15	57	44.2	3.440S	142.869E	080	5.70				10
69	03	01	2	47	58.4	4.709S	152.015E	113	5.10		5.00 ML PMG		18
69	03	02	03	07	45.2	6.041S	148.790E	070	4.80		4.90 ML PMG		18
69	03	04	20	10	51.9	5.069S	152.453E	062	5.10		5.00 ML PMG		25
69	03	07	11	44	41.8	5.452S	152.331E	033	5.10		4.70 ML PMG		18
69	03	08	06	02	43.6	5.925S	155.275E	088			5.50 ML PMG		11
69	03	08	15	03	50.4	5.014S	151.801E	046	5.00				7
69	03	09	13	47	59.4	4.126S	135.511E	014	5.50	6.6	6.70 BRK		41
69	03	09	14	39	04.2	4.077S	135.634E	033	5.50	6.0			48
69	03	09	15	53	55.1	4.212S	135.460E	033	4.80				21
69	03	09	16	00	13.8	4.209S	135.500E	033	4.80				8
69	03	10	06	54	17.6	5.589S	147.211E	206	5.80		6.00 BRK6.80 ML PMG		77
69	03	11	22	03	38.9	3.071S	142.648E	014					5
69	03	12	07	02	15.0	5.021S	150.693E	230			4.90 ML PMG		11
69	03	13	13	10	55.5	5.921S	152.355E	033	4.90		5.20 ML PMG		17
69	03	19	20	12	41.2	6.053S	154.308E	054	5.20		5.50 ML PMG		30
69	03	21	02	39	12.7	6.146S	147.426E	090	5.40		5.50 ML PMG		23
69	03	21	17	23	41.8	3.520S	135.713E	035					9
69	03	23	23	01	03.2	6.494S	154.670E	051	5.00				25
69	03	26	04	29	08.6	6.351S	154.945E	088	5.10		5.30 ML PMG		48
69	03	29	12	00	55.0	6.321S	146.767E	068	4.60		5.10 ML PMG		12
69	04	01	12	09	35.4	5.267S	152.926E	060					8

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES					STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES		RICHTER /LOCAL	
69	04	02	16	26	55.0	10.842S	162.424E	034	4.30					10
69	04	03	15	02	35.1	6.489S	130.459E	040	5.20					45
69	04	05	23	08	58.5	6.689S	149.480E	046	4.90				5.10 ML PMG	8
69	04	06	14	38	52.8	5.263S	152.929E	056	4.90				5.10 ML PMG	8
69	04	07	02	36	24.4	5.278S	152.918E	059	4.90				5.30 ML PMG	9
69	04	08	10	19	48.8	3.708S	151.090E	005	5.10					9
69	04	09	21	41	50.9	7.260S	156.015E	051	4.90					15
69	04	12	09	05	46.8	4.858S	151.601E	109	5.10				5.90 ML PMG	18
69	04	13	22	57	35.3	10.681S	162.652E	041	4.90					8
69	04	15	17	50	20.8	6.478S	142.975E	031	5.30					8
69	04	15	21	08	12.8	6.103S	142.943E	011	5.10				4.70 ML PMG	16
69	04	16	01	16	59.6	3.562S	151.234E	033	4.90					14
69	04	16	01	22	47.5	3.536S	150.974E	039	5.70	6.5	6.25 PAS		5.70 ML PMG	70
69	04	17	13	35	59.7	10.985S	164.964E	033						8
69	04	18	12	32	03.4	4.538S	132.691E	033	5.50					60
69	04	20	04	51	34.5	1.605S	136.883E	042	5.50					10
69	04	21	14	11	42.9	4.801S	153.246E	057	5.10					10
69	04	21	14	50	07.2	6.259S	151.859E	049					4.80 ML PMG	13
69	04	21	21	48	39.1	5.216S	150.919E	168					5.00 ML PMG	10
69	04	26	21	52	31.6	5.958S	146.133E	122	4.80				5.00 ML PMG	12
69	04	28	19	39	05.5	7.889S	158.781E	077	5.70		5.75 BRK			81
69	05	03	03	37	10.6	3.622S	135.768E	042						6
69	05	03	10	42	00.0	4.605S	153.403E	102	5.50				5.10 ML PMG	9
69	05	07	13	32	53.6	10.323S	161.756E	062	4.70					9
69	05	07	22	17	35.4	5.239S	152.722E	054	5.10				5.40 ML PMG	36
69	05	08	22	37	16.8	5.567S	146.201E	076	5.10				5.50 ML PMG	24
69	05	09	14	34	11.5	6.015S	153.692E	133	4.90					10
69	05	11	08	03	27.8	5.603S	148.429E	033					4.30 ML PMG	7
69	05	14	11	32	03.7	4.127S	152.770E	131	4.60					11
69	05	15	03	09	53.0	5.795S	149.265E	118					5.40 ML PMG	12
69	05	15	07	51	23.7	7.218S	155.741E	033						5

TABLE S (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES				STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES	RICHTER /LOCAL	
69	05	17	11	02	09.5	6.252S	152.162E	033					8
69	05	17	23	17	37.2	4.169S	154.349E	033					7
69	05	18	00	15	31.5	9.004S	158.448E	016	5.60	5.2			66
69	05	20	03	15	58.8	5.652S	148.120E	243				4.30 ML PMG	7
69	05	20	16	02	23.9	9.119S	152.444E	042	4.60			4.90 ML PMG	11
69	05	21	17	05	03.4	4.585S	153.157E	065	5.10			5.20 ML PMG	31
69	05	24	03	40	28.0	4.014S	153.102E	033					10
69	05	24	16	27	39.4	10.115S	161.321E	096	5.20				66
69	05	25	02	05	24.2	4.741S	151.380E	155	4.50			4.80 ML PMG	11
69	05	26	03	39	01.9	6.283S	155.372E	235	4.40				13
69	05	27	04	34	32.9	10.710S	161.836E	041	4.80				24
69	05	27	15	01	21.9	10.722S	164.351E	008	5.20				53
69	05	29	00	00	34.2	6.917S	146.267E	150	4.90			4.60 ML PMG	17
69	05	31	02	56	11.8	7.481S	155.560E	104	4.90				14
69	05	31	23	56	21.6	4.880S	154.222E	403	5.50			6.40 ML PMG	126
69	06	01	23	20	45.5	3.331S	142.905E	110	4.80				16
69	06	03	18	51	27.8	4.563S	152.944E	064	4.80				13
69	06	04	00	30	12.9	7.085S	154.201E	033	4.80				12
69	06	04	15	26	47.3	5.172S	152.596E	034					8
69	06	06	00	12	41.4	5.635S	152.143E	041	4.50				9
69	06	09	06	51	16.1	3.241S	142.893E	017	5.20	5.3		5.80 ML PMG	62
69	06	14	03	22	56.8	7.913S	158.982E	062	6.00		6.60 PAS		111
69	06	14	09	24	15.4	2.176S	137.834E	113	4.80				17
69	06	14	09	26	10.6	5.559S	145.517E	114	5.20			5.90 ML PMG	38
69	06	18	10	54	42.6	5.071S	151.571E	124	4.80			5.60 ML PMG	15
69	06	20	12	51	14.9	10.037S	161.415E	072	4.90				12
69	06	21	15	15	18.1	4.526S	151.903E	077	4.80			5.00 ML PMG	13
69	06	23	19	51	07.4	5.750S	152.228E	030	4.80				11
69	06	24	03	29	17.3	5.821S	146.772E	113	5.60			6.00 ML PMG	107
69	06	27	02	47	46.3	6.403S	130.133E	113	5.30				20
69	07	02	08	21	48.6	5.445S	147.025E	219	4.70			4.70 ML PMG	18

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES				STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES	RICHTER /LOCAL	
69	07	05	01	44	01.1	3.772S	131.467E	033	5.50	5.2			46
69	07	06	03	41	51.8	6.395S	154.903E	094	4.60			5.50 ML PMG	27
69	07	06	13	53	57.7	6.925S	155.136E	148	4.60				14
69	07	13	08	32	13.2	7.006S	149.418E	033				4.30 ML PMG	10
69	07	13	13	59	44.3	8.542S	158.903E	533	4.70				23
69	07	14	16	40	13.1	9.756S	161.975E	029					8
69	07	14	20	11	45.7	5.587S	147.070E	208	5.10			4.40 ML PMG	13
69	07	16	12	39	26.2	4.705S	153.141E	085	4.60			6.00 ML PMG	47
69	07	19	01	33	44.0	6.381S	130.055E	142	5.30				30
69	07	20	20	39	56.2	1.481S	137.651E	093	4.80				8
69	07	21	13	38	35.6	10.348S	161.380E	085	4.90				24
69	07	26	18	33	00.	9.200S	148.800E					4.8 ML PMG	7
69	07	29	01	55	20.4	3.376S	144.843E	006	5.50			5.20 ML PMG	52
69	07	29	03	37	49.8	3.363S	151.947E	376	4.50			5.40 ML PMG	21
69	07	29	11	01	07.9	6.030S	147.575E	094				4.60 ML PMG	8
69	07	31	08	45	31.5	3.809S	151.564E	028	4.90				20
69	08	01	13	59	09.9	10.331S	161.428E	069	4.80				22
69	08	01	19	31	20.6	5.478S	151.210E	110	4.80			[illegible] ML PMG	7
69	08	02	04	30	29.2	6.548S	146.921E	017	5.30			[illegible] PMG	43
69	08	03	00	22	32.0	4.240S	153.016E	065	[illegible].30		5.60 PAS6.[illegible]	[illegible] ML PMG	85
69	08	03	10	30	38.5	10.748S	164.441E	014					10
69	08	04	07	44	06.[illegible]	5.338S	152.474E	060	4.80				12
69	08	04	14	38	21.6	7.244S	151.213E	022					11
69	08	05	16	32	25.8	5.246S	153.778E	069	5.40		6.13 BRK6.70	ML PMG	61
69	08	06	00	26	40.7	5.324S	154.806E	040					11
69	08	06	04	38	24.7	5.210S	154.145E	115	5.70				9
69	08	06	05	26	50.9	3.629S	144.484E	048	5.10				9
69	08	06	06	54	58.5	3.513S	144.419E	040	5.20				8
69	08	06	07	16	49.6	5.212S	154.018E	120	5.00				14
69	08	06	10	05	53.0	6.204S	154.089E	089	5.00				7
69	08	06	12	30	10.4	6.478S	145.922E	111				3.90 ML PMG	6

TABLE S (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES				STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES	RICHTER /LOCAL	
69	08	06	17	23	07.3	5.630S	153.392E	043					7
69	08	07	01	49	33.2	5.268S	154.064E	116	5.20			6.00 ML PMG	58
69	08	07	06	08	59.6	5.291S	153.986E	129	4.90			5.40 ML PMG	15
69	08	07	07	30	42.8	5.208S	154.052E	131	5.00				9
69	08	07	10	10	11.6	5.056S	154.182E	126					12
69	08	07	21	03	19.4	5.185S	154.148E	120	5.90				10
69	08	09	11	28	51.2	5.419S	154.279E	100					11
69	08	09	23	26	19.1	5.312S	154.059E	114	4.10				9
69	08	10	04	05	13.3	5.201S	154.020E	124	5.00			5.40 ML PMG	13
69	08	11	10	43	33.9	4.296S	153.740E	260	5.00			5.30 ML PMG	18
69	08	11	12	25	57.7	5.234S	154.113E	122	5.20			5.30 ML PMG	10
69	08	12	09	21	54.6	7.166S	154.926E	043	5.10			5.20 ML PMG	18
69	08	12	10	47	30.6	6.942S	154.917E	058	4.80				9
69	08	12	10	57	51.3	4.192S	151.918E	272					12
69	08	13	11	14	36.2	4.780S	151.803E	133	4.60			5.10 ML PMG	9
69	08	14	10	58	01.7	5.368S	152.016E	033	5.60			5.60 ML PMG	32
69	08	15	03	37	52.8	3.514S	144.390E	022	5.40			5.80 ML PMG	21
69	08	15	18	18	07.9	10.310S	162.122E	034	4.30				12
69	08	17	10	10	29.8	7.020S	155.624E	066	5.10				50
69	08	19	02	12	48.5	10.387S	161.530E	070	5.00				24
69	08	20	17	22	13.7	5.320S	149.656E	027	4.80	5.2		5.90 ML PMG	42
69	08	22	03	05	38.3	8.027S	156.191E	028	4.70				12
69	08	22	15	45	04.7	7.552S	156.008E	080	5.10			5.30 ML PMG	37
69	08	23	01	13	48.7	5.196S	153.504E	061				5.40 ML PMG	12
69	08	23	07	54	27.1	7.645S	156.293E	055	5.00				28
69	08	24	08	40	41.2	6.064S	154.660E	112					11
69	08	24	12	39	30.1	7.289S	148.131E	039	4.70			5.10 ML PMG	28
69	08	25	19	07	24.0	5.137S	131.403E	071	5.30				15
69	08	26	03	14	59.3	7.427S	156.033E	100	4.80				17
69	08	26	07	53	55.7	5.938S	151.413E	052	4.40			4.90 ML PMG	15
69	08	26	16	58	02.3	5.808S	151.187E	059	5.60			6.20 ML PMG	93

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES					STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES		RICHTER /LOCAL	
69	08	26	19	13	10.5	6.004S	148.034E	070	4.90				5.30 ML PMG	30
69	08	28	11	55	17.5	6.118S	150.516E	049	4.60				4.80 ML PMG	17
69	08	28	15	10	29.3	5.850S	149.295E	100					5.40 ML PMG	23
69	08	30	12	51	57.9	5.656S	148.261E	167	5.20				5.50 ML PMG	46
69	08	30	23	55	49.6	3.360S	139.861E	030	5.10					22
69	09	02	05	57	03.9	5.114S	153.349E	060						9
69	09	02	08	09	53.2	4.403S	152.724E	041						9
69	09	03	15	56	04.6	11.257S	163.622E	033						10
69	09	05	16	07	06.4	5.297S	154.009E	180	5.40					21
69	09	05	19	21	05.8	5.638S	151.953E	052	5.10				4.80 ML PMG	15
69	09	06	14	49	55.9	8.840S	157.812E	015	5.80	6.1	6.10	PAS		66
69	09	06	17	08	03.2	8.898S	157.861E	010	5.80	5.7				69
69	09	06	19	32	05.2	8.883S	158.052E	033	4.50					6
69	09	07	03	06	02.2	8.890S	157.711E	033	5.60					57
69	09	07	06	21	05.1	9.020S	157.990E	035	5.20					24
69	09	07	08	40	34.3	6.558S	155.766E	173	5.30				5.60 ML PMG	44
69	09	07	16	03	18.1	6.425S	130.223E	132	5.00					9
69	09	08	02	09	16.3	5.206S	154.176E	116						11
69	09	08	12	45	34.6	5.097S	153.420E	047	5.20	5.4			5.90 ML PMG	63
69	09	08	17	21	48.8	4.943S	153.529E	071						9
69	09	08	20	49	39.6	5.222S	153.367E	069	4.90				5.00 ML PMG	12
69	09	11	18	18	09.3	9.200S	158.423E	069	4.90					6
69	09	12	12	59	38.1	5.849S	147.447E	165	4.60				4.70 ML PMG	18
69	09	12	16	13	07.3	5.354S	153.340E	041						14
69	09	12	18	05	28.4	6.522S	147.011E	114					4.70 ML PMG	15
69	09	14	01	33	38.5	6.030S	151.405E	071	4.70				4.70 ML PMG	11
69	09	18	11	57	33.0	3.182S	136.446E	050	5.40					28
69	09	18	22	50	17.5	5.140S	150.743E	246	4.90				4.80 ML PMG	12
69	09	19	07	08	53.9	4.588S	153.204E	081	4.90				5.20 ML PMG	17
69	09	19	20	13	16.4	5.432S	152.012E	057	4.40					14
69	09	20	00	12	17.6	10.459S	161.576E	087	4.60					22

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES CGS BODY WAVE	MAGNITUDES CGS SURF WAVE	MAGNITUDES OTHER SOURCES	MAGNITUDES RICHTER /LOCAL	STN
69	09	20	08	56	44.8	3.131S	142.031E	038	5.10				39
69	09	26	14	17	56.9	5.433S	153.024E	050	4.70			5.00 ML PMG	15
69	09	27	11	35	33.8	7.113S	130.981E	033	4.50				8
69	10	01	18	42	12.8	6.177S	130.401E	179	5.30				14
69	10	02	09	22	30.1	6.428S	150.753E	041	4.20			4.40 ML PMG	13
69	10	05	10	59	18.1	5.173S	152.574E	069	4.90			5.30 ML PMG	19
69	10	06	17	48	54.3	5.446S	152.106E	046	5.10			5.20 ML PMG	18
69	10	06	18	17	58.6	5.503S	152.214E	042	4.70				16
69	10	09	11	56	23.8	5.600S	153.480E	090	5.30			5.30 ML PMG	17
69	10	09	13	32	57.4	9.010S	157.975E	047	4.90				13
69	10	11	19	41	58.3	5.489S	147.112E	218	5.10			5.50 ML PMG	29
69	10	14	10	29	00.	9.200S	150.000E					5.2 ML PMG	5
69	10	14	11	05	17.1	4.584S	153.253E	084					11
69	10	17	21	11	21.4	5.940S	151.403E	057	5.10			5.50 ML PMG	18
69	10	17	22	50	05.7	10.696S	164.749E	063	4.80				26
69	10	18	03	03	13.4	5.608S	154.278E	112	5.10			5.30 ML PMG	12
69	10	18	11	16	55.6	5.953S	154.083E	043	5.30			5.20 ML PMG	11
69	10	20	01	12	23.4	5.628S	153.054E	050	4.60			5.50 ML PMG	28
69	10	21	14	41	46.2	4.160S	150.215E	524	4.70			4.90 ML PMG	23
69	10	21	15	07	52.1	4.972S	150.752E	046					9
69	10	21	18	48	14.9	5.652S	153.077E	039	4.40			5.20 ML PMG	12
69	10	22	05	58	48.8	4.924S	154.211E	390	4.80			5.50 ML PMG	52
69	10	22	07	12	07.7	4.786S	152.510E	071	5.30			5.90 ML PMG	67
69	10	26	18	07	04.5	5.253S	149.819E	004				4.70 ML PMG	11
69	10	27	19	45	46.4	5.774S	151.070E	073	4.50			4.70 ML PMG	11
69	10	28	11	49	46.7	3.932S	151.619E	019	4.90				20
69	10	29	16	59	15.8	5.809S	148.860E	101	4.00			4.40 ML PMG	10
69	10	30	12	58	21.6	3.560S	143.113E	033					8
69	10	30	18	39	23.0	2.453S	143.539E	033	5.20	4.9		5.10 ML PMG	36
69	10	31	04	29	48.9	2.503S	143.478E	019	4.90				18
69	11	01	21	07	22.9	3.702S	143.221E	036	5.30			5.50 ML PMG	21

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES			STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES / RICHTER / LOCAL	
69	11	02	02	10	11.5	5.032S	153.514E	064			5.00 ML PMG	13
69	11	03	12	12	15.0	9.552S	159.601E	038	4.40			7
69	11	03	16	55	19.5	5.761S	154.022E	077	5.10		5.40 ML PMG	19
69	11	04	03	57	23.2	6.180S	130.110E	033	5.10			14
69	11	05	01	30	03.6	7.942S	156.198E	055	5.10			10
69	11	06	04	17	01.4	5.057S	153.355E	130				7
69	11	06	06	33	20.3	4.376S	155.062E	502	4.70			14
69	11	07	05	02	04.8	5.488S	151.820E	068	4.60			10
69	11	07	18	24	57.6	4.039S	152.275E	186	4.90		5.20 ML PMG	24
69	11	08	17	53	26.2	6.183S	146.584E	075	4.40		5.40 ML PMG	12
69	11	10	05	36	48.7	2.475S	139.812E	015	5.00			18
69	11	10	15	42	34.5	5.567S	142.011E	040	5.30		5.10 ML PMG	16
69	11	11	15	23	59.2	5.683S	151.380E	073	5.30		6.40 ML PMG	75
69	11	12	05	26	37.0	10.746S	161.902E	024	4.00			6
69	11	12	13	21	25.5	5.053S	152.624E	064				11
69	11	12	13	54	59.1	5.390S	152.357E	044				10
69	11	12	15	12	42.9	5.406S	152.414E	045				11
69	11	12	15	40	15.5	5.977S	148.797E	082	5.00		5.90 ML PMG	57
69	11	12	20	54	02.7	5.391S	152.308E	045	5.00		4.80 ML PMG	15
69	11	13	09	51	21.4	5.833S	151.998E	033			4.70 ML PMG	9
69	11	13	10	14	37.4	5.492S	152.249E	104				12
69	11	14	11	26	31.3	7.763S	159.128E	038	4.70			11
69	11	16	05	40	22.2	6.535S	155.021E	057	5.20			11
69	11	16	05	44	01.6	6.478S	154.975E	063	5.00		5.40 ML PMG	32
69	11	16	06	15	55.9	5.464S	151.377E	071			5.20 ML PMG	16
69	11	16	20	09	10.4	6.209S	147.938E	062	4.90		5.50 ML PMG	35
69	11	18	17	40	36.1	5.451S	152.493E	051	4.80		5.00 ML PMG	12
69	11	22	08	35	21.7	2.861S	139.208E	033				11
69	11	23	08	54	53.5	10.394S	161.524E	059	5.30			41
69	11	24	03	43	17.0	4.150S	152.839E	067	4.80			29
69	11	25	21	51	04.2	3.495S	138.463E	052	5.20			35

TABLE 8 (Continued)

YR	MO	DAY	HR	MN	SEC	LAT.	LONG.	DEPTH	MAGNITUDES			STN
									CGS BODY WAVE	CGS SURF WAVE	OTHER SOURCES / RICHTER / LOCAL	
69	11	25	22	31	07.1	5.023S	153.501E	072	4.80		5.40 ML PMG	32
69	11	26	12	45	34.6	5.267S	144.058E	110	4.80		4.50 ML PMG	14
69	11	30	00	11	04.1	5.721S	149.504E	161	5.10		5.00 ML PMG	18
69	12	05	14	03	19.4	2.369S	140.502E	020				11
69	12	06	06	13	51.5	5.329S	152.296E	100	4.90		5.00 ML PMG	6
69	12	07	22	32	31.5	4.806S	143.504E	105	5.30		5.00 ML PMG	23
69	12	10	23	42	24.1	8.814S	160.152E	085	4.80			34
69	12	14	05	52	32.1	6.656S	154.740E	012	5.50			8
69	12	15	00	15	32.4	3.516S	144.991E	044	5.40			8
69	12	18	02	31	01.7	4.125S	151.879E	221				9
69	12	18	12	48	40.1	5.254S	153.701E	033	5.30			8
69	12	18	16	02	31.3	5.461S	153.470E	043	5.20			11
69	12	19	12	15	30.7	6.299S	154.619E	075	4.90		5.60 ML PMG	23
69	12	19	16	29	16.8	6.239S	154.563E	075	4.60		5.40 ML PMG	12
69	12	20	09	40	40.9	4.192S	152.700E	048	4.70		5.00 ML PMG	17
69	12	21	07	20	51.6	5.543S	146.030E	130	5.30		4.90 ML PMG	14
69	12	22	03	43	47.5	5.693S	153.631E	044	5.50		5.00 ML PMG	16
69	12	25	14	53	12.0	6.047S	150.031E	033	4.30		4.70 ML PMG	11
69	12	28	10	06	25.6	10.719S	163.304E	034	5.00			11
69	12	29	23	52	50.6	4.272S	151.278E	026	4.90			10
69	12	30	00	43	04.0	4.261S	151.213E	033				9

TABLE 9. REPORTS OF EARTHQUAKES FELT IN THE NEW GUINEA/SOLOMON ISLANDS REGION, 1969

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	1	3	22	40	0.0	6.08	148.92	4
69	1	4	9	20	0.0	3.67	143.30	3
69	1	5	11	3	0.0	5.33	150.08	3
69	1	5	11	4	0.0	6.25	149.58	3
69	1	6	0	50	0.0	3.65	143.68	4
69	1	6	0	50	0.0	3.63	143.65	3
69	1	6	0	50	0.0	3.67	143.30	4
69	1	6	3	20	0.0	3.63	143.65	3
69	1	6	3	20	0.0	3.65	143.68	4
69	1	7	1	10	0.0	5.63	146.48	4
69	1	7	1	15	0.0	6.73	147.02	4
69	1	7	1	15	0.0	7.00	146.58	3
69	1	7	1	15	0.0	6.25	145.67	3
69	1	7	1	16	0.0	5.83	144.68	3
69	1	7	1	16	0.0	5.22	145.80	3
69	1	7	1	17	0.0	5.75	145.25	3
69	1	7	1	35	0.0	7.90	147.17	4
69	1	9	8	25	0.0	6.55	147.87	3
69	1	9	9	10	0.0	6.55	147.87	3
69	1	9	9	45	0.0	6.55	147.87	3
69	1	9	12	18	0.0	6.55	147.87	3
69	1	9	13	9	0.0	6.55	147.87	3
69	1	9	13	43	0.0	6.55	147.87	4
69	1	9	15	48	0.0	6.55	147.87	4
69	1	14	5	31	0.0	6.30	145.87	4
69	2	5	20	40	0.0	4.37	152.28	4
69	2	6	5	32	0.0	4.17	152.17	3
69	2	14	22	35	0.0	3.67	143.33	3
69	2	17	2	45	0.0	5.00	145.78	4
69	2	17	2	55	0.0	5.75	145.25	3
69	2	25	4	56	0.0	6.20	155.63	3
69	2	25	9	40	0.0	6.20	155.63	3

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	2	25	10	50	0.0	6.20	155.63	3
69	2	28	17	30	0.0	3.58	142.75	4
69	3	3	17	30	0.0	3.67	143.30	3
69	3	7	7	30	0.0	5.12	144.72	3
69	3	8	6	3	0.0	6.20	155.63	4
69	3	8	18	40	0.0	6.20	155.63	4
69	3	10	6	15	0.0	6.25	145.67	3
69	3	10	6	50	0.0	6.57	147.85	3
69	3	10	6	50	0.0	6.72	147.00	4
69	3	10	6	54	0.0	6.32	144.05	3
69	3	10	6	55	0.0	6.97	146.58	4
69	3	10	6	55	0.0	8.78	148.25	4
69	3	10	6	55	0.0	6.15	145.55	4
69	3	10	6	55	0.0	5.75	145.23	4
69	3	10	6	55	0.0	6.90	146.70	5
69	3	10	6	55	0.0	6.38	146.03	4
69	3	10	6	55	0.0	6.63	146.97	4
69	3	10	6	55	0.0	6.42	146.82	4
69	3	10	6	55	0.0	6.33	145.93	5
69	3	10	6	55	0.0	5.58	147.92	4
69	3	10	6	55	0.0	5.83	145.75	4
69	3	10	6	55	0.0	6.20	144.90	4
69	3	10	6	55	0.0	6.33	149.63	4
69	3	10	6	55	0.0	7.75	147.62	4
69	3	10	6	55	0.0	6.32	146.07	4
69	3	10	6	55	0.0	5.95	147.35	4
69	3	10	6	55	0.0	6.20	147.20	5
69	3	10	6	55	0.0	6.05	144.57	4
69	3	10	6	55	0.0	7.35	146.03	4
69	3	10	6	55	0.0	4.75	145.00	4
69	3	10	6	55	0.0	6.28	146.25	5
69	3	10	6	55	0.0	5.23	145.83	4
69	3	10	6	55	0.0	5.00	145.78	5
69	3	10	6	55	0.0	6.22	145.78	5

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	3	10	6	55	0.0	6.48	147.87	4
69	3	10	6	55	0.0	4.55	145.95	4
69	3	10	6	55	0.0	5.47	145.73	4
69	3	10	6	55	0.0	5.58	148.32	4
69	3	10	6	55	0.0	6.35	145.45	4
69	3	10	6	55	0.0	6.25	145.63	4
69	3	10	6	55	0.0	6.40	145.98	5
69	3	10	6	55	0.0	6.55	145.60	5
69	3	10	6	55	0.0	6.68	147.77	5
69	3	10	6	55	0.0	5.23	145.83	5
69	3	10	6	55	0.0	6.55	147.87	4
69	3	10	6	55	0.0	5.60	147.62	4
69	3	10	6	55	0.0	7.90	147.17	4
69	3	10	6	55	0.0	5.12	144.72	3
69	3	10	6	55	0.0	5.47	150.50	3
69	3	10	6	55	0.0	7.32	146.18	5
69	3	10	6	55	0.0	6.60	147.77	4
69	3	10	6	55	0.0	6.13	145.13	4
69	3	10	6	55	0.0	6.02	144.97	5
69	3	10	6	55	0.0	7.32	146.72	4
69	3	10	6	55	0.0	4.27	144.98	4
69	3	10	6	55	0.0	6.97	146.58	5
69	3	10	6	55	0.0	6.63	146.57	5
69	3	10	6	55	0.0	6.00	147.25	4
69	3	10	6	55	0.0	6.12	146.47	4
69	3	10	6	55	0.0	5.98	147.20	4
69	3	10	6	55	0.0	6.25	149.58	3
69	3	10	6	55	0.0	5.90	145.10	4
69	3	10	6	55	0.0	6.08	146.20	4
69	3	10	6	55	0.0	6.55	147.87	4
69	3	10	6	55	0.0	6.20	147.20	6
69	3	10	6	55	0.0	6.97	146.58	5
69	3	10	6	55	0.0	6.42	147.57	5
69	3	10	6	55	0.0	5.32	145.58	4
69	3	10	6	55	0.0	5.95	147.35	4
69	3	10	6	55	0.0	6.05	145.42	4
69	3	10	6	55	0.0	6.58	146.78	5

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	3	10	6	55	0.0	6.18	145.45	4
69	3	10	6	55	0.0	5.38	145.60	4
69	3	10	6	55	0.0	5.23	145.83	4
69	3	10	6	55	0.0	8.88	147.75	4
69	3	10	6	55	0.0	9.50	147.13	3
69	3	10	6	55	0.0	6.73	147.02	5
69	3	10	6	55	0.0	6.73	146.92	5
69	3	10	6	55	0.0	6.20	143.70	4
69	3	10	6	55	0.0	7.32	146.72	4
69	3	10	6	55	0.0	5.23	145.75	3
69	3	10	6	55	0.0	6.73	147.02	4
69	3	10	6	56	0.0	5.75	145.23	4
69	3	10	6	56	0.0	6.05	145.42	3
69	3	10	6	57	0.0	5.23	145.83	3
69	3	10	6	58	0.0	8.35	146.98	3
69	3	10	7	0	0.0	8.33	147.83	3
69	3	10	7	0	0.0	6.42	147.57	4
69	3	15	20	50	0.0	9.67	150.75	6
69	3	19	9	41	0.0	3.68	143.60	3
69	3	21	2	40	0.0	7.00	146.58	3
69	3	21	2	40	0.0	6.67	146.92	3
69	3	21	2	45	0.0	6.73	147.02	3
69	3	29	11	0	0.0	6.25	146.25	3
69	3	29	12	2	0.0	7.00	146.58	3
69	4	1	23	10	0.0	9.67	150.83	3
69	4	4	12	15	0.0	9.67	150.83	4
69	4	5	18	10	0.0	9.67	150.83	4
69	4	6	19	20	0.0	9.67	150.83	3
69	4	8	2	1	0.0	6.55	147.87	4
69	4	9	11	0	0.0	9.67	150.83	4
69	4	14	18	0	0.0	5.88	142.97	4
69	4	14	21	0	0.0	5.88	142.97	4
69	4	15	17	30	0.0	5.88	142.97	4
69	4	15	21	15	0.0	5.88	142.97	4
69	4	16	0	0	0.0	2.42	147.33	3
69	4	16	1	21	0.0	2.58	150.83	5

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	4	16	1	25	0.0	4.25	151.75	4
69	4	16	1	25	0.0	4.17	152.17	3
69	4	16	1	30	0.0	2.97	150.83	5
69	4	16	17	30	0.0	5.88	142.97	4
69	4	16	21	12	0.0	5.88	142.97	4
69	4	30	13	2	0.0	3.67	143.30	3
69	5	1	19	22	0.0	5.88	142.97	3
69	5	8	8	20	0.0	4.25	151.75	3
69	5	8	9	19	0.0	4.20	151.50	3
69	5	8	12	57	0.0	3.67	143.33	3
69	5	8	22	40	0.0	5.15	145.72	4
69	5	8	22	45	0.0	6.73	147.02	3
69	5	9	8	40	0.0	6.25	145.63	3
69	5	9	9	36	0.0	5.25	145.75	3
69	5	11	1	0	0.0	3.67	143.33	3
69	5	18	5	0	0.0	9.67	150.83	4
69	5	20	16	25	0.0	9.08	152.88	4
69	5	21	3	5	0.0	4.17	152.17	4
69	5	22	14	6	0.0	3.67	143.33	3
69	5	24	7	16	0.0	6.20	155.63	3
69	5	24	11	25	0.0	4.20	151.50	4
69	5	24	21	16	0.0	6.20	155.63	4
69	5	26	11	30	0.0	9.67	150.83	3
69	5	26	13	25	0.0	9.67	150.83	4
69	5	29	2	5	0.0	5.15	147.72	3
69	6	1	23	16	0.0	3.58	142.75	4
69	6	3	19	19	0.0	6.30	145.87	3
69	6	4	4	45	0.0	4.37	152.28	3
69	6	8	16	0	0.0	3.03	141.17	4
69	6	9	6	50	0.0	3.57	142.80	5
69	6	9	6	50	0.0	3.58	142.75	3
69	6	9	6	50	0.0	3.60	142.37	4
69	6	9	6	50	0.0	3.12	142.33	4
69	6	9	6	50	0.0	3.57	142.03	3
69	6	9	6	50	0.0	3.58	143.67	4
69	6	9	6	50	0.0	3.67	143.30	4
69	6	9	6	50	0.0	3.63	143.07	4

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	6	9	6	50	0.0	3.12	142.33	4
69	6	9	6	50	0.0	3.55	143.68	4
69	6	9	6	50	0.0	4.23	142.82	4
69	6	9	6	50	0.0	3.55	143.68	4
69	6	9	6	50	0.0	3.05	142.07	4
69	6	9	6	50	0.0	3.67	143.17	4
69	6	9	6	50	0.0	3.73	142.30	3
69	6	9	6	50	0.0	4.08	143.15	4
69	6	24	3	30	0.0	6.97	146.58	4
69	6	24	3	30	0.0	6.55	147.87	4
69	6	24	3	30	0.0	6.20	147.20	5
69	6	24	3	30	0.0	6.73	147.02	4
69	6	24	3	30	0.0	5.15	145.72	4
69	6	24	3	30	0.0	5.23	145.83	3
69	6	24	3	30	0.0	6.63	146.57	7
69	6	24	3	30	0.0	7.90	147.17	4
69	6	24	3	30	0.0	6.27	146.27	4
69	6	24	3	30	0.0	6.00	147.20	3
69	6	24	3	30	0.0	7.42	144.25	3
69	6	24	3	30	0.0	8.75	148.25	3
69	6	24	3	30	0.0	6.12	146.47	3
69	6	24	3	30	0.0	6.05	145.42	3
69	6	24	3	30	0.0	6.25	145.63	5
69	6	28	10	23	0.0	3.42	143.42	3
69	7	6	3	42	0.0	6.20	155.63	3
69	7	6	3	42	0.0	6.33	155.50	3
69	7	8	16	45	0.0	4.17	152.17	4
69	7	10	16	0	0.0	9.68	150.85	4
69	7	10	17	58	0.0	9.67	150.83	4
69	7	10	19	57	0.0	9.75	150.83	6
69	7	16	12	45	0.0	6.33	155.50	3
69	7	17	0	40	0.0	4.18	152.17	4
69	7	29	11	0	0.0	6.73	147.02	3

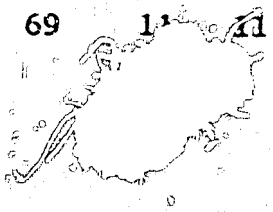
YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	7	30	21	28	0.0	6.20	155.63	3
69	7	31	8	47	0.0	4.18	151.65	3
69	8	2	4	31	0.0	6.73	147.02	5
69	8	2	4	31	0.0	6.72	147.00	4
69	8	2	4	31	0.0	6.20	147.20	4
69	8	2	4	31	0.0	5.12	144.72	3
69	8	2	4	31	0.0	6.73	146.92	5
69	8	2	4	31	0.0	6.63	146.52	4
69	8	2	4	31	0.0	6.23	145.72	4
69	8	2	4	31	0.0	6.73	147.02	4
69	8	2	4	31	0.0	4.55	151.62	3
69	8	2	4	31	0.0	4.32	152.20	4
69	8	2	4	31	0.0	4.40	152.20	4
69	8	2	4	31	0.0	4.13	152.47	4
69	8	2	4	35	0.0	4.55	151.62	3
69	8	2	4	35	0.0	6.58	146.13	3
69	8	2	4	35	0.0	6.28	145.13	4
69	8	2	4	35	0.0	6.38	146.03	3
69	8	2	4	35	0.0	4.82	152.02	4
69	8	2	4	35	0.0	7.32	146.72	4
69	8	2	4	35	0.0	6.73	147.02	5
69	8	2	4	35	0.0	6.72	147.00	4
69	8	2	4	35	0.0	6.63	146.57	4
69	8	2	4	35	0.0	6.33	145.93	4
69	8	2	4	35	0.0	6.08	146.20	5
69	8	2	4	35	0.0	6.55	145.69	4
69	8	2	4	35	0.0	7.37	146.18	5
69	8	2	4	35	0.0	4.40	152.20	3
69	8	2	4	35	0.0	4.32	152.20	4
69	8	2	4	35	0.0	9.05	148.37	3
69	8	2	4	35	0.0	6.23	145.72	4
69	8	2	4	39	0.0	6.73	147.02	4
69	8	2	6	37	0.0	6.73	147.02	3
69	8	2	14	15	0.0	6.73	147.02	4
69	8	3	0	22	0.0	4.50	152.33	6
69	8	3	0	22	0.0	4.18	152.17	5

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	8	3	0	22	0.0	4.75	152.42	4
69	8	3	0	22	0.0	6.22	153.68	4
69	8	3	0	23	0.0	4.33	152.25	5
69	8	3	0	24	0.0	3.78	152.25	4
69	8	3	0	24	0.0	5.73	154.72	4
69	8	3	0	24	0.0	4.22	151.63	3
69	8	3	0	24	0.0	3.20	151.90	5
69	8	3	0	24	0.0	4.20	151.50	4
69	8	3	0	24	0.0	4.40	152.20	5
69	8	3	0	24	0.0	3.92	152.83	5
69	8	3	0	24	0.0	5.53	151.52	3
69	8	3	0	24	0.0	4.37	152.28	5
69	8	3	0	24	0.0	4.37	152.28	4
69	8	3	0	24	0.0	4.42	152.08	7
69	8	3	0	24	0.0	4.32	152.20	6
69	8	3	0	24	0.0	4.17	152.17	4
69	8	3	0	24	0.0	6.33	155.50	4
69	8	3	0	24	0.0	4.17	152.17	6
69	8	3	0	24	0.0	4.55	151.62	3
69	8	3	0	24	0.0	4.42	152.08	6
69	8	3	0	24	0.0	4.78	152.83	5
69	8	3	0	24	0.0	3.90	152.52	3
69	8	3	0	24	0.0	4.82	152.02	4
69	8	3	0	24	0.0	3.30	151.75	3
69	8	3	0	24	0.0	6.25	155.08	3
69	8	3	0	24	0.0	5.00	151.25	4
69	8	3	2	44	0.0	4.18	152.17	4
69	8	3	3	15	0.0	4.18	152.17	4
69	8	3	3	39	0.0	4.18	152.17	4
69	8	3	18	30	0.0	6.65	155.33	4
69	8	5	16	30	0.0	5.83	155.17	4
69	8	5	16	32	0.0	5.17	154.58	4
69	8	5	16	32	0.0	4.18	152.17	4
69	8	5	16	32	0.0	4.50	152.33	3
69	8	5	16	34	0.0	5.15	154.58	4
69	8	5	16	34	0.0	4.03	152.65	4

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	8	5	16	34	0.0	3.83	152.68	4
69	8	5	16	34	0.0	6.65	155.33	4
69	8	5	16	34	0.0	6.68	155.73	4
69	8	5	16	34	0.0	6.57	155.35	5
69	8	5	16	34	0.0	5.53	151.52	4
69	8	5	16	34	0.0	5.83	155.25	4
69	8	5	16	34	0.0	4.22	151.63	4
69	8	5	16	34	0.0	4.42	152.08	4
69	8	5	16	34	0.0	6.33	155.68	4
69	8	5	16	34	0.0	6.83	155.75	3
69	8	5	16	34	0.0	4.37	152.58	4
69	8	5	16	34	0.0	4.20	151.50	4
69	8	5	16	34	0.0	4.40	152.20	4
69	8	5	16	34	0.0	5.40	154.67	5
69	8	5	16	34	0.0	3.92	152.83	4
69	8	5	16	34	0.0	5.45	154.68	5
69	8	5	16	34	0.0	6.33	155.50	5
69	8	5	16	34	0.0	4.17	152.17	4
69	8	5	16	34	0.0	4.55	151.53	4
69	8	5	16	34	0.0	5.85	155.22	4
69	8	5	16	34	0.0	4.37	152.28	4
69	8	5	16	34	0.0	4.82	152.02	4
69	8	5	16	34	0.0	6.25	155.08	5
69	8	5	16	34	0.0	4.32	152.23	6
69	8	5	16	34	0.0	3.20	151.60	4
69	8	5	16	34	0.0	4.25	151.58	3
69	8	5	16	35	0.0	4.33	152.25	4
69	8	5	16	35	0.0	5.00	151.25	4
69	8	7	1	40	0.0	6.25	155.08	5
69	8	7	1	50	0.0	4.18	152.17	3
69	8	7	1	50	0.0	6.22	155.63	5
69	8	7	1	52	0.0	6.33	155.50	4
69	8	8	3	40	0.0	6.73	147.02	3
69	8	11	18	30	0.0	2.58	150.83	3
69	8	13	23	0	0.0	4.22	151.67	3
69	8	14	10	58	0.0	4.33	152.25	4

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	8	14	10	58	0.0	4.25	151.58	4
69	8	14	10	58	0.0	4.18	152.17	3
69	8	15	21	55	0.0	3.42	145.42	4
69	8	17	10	11	0.0	6.33	155.50	4
69	8	17	17	28	0.0	7.90	147.17	5
69	8	20	17	3	0.0	4.37	152.28	4
69	8	20	17	25	0.0	5.28	150.07	4
69	8	20	17	30	0.0	5.55	150.17	4
69	8	22	13	45	0.0	6.33	155.50	4
69	8	23	1	40	0.0	6.73	147.02	4
69	8	24	12	45	0.0	8.33	147.83	4
69	8	25	16	58	0.0	5.32	151.03	5
69	8	25	16	58	0.0	4.18	152.17	4
69	8	25	16	58	0.0	5.50	148.33	4
69	8	26	17	0	0.0	4.25	151.58	3
69	8	26	17	0	0.0	5.00	151.25	3
69	8	26	17	0	0.0	6.33	149.63	4
69	8	26	17	0	0.0	4.60	152.20	4
69	8	26	17	0	0.0	5.47	150.50	4
69	8	26	17	0	0.0	4.37	152.28	4
69	8	26	17	0	0.0	4.62	152.08	4
69	8	26	17	0	0.0	5.53	151.52	5
69	8	26	17	0	0.0	5.48	150.08	5
69	8	26	17	0	0.0	4.20	151.50	4
69	8	26	17	0	0.0	5.00	151.25	4
69	8	26	17	0	0.0	5.55	150.17	4
69	8	26	17	0	0.0	4.55	151.62	4
69	8	26	17	0	0.0	4.92	151.17	4
69	8	26	17	0	0.0	5.65	150.27	4
69	8	26	19	14	0.0	6.55	147.87	4
69	8	28	11	57	0.0	5.55	150.17	3
69	8	29	23	57	0.0	3.50	141.33	3
69	9	4	2	43	0.0	6.55	147.87	4
69	9	7	8	40	0.0	6.33	155.50	4
69	9	8	12	47	0.0	6.33	155.50	4
69	9	12	13	2	0.0	6.73	147.02	4

YR.	MN.	DY	HR.	MN.	SEC	LAT-S	LONG-E	INT
69	9	20	8	58	0.0	3.12	142.33	4
69	9	20	9	5	0.0	3.00	142.03	4
69	9	20	9	45	0.0	3.05	142.07	6
69	9	21	22	18	0.0	6.73	147.02	4
69	9	25	3	57	0.0	3.67	143.33	4
69	9	29	15	55	0.0	3.00	142.03	4
69	10	14	13	30	0.0	9.42	150.33	3
69	10	22	7	12	0.0	4.37	152.28	3
69	10	22	7	13	0.0	4.13	152.47	3
69	10	22	7	13	0.0	4.25	151.75	3
69	10	28	11	50	0.0	4.25	151.75	5
69	10	28	11	50	0.0	4.17	152.17	4
69	10	28	11	50	0.0	4.20	151.50	5
69	10	30	13	0	0.0	3.42	143.42	3
69	10	30	13	0	0.0	3.67	143.33	
69	10	30	13	0	0.0	3.67	143.33	3
69	10	30	17	50	0.0	3.42	143.42	3
69	10	30	21	0	0.0	3.12	142.33	3
69	11	1	21	10	0.0	4.17	142.92	4
69	11	1	21	10	0.0	3.42	143.42	4
69	11	1	21	11	0.0	3.67	143.33	3
69	11	8	17	55	0.0	6.28	146.03	3
69	11	10	15	45	0.0	5.88	142.97	4
69	11	11	15	25	0.0	5.48	150.08	5
69	11	11	15	25	0.0	4.42	152.08	4
69	11	11	15	25	0.0	5.00	151.25	4
69	11	11	15	25	0.0	4.17	152.17	3
69	11	11	15	25	0.0	4.62	152.08	3
69	11	11	15	25	0.0	4.32	152.23	3
69	11	11	15	25	0.0	6.22	148.92	3
69	11	11	15	25	0.0	5.28	151.04	4
69	11	11	15	25	0.0	5.55	150.17	3
69	11	11	15	25	0.0	4.37	152.28	4
69	11	11	15	25	0.0	4.92	151.17	4



YR.	MN.	DY	HR.	MI.	SEC	LAT-S	LONG-E	INT
69	11	11	15	25	0.0	5.53	151.52	4
69	11	11	15	25	0.0	5.50	148.50	4
69	11	11	15	25	0.0	5.58	148.32	4
69	11	11	15	25	0.0	5.08	151.97	3
69	11	11	15	25	0.0	4.55	151.62	3
69	11	12	15	40	0.0	6.43	149.95	4
69	11	12	15	41	0.0	5.88	148.80	3
69	11	16	5	45	0.0	6.25	155.08	3
69	11	16	5	45	0.0	6.20	155.63	4
69	11	16	20	10	0.0	6.42	147.57	4
69	11	16	20	10	0.0	5.62	147.85	4
69	11	16	20	10	0.0	5.50	148.50	3
69	11	16	20	10	0.0	5.98	147.20	4
69	11	16	20	10	0.0	6.12	146.47	4
69	11	16	20	10	0.0	7.10	146.63	3
69	11	16	20	10	0.0	6.48	147.87	4
69	11	16	20	10	0.0	7.90	147.17	3
69	11	16	20	10	0.0	6.67	146.92	3
69	11	16	20	11	0.0	6.55	147.87	4
69	11	16	20	12	0.0	6.28	146.03	3
69	11	16	20	12	0.0	7.32	146.72	3
69	11	16	20	16	0.0	5.15	145.72	3
69	11	30	19	15	0.0	6.28	145.88	4
69	12	7	22	33	0.0	5.88	142.97	3
69	12	15	7	14	0.0	5.88	142.97	5
69	12	19	12	15	0.0	6.25	155.08	4
69	12	19	12	15	0.0	6.33	155.50	3
69	12	19	16	30	0.0	6.33	155.50	3
69	12	19	16	30	0.0	6.25	155.08	4
69	12	20	9	42	0.0	4.17	152.17	3
69	12	20	9	42	0.0	4.33	152.25	4

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