

Department of Scientific and Industrial Research

Geophysics Division

APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA.Latitude: $13^{\circ} 54' 33.7''$ S Longitude: $171^{\circ} 46' 37.9''$ W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

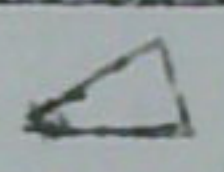
Sprengnether long period seismometers

To = 30 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

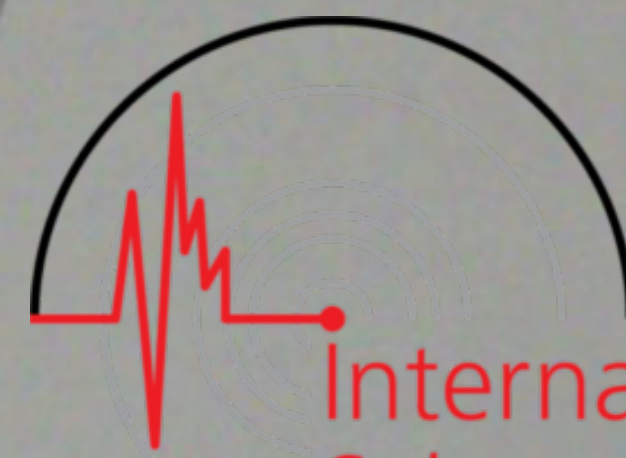
L.P. 750

JANUARY 1964 *

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
1	1	eS	ZN	17	46	34							67.0	USCGS: 45.4N, 151.9E. h about 45 km Kurile Islands H = 17 26 43.5 Mag. 6(Pal), 5.6(CGS)
		eSSS	Z		54.4									
		eL	ZN		56.0									
2	2	eS	Z	19	27.0								31.0	USCGS: 8.4S, 157.1E. h about 33 km. Solomon Islands Felt: Munda H = 19 15 23.9 Mag. 5.5 (CGS)
		eL	ZN		30.0									
3	2	eP	Z	23	44	03								
		iS	NE			58								
4	3	eP	Z	00	47	03								
		iS	NE			58								
5	4	eS	NE	03	58	08								
6	5	eP	ZNE	10	14	53	1.5	1.5	1.4	1.5	1.9	1.9	13.4	USCGS: 26.6S, 175.7W. h about 31 km. Kermadec Islands region H = 10 11 53.0 Mag. 5.1 (CGS)
		eS	NE		17	05								
		eT	ZNE		26	05								
7	5	iP	Z	12	39	39.6								
		iS	NE		40	14								
8	5	eS	ZNE	16	42	50							74.0	USCGS: 61.4S, 154.9E. h about 33 km. Macquarie Island region H = 16 25 52.6
		eL	NE		47.7									
		eL	Z		48.6									

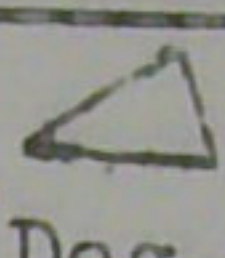
* See note at end

Jan 64

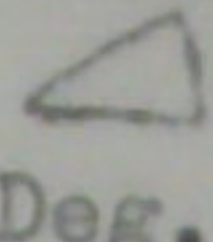
International
Seismological
Centre

No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ac	Te	(Deg.)	Remarks
9	6	eS ZNE eSS ZNE e Z eL Z	00 14 50 21 24 25 10 37.4								
10	6	iP Z iS NE	00 46 36 57								
11	6	iP Z	06 05 55	1.9	2.9					73.0	Compression? USCGS: 27.2N, 127.3E. h about 110 km. Ryukyn Islands H = 05 54 42.7 Mag. 5.7 (CGS)
12	6	eiP Z eS NE	06 24 41 26 16								
13	6	e(P) Z eS NE	11 24 52 26 01								
14	7	eS Z eL ZE	05 35 22 40.7							54.0	USCGS: 58.8S, 149.4E. h about 33 km. Macquarie Islands region H = 05 18 24.5
15	7	e ZN	13 27.0								
16	7	eP Z iS NE	22 01 42 02 01								
17	7	eP ZE iS E eT ZE	23 13 40 14 32 18 31							4.7	USCGS: 18.3S, 173.4W. h about 33 km. Tonga Islands H = 23 12 33.4 Mag. 4.7 (CGS)
18	8	eP Z eS E eT ZE	08 33 08 53 36 20								
19	8	iP ZE iS E	11 52 09 24.5								Compression
20	8	eP Z iS E eT ZE	11 59 58 12 01 00.1 04 49							5.5	USCGS: 18.8S, 173.8W. h about 33 km. Tonga Islands H = 11 58 42.5 Mag. 4.8 (CGS)
21	8	eL N eL Z	23 00 00 04.2							69.0	USCGS: 3.7S, 119.4E. h about 90 km. Celebes H = 22 30 49.7 Mag. 5.2 (CGS) Seven killed, 11 injured and extensive property damage at Pinrang



No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
22	9	eS	ZN	18	51	50							68.0	USCGS: 45.5N, 150.9E. h about 40 km. Kurile Islands H = 18 31 52.4 Mag. 5.6 (CGS)
		eSS	ZN		55	46								
		eSSS	ZN		59	36								
		eL	ZN	19	02.5									
23	10	iP	Z	02	49	56								
		eS	ZNE		50	23								
24	10	eP	Z	05	02	12							70.0	USCGS: 42.0N, 142.6E. h about 33 km. Near south coast of Hokkaido, Japan H = 04 50 53.4 Mag. 5.4-6(Bks), 5.5(CGS)
		eS	ZNE		11	08								
		eSS	Z		14	48								
		eSSS	ZN		19	00								
		eL	ZNE		22.3									
25	10	iP	Z	07	26	00	1.2	0.8						
		eS	ZNE			47								
26	10	iP	ZE	16	53	25.5	8.2	2.0			3.9	2.0	3.5	Dilatation USCGS: 15.4S, 175.0W. h about 33 km. Tonga Islands region H = 16 52 36.2 Mag. 5.0 (CGS)
		iS	NE		54	06								
27	10	eL	ZNE	17	28.2								68.0	USCGS: 45.4N, 150.0E. h about 50 km. Kurile Islands H = 16 57 26.5 Mag. 5.4 (CGS)
28	10	eP	Z	22	02	32							59.0	USCGS: 6.9S, 129.4E. h about 117 km. Banda Sea H = 21 52 47.6 Mag. 5.5 (CGS)
29	10	iP	Z	22	18	32								
		eS	NE			53								
30	11	iP	ZNE	06	40	18.7	7.8	1.9	6.3	1.9	2.6	1.9	1.7	Dilatation from north north east USCGS: 15.1S, 172.9W. h about 33 km. Samoa Islands H = 06 39 55 Mag. 4.2 (CGS)
		iS	NE			35								
31	11	e(L)	E	07	30.8									
32	11	eS	N	09	31	50							18.0	USCGS: 14.1S, 169.6E. h about 33 km. New Hebrides Islands H = 09 24 15.6 Mag. 4.9 (CGS)
33	11	eP	Z	17	53	13								
		eS	NE		54	43								

No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	(Deg.)	Remarks
34	12	eP Z eS NE eT ZNE	00 02 24 04 44 16 20								
35	12	iP Z eS ZE eL ZE eL ZNE	06 11 03.3 20 04 27 50 30.2							66.0	Dilatation USCGS: 53.2N, 166.3W. h about 33 km. Fox Islands, Aleutian Is. H = 06 00 13.2 Mag. 5.5 (CGS)
36	12	iP Z epP Z	11 20 47.3 21 33							41.6	Compression USCGS: 5.48, 146.8E. h about 229 km. Near coast of north east New Guinea H = 11 13 19.6 Mag. 5.6 (CGS)
37	13	iP Z eS NE	13 34 39 35 47							7.0	Compression USCGS: 19.83, 175.6W. h about 190 km. Tonga Islands region H = 13 32 59.2 Mag. 4.1 (CGS)
38	13	eL ZE	17 55.5							71.0	USCGS: 2.3N, 102.0W. h about 33 km. West of Galapagos Islands H = 17 23 30.1 Mag. 4.9 (CGS)
39	13	iP Z eS ZN	18 53 59.9 58 00	1.3	2.0					21.7	Compression USCGS: 11.68, 166.2E. h about 59 km. Santa Cruz Islands H = 18 49 09.8 Mag. 5.2 (CGS)
40	14	eP Z eS ZNE eL E eT ZNE	04 21 08 23 36 23.8 34 17							15.5	USCGS: 28.8S, 176.2W. h about 89 km. Kermadec Islands H = 04 17 50.5 Mag. 4.7 (CGS)
41	14	iP Z is NE	10 11 19 45							2.5	Dilatation USCGS: 15.98, 173.0W. h about 33 km. Tonga Islands H = 10 10 44.7 Mag. 4.5 (CGS)
42	14	eP Z eS ZNE eT ZNE	10 23 35 26 12 37 07							15.5	USCGS: 28.1S, 178.1W. h about 195 km. Kermadec Is. region H = 10 20 10.3 Mag. 4.5 (CGS)

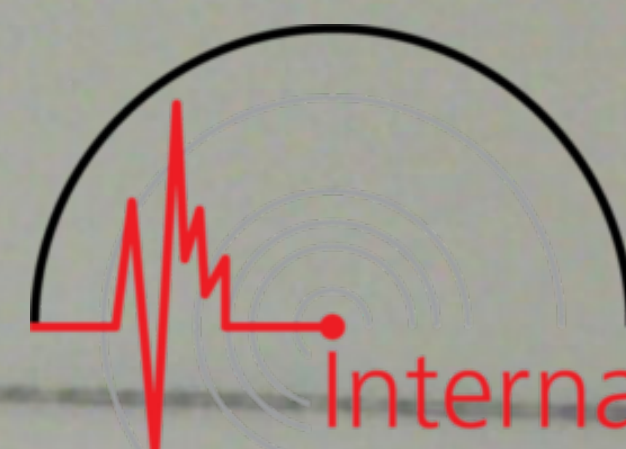
No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks	
43	14	eP e epP eS ePCS eSS	Z Z Z NE Z NE	15 45 17	46 04 51 00 54 00							37.6	USCGS: 5.2S, 150.8E. h about 169 km. Near north coast of New Britain Felt: Rabaul H = 15 38 13.8 Mag. 5.6 (CGS)	
44	14	eP eS eT	Z NE ZNE	19 07 10	36 00									
45	14	eP iS	Z NE	20 23 31 51										
46	14	eP eS	Z NE	22 22 02 26										
47	15	eL eL	Z N	02 54.7 56.0								68.0	USCGS: 45.3N, 150.6E. h about 45 km. Kurile Islands H = 02 23 47.4 Mag. 5.3 (CGS)	
48	15	eP eS eT	ZN ZNE ZNE	18 50 01 52 43 19 03 30		3.6	2.0	1.4	2.0			15.8	USCGS: 28.4S, 178.4W. h about 211 km. Kermadec Islands H = 18 46 32.9 Mag. 4.7 (CGS)	
49	15	eP eS	Z ZNE	19 15 56 16 49										
50	15	iP iPoP eS eSS eSSS eLq eLr	Z Z ZN ZN ZNE ZNE ZN	21 46 25 42 54 48 58 39 22 01 24 04.0 07.2								63.0	Dilatation USCGS: 29.1N, 140.8E. h about 70 km. South of Honshu H = 21 36 05.0 Mag. 6.3 (Pas), 6.4 (CGS)	
51	15	eP eS	Z Z	23 07 14 08 56								8.9	USCGS: 17.4S, 179.7E. h about 599 km. Fiji Islands region H = 23 05 02 Mag. 4.3 (CGS)	
52	16	iP iS	Z NE	08 45 40.7 46 15										
53	16	eP eS	Z NE	11 47 04 48 56								10.4	USCGS: 21.5S, 179.1W. h about 609 km. Fiji Islands region H = 11 44 41.8 Mag. 4.4 (CGS)	
54	17	eP eS eL eL	Z E ZN ZE	02 58 48 03 01 44 02.3 03 50								19.1	USCGS: 21.6S, 169.9E. h about 33 km. Loyalty Is. region H = 02 54 26.8	



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						(Deg.)	Remarks
55	17	eP	Z	03	18	20							20.6	USCGS: 12.3S, 167.1E. h about 230 km. Santa Cruz Islands H = 03 13 56.3 Mag. 4.7 (CGS)
56	17	eP	ZE	09	38	18	0.6	2.1					25.3	USCGS: 11.4S, 162.4E. h about 33 km. Solomon Islands H = 09 32 51.6 Mag. 4.7 (CGS)
57	17	eP	Z	12	17	00	1.5	1.0					11.6	USCGS: 24.3S, 177.0W. h about 51 km. Tonga Islands region H = 12 14 15.8 Mag. 4.7 (CGS)
58	18	iP iS	ZE NE	11	39	37 57								Samoa Islands region
59	18	eP iPcP ePP eS eSS eSSS eLq eLr	Z Z Z ZNE ZNE ZE NE ZNE	12	16	24 29 19 26 31 34 36 38.7	1.0 4.1	2.0 2.0					76.0	USCGS: 23.1N, 120.5E. h about 33 km. Taiwan H = 12 04 40.0 Mag. 6 $\frac{3}{4}$ (Pas), 6 $\frac{3}{4}$ -7(BK) 6 $\frac{1}{2}$ -6 $\frac{3}{4}$ (Pal), 6.1(CGS) 110 dead, 479 injured
		Surface waves for 30 min.												
60	18	iP eS	Z ZNE	12	45	17.4 32								Samoa Islands region
61	18	eP eS eT	Z NE ZNE	18	46 49 58	55 00 37							12.3	USCGS: 25.1S, 176.9W. h about 33 km. Kermadec Islands region H = 18 44 05.0 Mag. 4.6 (CGS)
62	19	eL	ZE	07	14.4								29.8	USCGS: 9.2S, 158.2E. h about 32 km. Solomon Islands H = 07 00 03.3 Mag. 5.7 (CGS)
63	19	eP eS eT	Z NE ZNE	11	56 59	21 53 22								
64	19	eP eS	Z NE	23	23 24	56 42								
65	19	iP iS	ZNE NE	23	25 26	01 29	5.3	1.3	6.2	1.5	4.5	1.5	6.6	Dilatation from north west USCGS: 18.3S, 176.9W. h about 48 km. Fiji Islands H = 23 22 19.1 Mag. 4.5 (CGS)

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No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	(Deg.)	Remarks
66	20	iP Z i Z ipP ZNE iS ZNE iPcS Z	17 12 43.2 13 26 16 08 20 28	13.0	2.1					18.9	Dilatation USCGS: 20.7S, 169.9E. h about 141 km. Loyalty Islands region H = 17 08 37.4 Mag. 6.3(Pas), 6.1(CGS)
67	20	eP Z eS NE eT ZNE	23 10 19 13 11 25 05							17.2	USCGS: 30.0S, 177.9W. h about 44 km. Kermadec Islands region H = 23 06 26.2 Mag. 5.1 (CGS)
68	21	eP Z	07 25 51								
69	21	iP Z eS NE	08 40 32 43 05								Dilatation
70	21	iP Z eS NE	09 39 58 41 57								Compression
71	22	iP Z iS NE	20 42 27.4 57	2.5	1.5						Compression
72	22	iP Z iS NE	22 20 48 21 36							3.7	Compression USCGS: 15.8S, 175.1W. h about 307 km. Fiji Islands region H = 22 19 44.1 Mag. 4.1 (CGS)
73	23	iP ZE iS ZE iL ZE	00 04 32 08 28 09 18	1.8	2.4					21.7	Dilatation USCGS: 13.7S, 165.9E. h about 33 km. New Hebrides Islands H = 23 59 43.6 Mag. 6.0 (CGS)
74	23	iP Z	02 51 20.6	0.7	2.0					7.7	Dilatation USCGS: 17.7S, 178.6W. h about 520 km. Fiji Islands H = 02 49 22 Mag. 3.6 (CGS)
75	23	iP Z iS NE	14 48 10.7 40								
76	24	iP Z iS NE	00 07 57 08 28								
77	24	iP Z eS NE	15 17 28.5 50							1.7	Compression USCGS: 15.0S, 173.1W. h about 33 km. Tonga Islands H = 15 17 03.0 Mag. 4.5 (CGS)



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
78	24	iP	Z	17	28	37	1.0	1.9					76.0	Compression USCGS: 38.7N, 129.4E. h about 542 km. Near east coast of Korea H = 17 17 45.5 Mag. 5.3 (CGS)
79	24	iP	Z	19	55	21	3.5	1.8					7.5	USCGS: 17.8S, 178.5W. h about 584 km. Fiji Islands H = 19 53 25.7 Mag. 4.4 (CGS)
80	24	eP eS	Z Z	21	14 16	31 03							8.9	USCGS: 21.7S, 176.2W. h about 32 km. Tonga Islands H = 21 12 23.2 Mag. 4.8 (CGS)
81	24	eP	Z	21	47	32							12.6	USCGS: 23.6S, 179.9E. h about 535 km. Fiji Islands H = 21 44 46 Mag. 4.5 (CGS)
82	25	iP iS	Z NE	01	28 30	48.3 21.8	0.5	1.9						Compression
83	25	iP iS	Z NE	03	41	15.2 42							3.0	Dilatation USCGS: 16.1S, 173.8W. h about 33 km. Tonga Islands H = 03 40 34.9 Mag. 4.3 (CGS)
84	25	eP iS	Z NE	07	07 08	06 59							11.6	USCGS: 22.6S, 179.7W. h about 600 km. Fiji Islands H = 07 04 32.8 Mag. 5.1 (CGS)
85	25	iP iS	Z NE	23	09 11	44 30							9.7	Compression USCGS: 20.8S, 178.8W. h about 580 km. Fiji Islands H = 23 07 29.3 Mag. 4.5 (CGS)
86	26	eP ePP eSKS eS e eL eL	Z Z E N ZE Z ZE	09	22 26 33 34 35 48.4 54.2	50 46 20 04 30							96.0	USCGS: 16.3S, 71.7W. h about 116 km. Southern Peru 6 injured, slight damage at Arequipa H = 09 09 33.9 Mag. 6.1 (CGS)
87	27	e(P) eS	Z NE	02	16	06 58								

No	Date	Phase		Time (G.M.T.)		Az	Tz	An	Tn	Ae	Te	(Deg.)	Remarks
88	27	eL	ZN	03	13.1							53.0	USCGS: 60.9S, 155.2E. h about 33 km. 800 km. south of Macquarie Island H = 02 46 33.4
89	27	eP	Z	20	22	14	0.7	1.9				12.5	USCGS: 23.1S, 179.4E. h about 526 km. Fiji Islands H = 20 19 30.6 Mag. 4.1 (CGS)
90	28	iP	Z	05	50	51	1.4	2.0				39.6	Compression USCGS: 6.3S, 148.7E. h about 33 km. New Britain region Felt: Doileae H = 05 43 22.1 Mag. 5.1 (CGS)
		eSS	ZNE		59	52							
		eL	ZE	06	02.0								
91	28	iP	Z	06	19	14	1.2	1.5				8.8	Compression USCGS: 20.5S, 177.8W. h about 473 km. Fiji Islands H = 06 17 09.3 Mag. 4.0 (CGS)
		eS	NE		20	50							
92	28	iP	Z	07	31	02.5	0.7	0.9				7.2	Dilatation USCGS: 17.7S, 176.7W. h about 417 km. Fiji Islands region H = 07 29 28 Mag. 4.1 (CGS)
		eS	NE		32	31							
93	28	eP	Z	10	45	50							
		eS	NE		47	31							
94	28	iPKP	Z	14	27	45.1	3.0	2.0				120.0	Dilatation USCGS: 36.5N, 70.9E. h about 207 km. Hindu Kush Felt: Northern Pakistan H = 14 09 17.1 Mag. 6.1 (CGS)
		ipPKP	Z		28	36	1.0	2.2					
		iPP	Z		29	03.2							
		esPP	Z		31	00							
		eS	NE		36.3								
		ePPS	Z		38	34							
		ePSKS	E		39	40							
		eSS	ZNE		45	14							
95	30	eP	Z	07	39	48						11.8	USCGS: 24.6S, 176.8W. h about 33 km. Tonga Islands region H = 07 37 01 Mag. 3.9 (CGS)
		eS	NE		41	47							

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

NEW ZEALAND

Department of Scientific and Industrial Research

Geophysics Division

APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA.

Latitude: 13° 54' 33.7"S Longitude: 171° 46' 37.9"W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

Sprengnether long period seismometers

To = 30 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

FEBRUARY 1964 *

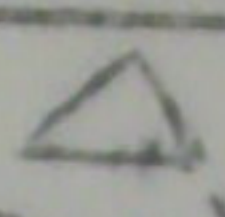
No	Date	Phase		Time (G.M.T.)			As	Ts	An	Tn	As	Te	△ (Deg.)	Remarks
1	1	iP	Z	18	04	42	1.3	1.0						
		iS	NE		05	03								
2	2	iP	Z	01	56	36								
		eS	NE		57	09								
3	2	eP	Z	02	50	12							8.0	USCGS: 19.98, 177.4W. h about 334 km. Fiji Islands region H = 02 48 17.0 Mag. 4.1 (CGS)
		eS	NE		51	37								
4	2	iP	Z	07	19	35.4								
		iS	NE			54.3								
5	2	eS	NE	09	16.0								75.0	USCGS: 24.2N, 122.6E. h about 28 km. Near east coast of Taiwan H = 08 54 48.3 Mag. 5.0 (CGS)
		eL	ZNE		28.8									
6	2	eP	ZNE	11	27	13	1.2	1.9	1.6	1.8	1.5	1.8		
		e	NE			50								
		e(S)	NE		30	39								
7	2	iP	Z	17	47	58								

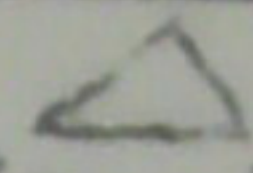
No.	Date	Phase		Time									Δ (Deg.)	Remarks
				(G.M.T.)			Az	Tz	Ln	Tn	Ae	Te		
8	2	iP	Z	23	45	24.2								
		iS	ZNE			40								
9	3	iP	Z	14	47	14								
		iS	NE			33.4								
10	3	iP	Z	20	08	26.6	7.4	1.6				12.0	USCGS: 23.2S, 179.8W. h about 509 km. South of Fiji Islands H = 20 05 47.6 Mag. 4.4 (CGS)	
		eS	NE		10	34								
11	4	iP	Z	05	22	50.3								
		iS	NE		23	27								
12	5	iP	Z	09	52	23.2	2.0	1.3				3.2	USCGS: 15.9S, 174.1W. h about 104 km. Tonga Islands region H = 09 51 36 Mag. 3.7 (CGS)	
		iS	NE			58								
13	5	iP	Z	11	37	32.8						9.7	Compression USCGS: 19.7S, 179.8W. h about 414 km. Fiji Islands region H = 11 35 18.6 Mag. 5.5 (CGS)	
		iS	NE		39	14								
14	5	eS	ZNE	11	50	06						66.0	USCGS: 36.5N, 141.0E. h about 46 km. Central Honshu, Japan Felt: Tokyo H = 11 30 15.7 Mag. 6 $\frac{1}{4}$ (Pas), 5.4(CGS)	
		eSSS	ZNE		57	34								
		eL	ZNE	12	00.5									
15	5	iP	Z	12	36	20								
		iS	NE			52								
16	5	eP	Z	12	50	39						8.1	USCGS: 16.6S, 179.6W. h about 475 km. Fiji Islands region H = 12 48 40.9 Mag. 4.0 (CGS)	
17	6	eP	Z	12	08	20								
		eS	NE		09	49								
18	6	eP	Z	13	18	40						71.0	USCGS: 55.7N, 155.8W. h about 33 km. Kodiak Island region H = 13 07 25.2 Mag. 6 $\frac{3}{4}$ -7(Pas), 6 $\frac{1}{2}$ -6 $\frac{3}{4}$ (Bks), 6 $\frac{3}{4}$ -7(Pal)	
		ePP	Z		20	20								
		ePPP	Z		22	50								
		iS	NE		27	55								
		eSS	ZNE		32	10								
		eSSS	E		35	40								
		eL	ZN		36	44								
		eL	ZN		39	24								
19	6	eP	Z	13	25	33						71.0	USCGS: 55.8N, 155.9W. h about 33 km. Kodiak Island region H = 13 13 45.2 Mag. 5.4 (CGS)	

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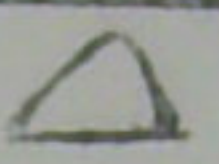
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No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
33	10	eP Z eS NE	13	32 35	54 02								
34	10	ipPeP Z	17	40	23.5	0.6	2.1					83.0	Dilatation USCGS: 6.1S, 104.1E. h about 126 km. Near west coast of Sumatra H = 17 27 07 Mag. 5.5 (CGS)
35	11	iP Z eS NE eT ZNE	02	35 37 42	54 05 07	1.4	1.0					6.0	USCGS: 19.5S, 174.0W. h about 33 km. Tonga Islands region H = 02 34 26.8 Mag. 4.9 (CGS)
36	11	iP Z	13	44	46.2	0.5	1.2						Compression
37	11	iP Z iS NE	18	21 22	41.5 10	3.5	1.8					2.5	Compression USCGS: 15.9S, 173.1W. h about 33 km. Samoa Islands region H = 18 21 05.5 Mag. 5.2 (CGS)
38	11	eP Z eS NE	20	43 45	42 24								
39	11	iP Z eS NE eT ZNE	20	52 54	16.7 45 50	0.5	0.8						
40	12	eP ZNE iS ZNE	01	36 37	55 22							2.8	USCGS: 15.6S, 174.0W. h about 45 km. Samoa Islands region H = 01 36 12.5 Mag. 4.6 (CGS)
41	12	eP Z eS ZN eSS Z eSSS ZN eL Z	20	39 46 47 49 51	47 10 42 32 48							43.4	Disturbed by artificial vibrations USCGS: 3.5S, 146.6E. h about 33 km. Admiralty Islands region H = 20 31 53.2 Mag. 5.4 (CGS)
42	12	iP ZE iS NE Coda for about 30 min	22	34 35	39.1 10	7.4	2.0		11.2	2.0		2.9	Dilatation from east USCGS: 15.3S, 174.4W. h about 33 km. Samoa Islands region H = 22 33 59.2 Mag. 5.3(Bks), 5.0(CGS)
43	12	eP Z iS NE	23	28	19 41								
44	13	eS ZE eL Z eL NE	03	40 43.7 45.5	06							42.4	USCGS: 3.5S, 146.6E. h about 33 km. Admiralty Islands region H = 03 25 45.1 Mag. 4.9 (CGS)

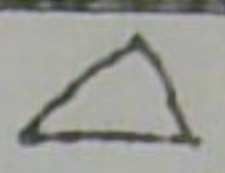
No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
45	13	iP	Z	03	56	02.2								
46	13	iP	Z	04	07	11								
47	13	iP	Z	04	25	17								
		e	NE		28	00								
48	13	iP	Z	08	18	29	1.1	1.4						
		eS	NE			58								
		eT	ZNE		21	09								
49	13	e(S)	NE	10	45.4									
		e	N		47.5									
50	13	eP	Z	11	12	34								
		e	NE		15	25								
51	13	eP	Z	11	43	26							4.9	USCGS: 18.3S, 173.8W. h about 33 km. Tonga Islands region H = 11 42 16.5 Mag. 4.3 (CGS)
		eS	NE		44	18								
		eT	ZNE		48	10								
52	14	e(P)	ZE	04	22	11								
53	14	iP	Z	06	30	02								
		i	E			23								
54	14	eP	Z	16	36	51							37.0	USCGS: 5.1S, 151.7E. h about 55 km. New Britain Felt H = 16 29 45.0 Mag. 6.3(Pas), 6.0(CGS)
		iS	ZNE		42	30								
		iSSS	ZNE		45	18								
		iL	ZE		47	00								
		Surface waves for about 30 min												
55	15	iP	Z	14	02	03.3	2.5	1.3					7.5	Compression USCGS: 18.7S, 177.8W. h about 332 km. Fiji Islands H = 14 00 07.8 Mag. 4.5 (CGS)
		eS	NE		03	30								
56	15	eL	ZNE	22	16.7								31.0	USCGS: 8.7S, 157.1E. h about 52 km. Solomon Islands region H = 22 01 58.4 Mag. 5.1 (CGS)
57	16	iP	Z	21	41	35.2	1.0	2.0					36.6	Dilatation USCGS: 5.6S, 152.0E. h about 49 km. New Britain Felt: Rabaul H = 21 34 32.3 Mag. 5.6 (CGS)
		e	Z		47.3									
		e	N		50.0									
		eL	Z	51.5										
58	17	e(P)	Z	06	02	28								
59	17	eP	Z	16	45	47							12.2	USCGS: 22.6S, 179.3E. h about 547 km. Fiji Islands H = 16 43 06.9 Mag. 4.9 (CGS)
		eS	NE		47	51								

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
60	17	iP	Z	22	45	19.5								
		iS	NE			38								
61	18	iP	ZE	04	43	48.7	13.8	2.0			9.5	2.0	3.5	Compression from west USCGS: 15.5S, 175.0W. h about 289 km. Tonga Islands region H = 04 42 47.7 Mag. 4.8 (CGS)
		iS	NE		44	35								
62	18	e(P)	Z	06	02	04								
63	18	iP	Z	09	12	52.8							3.6	Dilatation USCGS: 15.4S, 175.1W. h about 287 km. Tonga Islands region H = 09 11 52 Mag. 3.8 (CGS)
		eS	NE		13	38								
64	18	eP	Z	10	40	54	0.5	2.0					26.7	USCGS: 10.3S, 161.2E. h about 73 km. Solomon Islands H = 10 35 20.1 Mag. 4.9 (CGS)
		eS	NE		46	34								
		eL	Z		48.0									
65	18	eP	Z	19	12	16							12.0	USCGS: 23.5S, 179.2W. h about 361 km. South of Fiji Islands H = 19 09 35.1 Mag. 4.0 (CGS)
		eS	NE		14	19								
66	18	iP	ZNE	22	46	22	14.7	1.2					3.0	Compression from south- west USCGS: 14.2S, 174.9W. h about 33 km. Samoa Islands region H = 22 45 35.1 Mag. 4.6 (CGS)
		iS	NE			54								
67	19	eP	Z	11	17	40								
		eS	NE		18	31								
		eT	ZNE		22	30								
68	20	eL	ZN	10	25.2								66.0	USCGS: 44.6N, 150.0E. h about 50 km. Kurile Islands H = 09 53 51.1 Mag. 5.2 (CGS)
69	21	iP	Z	14	53	05.7								
		iS	NE			28								
70	21	eP	Z	15	07	54								
		i	NE		08	15								
		i	NE		09	00								
71	22	eP	Z	01	52	39							25.3	USCGS: 36.9S, 176.9E. h about 203 km. Near coast of North Island, New Zealand H = 01 47 32.1 Mag. 5.1 (CGS)
		i	NE			48								



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
72	22	eP eS eT	Z NE ZNE	08 09	54 57 09	24 12 14							17.1	USCGS: 30.1S, 177.3W. h about 33 km. Kermadec Islands H = 08 50 35.0 Mag. 5.1 (CGS)
73	22	iP iS	ZNE NE	12	27	20.3 46	36.0	1.6	13.2	2.0	10.2	2.0	2.6	Compression from south- west USCGS: 15.4S, 173.8W. h about 96 km. Samoa Islands H = 12 26 40.4 Mag. 4.6 (CGS)
74	23	iP eS	Z NE	22	45 46	52.5 10								
75	24	iP iS	Z ZN	14	52	28.5 55							2.7	Compression USCGS: 15.5S, 174.0W. h about 87 km. Samoa Islands H = 14 51 46.2 Mag. 4.5 (CGS)
76	25	i(P)	Z	13	25	07	1.0	1.2						
77	25	eP eS eL	Z NE ZN	23	27 30 31.3	25 24							17.3	USCGS: 30.1S, 177.9W. h about 51 km. Kermadec Islands H = 23 23 33.3 Mag. 4.8 (CGS)
78	25	eP eS	Z NE	23	34 36	30 50							13.7	USCGS: 25.9S, 178.8W. h about 296 km. Kermadec Islands region H = 23 31 25.7 Mag. 4.5 (CGS)
79	26	iP eS	Z NE	21	18 20	49.2 05							7.4	Compression USCGS: 20.7S, 174.4W. h about 33 km. Tonga Islands H = 21 17 08.1 Mag. 5.0 (CGS)
80	26	eP	Z	23	15	50	0.5	1.9					21.5	USCGS: 11.7S, 166.3E. h about 64 km. Santa Cruz Islands H = 23 11 04.4 Mag. 4.7 (CGS)
81	27	eS eSS eLq eLr	ZE N N ZE	15	36 42 52.0 56.3	54 30							99.0	USCGS: 21.7N, 94.4E. h about 102 km. Central Burma H = 15 10 48.4 Mag. 6.4 (CGS)
82	28	i(P)	Z	09	03	51.7								
83	28	eP	Z	15	13	40							13.2	USCGS: 24.4S, 179.9E. h about 590 km. South of Fiji Islands H = 15 11 01 Mag. 4.3 (CGS)

8.

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
84	29	iP	Z	09	14	18.6								
		eS	NE			36								
85	29	iP	ZNE	07	29	15	7.4	1.9	7.8	2.0	3.5	1.5	7.0	Dilatation? USCGS: 15.5S, 178.7W. h about 407 km. Fiji Islands region H = 07 27 31.9 Mag. 4.0 (CGS)
86	29	eS	NE	15	39.5								65.0	USCGS: 34.8N, 141.7E. h about 34 km. Off east coast of Honshu, Japan H = 15 20 12.8 Mag. 5.1 (CGS)
		eSSS	E		47.3									
		eL	ZNE		49.7									
87	29	iP	Z	20	14	46							4.5	USCGS: 18.2S, 172.8W. h about 33 km. Tonga Islands H = 20 13 41.6 Mag. 5.1 (CGS)
		iS	NE		15	34								
		eT	ZNE		19	50								

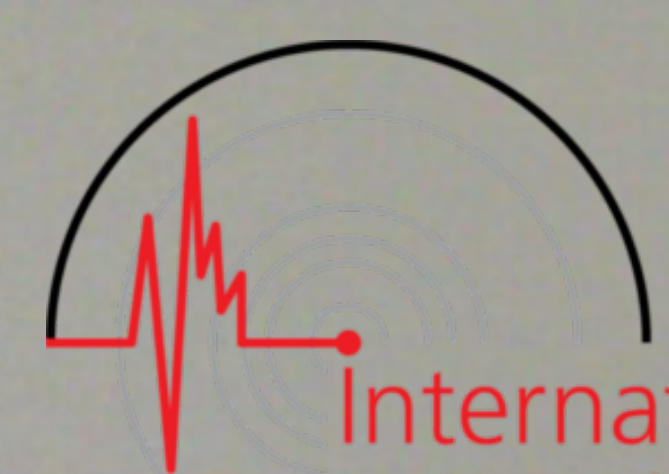
NOTE:

(i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.

(ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

John Milne
OBSERVER-IN-CHARGE

March 64



International
Seismological
Centre

NEW ZEALAND

Department of Scientific and Industrial Research

Geophysics Division

APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA.

Latitude: $13^{\circ} 54' 33.7''$ S Longitude: $171^{\circ} 46' 37.9''$ W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

Sprengnether long period seismometers

To = 30 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

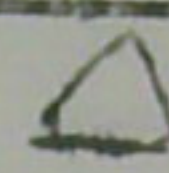
MARCH 1964 *

No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
1	1	iP Z	00 01 12	3.5	2.2					76.0	Dilatation USCGS: 8.5S, 112.7E. h about 73 km. Near south coast of Java H = 23 49 40.8 Mag. 5.8 (CGS)
2	2	eL ZNE	12 21.4								
3	2	eiP ZN eS ZNE Coda about 30 min.	19 34 04 35 03							5.9	USCGS: 18.9S, 174.8W. h about 105 km. Tonga Islands H = 19 32 41.7 Mag. 5.3 (CGS)
4	3	iP Z eS NE	01 26 10.3 27 38							7.5	Compression USCGS: 18.8S, 177.7W. h about 552 km. Fiji Islands H = 01 24 17.0 Mag. 4.0 (CGS)
5	3	eP Z eS NE	15 16 10 19 09							17.5	USCGS: 30.4S, 177.9W. h about 33 km. Kermadec Islands region H = 15 12 14.9 Mag. 4.3 (CGS)

* See note at end



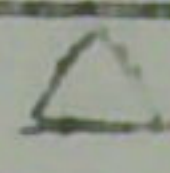
No	Date	Phase		Time									(Deg.)	Remarks
				(G. M. T.)			Az	Tz	An	Tn	Ae	Te		
6	3	e	Z	16	02	30								
		eL	ZNE		06.0									
7	3	e	ZNE	17	22.3									
8	3	iP	Z	17	49	57.7	2.5	2.0						
		i	Z		50	19								Compression
9	3	iP	Z	23	13	04.6								
		iS	NE			37								
10	4	iP	Z	20	11	23.8								
		eS	NE			52								
11	4	iP	Z	21	48	08.9	0.5	0.9						
		iS	NE			56								
12	4	iP	Z	23	35	56.3	2.5	1.0						
		iS	NE		37	04						6.6		Compression USCGS: 19.3S, 175.6W. h about 222 km. Tonga Islands region H = 23 34 22.5 Mag. 4.0 (CGS)
13	5	iP	Z	02	14	55								Dilatation
14	5	eL	E	06	37.2									
		eL	ZNE		39.2							81.0		USCGS: 45.2S, 96.4E. h about 40 km. Indian Ocean, east of Kerguelen Islands H = 06 00 41.3 Mag. 5.5 (CGS)
15	5	iP	Z	10	11	05	1.1	2.2						
		eS	N		15	36						25.5		Dilatation USCGS: 11.2S, 162.2E. h about 38 km. Solomon Islands region H = 10 05 37.2 Mag. 5.1 (CGS)
		e	ZNE		16	32								
16	5	iP	Z	15	16	55	2.7	0.8						
		iS	NE		17	14								
17	5	iP	Z	20	32	37								
		iS	NE		33	08						2.8		Dilatation USCGS: 16.4S, 173.0W. h about 33 km. Tonga Islands region H = 20 31 57.4 Mag. 4.7 (CGS)
18	5	e(P)	Z	20	48	39								
		eS	NE		50	03								
19	6	e(P)	Z	17	18	18								
20	6	iP	Z	18	52	34								
		eS	NE		53	17								
21	6	eP	Z	19	03	56	0.5	1.9						
		eS	ZN		09.2							34.2		USCGS: 6.1S, 154.4E. h about 74 km. New Britain region Felt: Rabaul H = 18 57 16.1 Mag. 6(Pal), 5.8(CGS)
		eSS	N		11	41								
		e	Z		12.0									
		eL	ZN		13.1									

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
22	6	eP	Z	19	30	09								
23	6	iP	Z	20	46	17							14.4	USCGS: 19.5S, 174.5E. h about 56 km. Fiji Islands region H = 20 42 55.8 Mag. 4.6 (CGS)
24	7	iP eS	Z NE	01	48 50	43.5 34	1.0 1.3						10.4	USCGS: 21.4S, 179.3W. h about 593 km. Fiji Islands region H = 01 46 21.1 Mag. 4.1 (CGS)
25	7	eP iS	Z NE	03	36 38	28 00							8.6	USCGS: 20.2S, 177.8W. h about 481 km. Fiji Islands region H = 03 34 25.2 Mag. 4.2 (CGS)
26	7	iP eS	Z NE	03	43 44	58 17								Samoa Islands region
27	7	eP iS	Z NE	08	48 49	46 12								Samoa Islands region
28	7	iP iS	Z NE	20	34 35	59.5 34								
29	7	eiP iS	Z NE	23	15 17	27 02	3.1 1.8						8.4	USCGS: 19.9S, 177.9W. h about 534 km. Fiji Islands H = 23 13 25.4 Mag. 4.5 (CGS)
30	8	eP eS eL	Z NE ZNE	01	42 48.2 51.9	34	0.5 1.8						34.6	USCGS: 44.0S, 168.4E. h about 33 km. South Island, New Zealand H = 01 35 48.1 Mag. 5.6 (CGS)
31	8	iP eS	Z NE	07	32	03 23								Samoa Islands region
32	8	eP eS	Z NE	18	15 16	10 07								
33	8	eP	Z	21	32	05								
34	9	eP eS	Z NE	10	26 28	23 31								
35	9	eiP	Z	12	13	56	0.5 1.0						10.7	USCGS: 22.0S, 179.1W. h about 492 km. Fiji Islands H = 12 11 31
36	10	iP eS	Z NE	05	11 12	52.9 56								

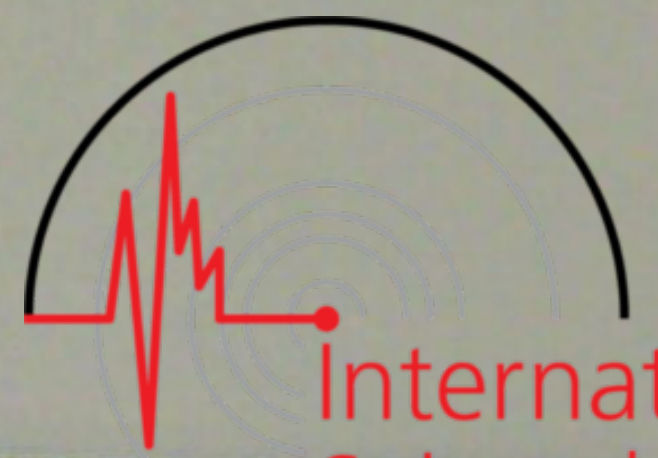


No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						△ (Deg.)	Remarks
37	10	eP	Z	14	10	07							62.0	USCGS: 1.9N, 127.5E. h about 117 km. Molucca Passage H = 13 59 54.8 Mag. 5.6 (CGS)
		ePcP	Z			51								
		eS	NE		18	28								
		eSS	N		23	14								
		eSSS	N		25.8									
		eL	ZNE		29.0									
38	10	eP	Z	14	46	12								
		iS	NE		47	04.5								
39	10	eP	Z	23	20	06							58.0	USCGS: 6.8S, 129.4E. h about 141 km. Banda Sea H = 23 10 24.4 Mag. 5.1 (CGS)
40	11	iP	Z	01	16	21.5							62.0	Compression USCGS: 1.8N, 127.1E. h about 58 km. Molucca Passage H = 01 06 00.4 Mag. 5.6 (CGS)
41	12	eP	Z	02	40	03								
		eS	NE		41	39								
42	12	iPcP	Z	04	07	55	0.5	2.0					75.0	Dilatation USCGS: 23.4N, 121.6E. h about 33 km. Near east coast of Taiwan H = 03 55 14.0 Mag. 5.2 (CGS)
43	12	iP	ZNE	04	10	31.4								
		iS	NE			53								Compression from south-west Samoa Islands region
44	12	eP	Z	04	32	56							11.5	USCGS: 22.9S, 179.2W. h about 378 km. Fiji Islands region H = 04 30 21.1 Mag. 4.6 (CGS)
		eS	NE		34	57								
		eT	ZNE		47	50								
45	12	eP	Z	06	52	23								Samoa Islands region
		iS	NE			55								
46	12	eP	Z	09	13	01								Samoa Islands region
		iS	NE			24								
47	12	eP	Z	10	39	31							10.9	USCGS: 21.9S, 179.5W. h about 561 km. Fiji Islands region H = 10 37 04.3 Mag. 4.1 (CGS)
		eS	NE		41	27								
48	12	iP	Z	17	20	09.5								
		eS	NE			50								
49	12	eP	Z	18	35	23	0.5	1.5						
50	12	eP	Z	18	51	34								
		eS	NE		52	06								

No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks	
51	12	iP eS	Z NE	20 04 58.5 05 17										
52	12	eP e(SSS) eL	Z N Z	22 44 15 23 02 10 05.4								0.5 2.1	71.0	USCGS: 13.5N, 122.9E. h about 33 km. Near south coast of Luzon, Philippine Island. Felt H = 22 32 56.7 Mag. 5.3 (CGS)
53	12	iP iS	ZNE NE	23 06 07 39										
54	13	eSSS eL	N Z	04 53.7 56.0									66.0	USCGS: 4.1S, 105.1W. h about 33 km. West of Galapagos Islands H = 04 26 23.5 Mag. 4.6 (CGS)
55	13	iP	Z	06 20 57								1.5 2.1	7.8	Dilatation USCGS: 17.7S, 178.7W. h about 522 km. Fiji Islands H = 06 19 02.5 Mag. 4.6 (CGS)
56	13	eP	ZN	08 41 24								0.5 2.0 0.5 1.8	13.5	USCGS: 24.0S, 179.0E. h about 512 km. South of Fiji Islands H = 08 38 32 Mag. 4.5 (CGS)
57	13	eP eS	Z NE	12 55 23 56 35										
58	14	eP iS	Z NE	05 12 42 13 32										
59	14	iP iS	ZNE ZNE	11 47 05.2 48 47								4.1 1.8 2.2 1.8 1.7 1.9	9.5	Dilatation USCGS: 20.6S, 178.5W. h about 561 km. Fiji Islands H = 11 44 53.8 Mag. 4.7 (CGS)
60	14	eP eS	Z NE	12 19 01 20 36									9.1	USCGS: 20.6S, 178.2W. h about 260 km. Fiji Islands region H = 12 16 53.4 Mag. 4.1 (CGS)
61	14	e(S)	N	12 50.0										
62	14	iP eS	ZNE N	15 09 07 11 30								9.8 2.1 2.8 2.4 4.0 2.3	15.5	Compression from south-west USCGS: 13.7S, 172.3E. h about 611 km. New Hebrides Islands region H = 15 05 54.4 Mag. 5.1 (CGS)

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
63	15	eP	ZNE	21	38	44								
64	15	iPKP	Z	22	50	19.8	0.9	2.3				154.0		 International Seismological Centre Dilatation USCGS: 36.2N, 7.6W. h about 27 km. West of Strait of Gibraltar Felt: Portugal, Spain, Morocco. Felt strongly by the "St. Raphael" at 36.6N, 7.9W. H = 22 30 26.0 Mag. $6\frac{3}{4}$ -7(Pas), 7-7 $\frac{1}{4}$ (Bks), 6 $\frac{1}{4}$ -6 $\frac{1}{2}$ (Pal), 6.2(CGS)
		ePP	Z		54	10								
		eSKS	Z		57	36								
		e	Z	23	02.6									
		e	ZN		06.7									
		ePPPS	ZN		09	24								
		e	ZN		12	30								
		eSSS	ZN		19	30								
		e	ZN		22	56								
		e	ZN		33.0									
		eLq	ZN		38.2									
		eLr	ZN		44.0									
65	16	eP	Z	02	40	07								
		iS	NE			27								
66	16	iP	Z	02	51	52								
		iS	NE		52	28.4								
67	16	iP	Z	05	11	10.2	0.5	1.9						Compression
68	16	iP	Z	08	51	09								
		iS	NE			35								
69	16	eP	Z	15	03	10						21.7		USCGS: 11.5S, 166.1E. h about 69 km. Santa Cruz Islands H = 14 58 23.4 Mag. 4.8 (CGS)
		ipP	Z			23.6								
		eS	ZNE		07	12								
		eSS	Z		08	44								
70	16	eS	NE	19	08	00						21.7		USCGS: 9.6S, 166.4E. h about 33 km. Santa Cruz Islands H = 18 59 28 Mag. 4.5 (CGS)
71	16	eP	Z	19	18	31								
		e	Z			50								
		eS	NE		22	00								
72	16	iP	Z	20	04	18								
		iS	NE			50								
73	16	iP	Z	21	41	54.7	1.5	1.4				9.6		USCGS: 20.6S, 178.7W. h about 578 km. Fiji Islands H = 21 39 42.5 Mag. 4.9 (CGS)
		iS	NE		43	38								
74	16	iP	Z	23	26	16.7								
		iS	NE		27	02								
75	17	eP	Z	10	21	07								
		eS	NE		22	18								
76	17	iP	Z	15	05	11	2.3	1.0						
		iS	ZNE			42								
77	17	eP	Z	17	49	17	0.5	1.8						
		i	Z			24	1.4	2.0						
		eS	NE		52	02								

Centre



No	Date	Phase		(G.M.T.)			Az Tz An Tn Ae Te						(Deg.)	Remarks
89	19	iP	Z	23	17	42.6								Samoa Islands region
		iS	E			58								
90	20	eP	Z	01	31	09								
		eS	E			49								
91	20	eS	ZN	01	33.2								53.0	USCGS: 62.2S, 155.8E. h about 33 km. Balleny Islands region H = 01 16 12.8
		eL	ZN		42.6									
92	20	eP	Z	01	36	45							7.1	USCGS: 18.6S, 177.4W. h about 334 km. Fiji Islands region H = 01 35 01 Mag. 3.6 (CGS)
		eS	ZE		38	03								
93	20	eP	Z	04	28	24							38.0	USCGS: 6.1S, 150.4E. h about 34 km. New Britain Felt: Fulleborne, Walindi, Palmalmal H = 04 21 08.1 Mag. 4.9 (CGS)
94	20	iP	Z	13	53	07.7								
		eS	ZE			38								
95	20	iP	Z	16	52	58								Samoa Islands region
		iS	E		53	17								
96	20	eP	Z	19	16	44							6.3	USCGS: 19.8S, 173.6W. h about 33 km. Tonga Islands H = 19 15 16.3 Mag. 4.7 (CGS)
		eS	E		17	55								
		e	ZE		18.5									
97	20	eP	Z	19	22	02								Samoa Islands region
		iS	N			24								
98	20	eP	Z	23	58	23								
		eS	N		59	51								
		eL	N	00	00.3									
99	21	eP	Z	01	50	10								
		eS	ZNE			24								
100	21	iP	ZE	03	51	50.3							60.0	Dilatation from east USCGS: 6.4S, 127.9E. h about 367 km. Banda Sea Felt: Darwin, Australia H = 03 42 19.6
		iS	NE		59	36								
		i	Z			46								
		i	N	04	01	14								
		isS	E		02	04								
		i	N		03	26								
		eSSS	ZNE		06	26								
101	21	eP	Z	04	16	57								
		iS	NE		17	21								
102	21	eP	Z	09	41	44								
		eS	NE		43	17								

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						△ (Deg.)	Remarks
103	21	iP iS	ZNE ZNE	10 57 58	48.2 19		7.9	1.2					2.8	Compression USCGS: 15.4S, 174.1W. h about 153 km. Samoa Islands region H = 10 57 03.7 Mag. 4.1 (CGS)
104	21	eL	ZNE	15	42.2								75.0	USCGS: 18.7N, 103.1W. h about 83 km. Near coast of Michoacan, Mexico H = 15 08 14.3 Mag. 5.1(Pal), 5.0(CGS)
105	21	eP eS eT	Z NE ZNE	16 30 33 42	31 03 29								14.7	USCGS: 27.6S, 177.2W. h about 33 km. Kermadec Islands region H = 16 27 11.7 Mag. 5.6 (CGS)
106	22	eS eSS eL	ZN ZN ZNE	08 09	59 04 15.9	00 54							89.0	USCGS: 35.7S, 72.9W. h about 33 km. Near coast of central Chile H = 08 35 06.4 Mag. 5.1 (CGS)
107	22	eP eS	Z NE	12	08 10	47 03								
108	22	eP iS	Z NE	22	52	15 33								
109	23	iP iS	Z NE	00	46 47	55 48	2.7	1.2					7.8	Compression USCGS: 20.2S, 176.5W. h about 33 km. Tonga Islands H = 00 45 01 Mag. 4.4 (CGS)
110	23	eP iS	Z NE	05	23	15 33.2								
111	23	iP eS	Z ZNE	09	21 25	44 03							19.7	USCGS: 31.8S, 179.5E. h about 464 km. Kermadec Islands region H = 09 17 47.3 Mag. 4.2 (CGS)
112	23	iP eS	Z NE	22	30 31	26 10								
113	24	iP eS	Z NE	00	29 30	05.3 34							7.2	Compression USCGS: 17.1S, 178.4W. h about 554 km. Tonga Islands region H = 00 27 14.7
114	24	iP eS	Z NE	05	32 33	45.5 08								



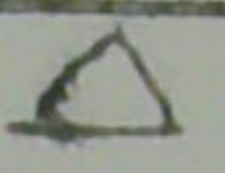
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
115	25	eP eS	Z NE	11 35 36	29 37								7.1	USCGS: 19.7S, 175.9W. h about 170 km. Tonga Islands region H = 11 33 48.4 Mag. 4.6 (CGS)
116	25	iP e	Z ZE	15 36 42	53 10								19.6	Dilatation USCGS: 20.1S, 168.8E. h about 33 km. Loyalty Islands region H = 15 32 26.0 Mag. 4.7 (CGS)
117	26	eP eS	Z NE	01 44 46	55 21								8.2	USCGS: 21.5S, 174.6W. h about 33 km. Tonga Islands H = 01 43 04 Mag. 4.3 (CGS)
118	26	eS eSSS eL	ZE NE ZNE	02 21 26 28.1	00 00								53.0	USCGS: 11.3N, 142.0E. h about 33 km. Mariana Islands H = 02 04 20.2 Mag. 4.9 (CGS)
119	26	eS eL	NE ZE	13 14	49 00.0	50							67.0	USCGS: 4.4S, 104.7W. h about 33 km. 1500 km. southwest of Galapagos Islands H = 13 29 56.2 Mag. 4.9 (CGS)
120	27	eP eS	Z NE	02 07	36 53									
121	27	i(P) iS	Z NE	02 09	07 59									
122	27	eP iS	Z NE	05 54	40 58									
123	27	iP e iS	Z ZNE NE	20 24 26 27	52 30 02		1.0	0.8					12.7	Compression USCGS: 23.7S, 179.9E. h about 520 km. South of Fiji Islands H = 20 22 10.6 Mag. 5.0 (CGS)
124	28	iP i i i eT	Z ZNE ZNE ZNE ZNE	03 48 45 58 49 05	08 13								77.0	Dilatation Very large amplitude on long period components USCGS: 61.1N, 147.6W. h about 20 km. Prince William Sound, Alaska H = 03 36 12.7 Mag. 8.4(Pas), $8\frac{1}{2}$ - $8\frac{3}{4}$ (Brk), 8.6(Pal), 8.5(CGS) 114 dead or missing many injured and major property damage in Alaska. Extensive damage from seismic sea waves throughout the Gulf

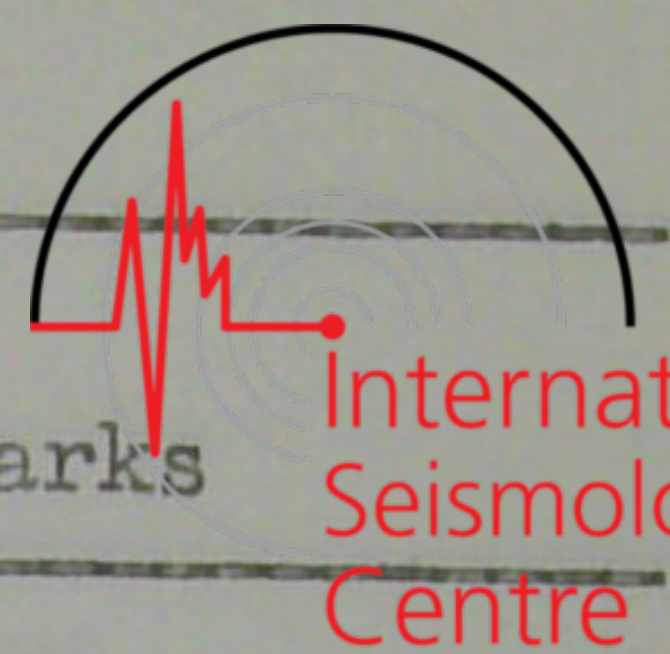
Surface waves for about 5 hours

7.7 0.9

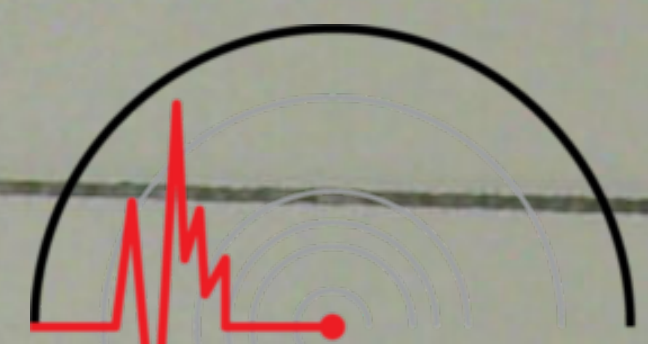


No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
124	28	(Cont)											of Alaska, along the west coast of North America, and in Hawaii.
125	28	iP	Z	05	05	51.8						75.0	Dilatation USCGS: 59.8N, 149.4W. h about 25 km. Alaskan aftershock H = 04 54 07.9 Mag. 6.1 (CGS)
126	28	iP	Z	06	55	25						75.0	Dilatation USCGS: 58.3N, 151.3W. h about 25 km. Alaskan aftershock H = 06 43 57.4 Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (Brk), 6.1(CGS)
127	28	iP	Z	07	22	07						75.0	Dilatation USCGS: 58.8N, 149.5W. h about 20 km. Alaskan aftershock H = 07 10 21.4 Mag. 6.2(Pas), $5\frac{3}{4}$ -6(Brk), 6.1(CGS)
128	28	iP	Z	09	12	24						72.0	Dilatation USCGS: 56.5N, 152.0W. h about 20 km. Alaskan aftershock H = 09 01 00.5 Mag. 6.2(Pas), $5\frac{1}{2}$ - $5\frac{3}{4}$ (Brk), 6.0(CGS)
129	28	iP	Z	10	47	03.2						72.0	Dilatation USCGS: 57.2N, 152.4W. h about 33 km. Alaskan aftershock H = 10 35 38.9 Mag. 6.3(Pas), $5\frac{3}{4}$ -6(Brk), 6.0(CGS)
130	28	iP iPcP	Z Z	11	40 41	50 24	5.3	2.3				67.0	Compression USCGS: 0.5N, 122.3E. h about 140 km. Northern Celebes H = 11 30 09.8 Mag. 5.8 (CGS)
131	28	iP	Z	12	32	10						72.0	Dilatation USCGS: 56.5N, 154.0W. h about 25 km. Alaskan aftershock H = 12 20 49.8 Mag. 6.5(Pas), $5\frac{1}{4}$ - $5\frac{3}{4}$ (Brk), 6.1(CGS)

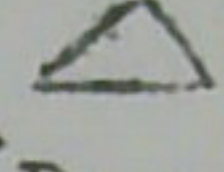
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
132	28	iP	Z	14	59	31.3							77.0	Dilatation USCGS: 60.4N, 146.5W. h about 10 km. Alaskan aftershock H = 14 47 37.1 Mag. 6.3(Pas), 5 $\frac{3}{4}$ -6(Brk), 6 $\frac{1}{2}$ -6 $\frac{3}{4}$ (Pal), 5.7(CGS)
133	28	iP	Z	15	01	06							77.0	Dilatation USCGS: 60.4N, 147.1W. h about 10 km. Alaskan aftershock H = 14 49 13.7 Mag. 6.5(Pas), 5 $\frac{1}{2}$ -5 $\frac{3}{4}$ (Brk), 5.8(CGS)
134	28	iP	Z	17	23	41								Compression
135	28	iP eS eSS eSSS e eL	Z ZNE NE Z E ZN	20	40	53.5							75.0	Compression USCGS: 59.8N, 148.7W. h about 40 km. Alaskan aftershock H = 20 29 08.6 Mag. 6.6 (Pas), 6 $\frac{1}{2}$ -6 $\frac{3}{4}$ (Brk), (Pal), 5.8(CGS)
136	29	eL	ZN	01	44.5								75.0	USCGS: 59.8N, 149.2W. h about 20 km. Alaskan aftershock H = 01 09 36.4 Mag. 5.2(Pas), 5 $\frac{1}{4}$ -5 $\frac{1}{2}$ (Brk), 5 $\frac{1}{2}$ (Pal), 5.5(CGS)
137	29	eP eL	Z ZN	04	24 54.1	10							77.0	USCGS: 60.2N, 145.5W. h about 15 km. Alaskan aftershock H = 04 12 15.7 Mag. 5.2(Pas), 4 $\frac{3}{4}$ -5(Brk), 5.3(CGS)
138	29	iP eS eSS eL	Z ZNE ZE ZNE	06	16 25 29 36.7	12.3 20 40							72.0	Dilatation USCGS: 56.1N, 154.3W. h about 30 km. Alaskan aftershock H = 06 04 44.5 Mag. 5.8(Pas), 5 $\frac{1}{4}$ -5 $\frac{1}{2}$ (Brk), 6-6 $\frac{1}{4}$ (Pal), 5.6(CGS)
		Surface waves about 30 min.												
139	29	eL	ZN	08	25.2								72.0	USCGS: 56.1N, 154.2W. h about 25 km. Alaskan aftershock H = 07 52 46.4 Mag. 4.9(Pas), 4.8(CGS)
140	29	iP	Z	15	44	17								Compression



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
141	29	eS eL	ZNE ZN	17	02 15.2	48						76.0	USCGS: 59.7N, 147.0W. h about 15 km. Alaskan aftershock H = 16 40 57.9 Mag. 5.8(Pas), 5 $\frac{1}{2}$ -5 $\frac{3}{4}$ (Brk), 5.6(CGS)	
142	29	eP eS eL	Z ZN Z	21	47 52 56.2	04 30	1.2	2.0				33.4	USCGS: 6.7S, 155.1E. h about 68 km. Solomon Islands Felt: Rabaul H = 21 40 32.7 Mag. 6(Pal), 5.3(CGS)	
143	30	iP e eS eSS e eSSS e eL	Z Z ZNE ZNE N ZE N ZN	02	29 36 38 43 45 46 47 50.6	36.4 08 52 08 00 42 56						72.0	Dilatation USCGS: 56.6N, 152.9W. h about 25 km. Alaskan aftershock H = 02 18 06.3 Mag. 6.6(Pas), 6 $\frac{1}{2}$ -6 $\frac{3}{4}$ (Brk), 6 $\frac{3}{4}$ (Pal), 5.8(CGS)	
Surface waves about 2 hours														
144	30	iP iS	Z NE	06	23 24	32 24								
145	30	eS eSS eSSS eL	ZNE ZN ZNE ZNE	07	31.1 35.5 39.6 43.7							75.0	USCGS: 59.9N, 145.7W. h about 15 km. Alaskan aftershock H = 07 09 34.0 Mag. 6.2(Pas), 5 $\frac{3}{4}$ -6(Brk), 6 $\frac{1}{4}$ -6 $\frac{1}{2}$ (Pal), 5.6(CGS)	
Surface waves about 40 min.														
146	30	eL	ZNE	13	36.0							73.0	USCGS: 56.5N, 152.7W. h about 20 km. Alaskan aftershock H = 13 03 34.9 Mag. 5.3(Pas), 4 $\frac{3}{4}$ -5(Brk), 5 $\frac{1}{2}$ -5 $\frac{3}{4}$ (Pal), 5.3(CGS)	
147	30	eS eL	ZNE ZNE	16	30.2 42.0							73.0	USCGS: 56.6N, 152.1W. h about 25 km. Alaskan aftershock H = 16 09 28.4 Mag. 5.5(Pas), 5 $\frac{1}{2}$ -5 $\frac{3}{4}$ (Brk), 5 $\frac{3}{4}$ -6(Pal), 5.5(CGS)	
148	30	eP eS eT	Z NE ZNE	18	44 46 55	39 35 06						11.3	USCGS: 24.2S, 176.4W. h about 33 km. Tonga Islands region H = 18 42 03.4 Mag. 4.6 (CGS)	
149	30	eL	ZN	18	47.1									
150	31	eS	ZNE	00	34	06						67.0	USCGS: 45.3N, 151.0E. h about 60 km. Kurile Islands H = 00 14 11.7 Mag. 5 $\frac{1}{2}$ -5 $\frac{3}{4}$ (Pal), 5.3(CGS)	



14.

No	Date	Phase		Time (G.M.T.)							 (Deg.)	Remarks
					Az	Tz	An	Tn	Ae	Te		
151	31	iP	ZNE	17 06 32	4.7	2.0	3.6	2.0	4.0	2.0	7.8	Dilatation USCGS: 17.7S, 178.8W. h about 540 km. Fiji Islands H = 17 04 39.0 Mag. 4.4 (CGS)

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

John Milne
OBSERVER-IN-CHARGE

NEW ZEALAND

Department of Scientific and Industrial Research

Geophysics Division

APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA.

Latitude: $13^{\circ} 54' 33.6''$ S Longitude: $171^{\circ} 46' 38.1''$ W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

Sprengnether long period seismometers

To = 30 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

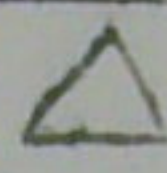
APRIL 1964 *

No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	(Deg.)	Remarks
1	1	eL ZN	03 56.1							72.0	USCGS: 57.2N, 151.3W. h about 25 km. Alaskan aftershock H = 03 23 17.2 Mag. 5.4(Pal), 5.1(CGS)
2	1	iP Z iS NE	06 12 13.3 29								Samoa Islands region
3	1	iP Z iS NE	14 16 45 17 06								Samoa Islands region
4	2	iP Z eS NE	01 17 51.9 20 06	1.8	1.6						Dilatation
5	2	ePcP Z ePP Z e Z eSKS ZE eS N e ZE eSS ZNE eSSS NE eL N eL E	01 25 18 28 50 33 12 35 32 36 24 37 26 42.2 46.1 49.5 52.2							92.0	USCGS: 5.9N, 95.7E. h about 132 km. Near coast of Northern Sumatra H = 01 11 55 Mag. 5.2 (CGS)
		Surface waves about 2 hours									

* See note at end



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
6	2	iP	Z	11	29	30								
		iS	NE		30	04								
7	2	iP	Z	16	07	21							65.0	Compression
		eS	NE		15	54								USCGS: 5.8N, 125.8E.
		eSSS	N		23.2									h about 179 km.
		eL	N		25.6									Mindanao, Philippine
		eL	ZE		27.0									Islands
8	2	iP	Z	19	41	25.4								H = 15 56 52.6
		iS	NE			46								Mag. 5.7 (CGS)
9	2	eL	Z	23	09.3									Samoa Islands region
10	3	eS	NE	04	36	50							76.0	USCGS: 59.8N, 144.3W.
														h about 20 km.
														Alaskan aftershock
														H = 22 34 31.7
														Mag. 4 $\frac{3}{4}$ -5 (Brk),
														5 $\frac{3}{4}$ -6 (Pal), 5.0 (CGS)
11	3	eP	Z	08	51	09	0.4	1.5					15.3	USCGS: 4.0N, 96.6E.
		eS	NE		53	32								h about 70 km.
		eT	ZNE	09	06	08								Near west coast of
														Sumatra
														H = 04 12 41.9
														Mag. 5.8 (CGS)
12	3	eL	ZN	09	21.1									USCGS: 27.9S, 178.1W.
														h about 33 km.
														Kermadec Islands
														H = 08 47 34.8
														Mag. 4.8 (CGS)
13	3	eP	Z	19	12	49	0.5	2.0						USCGS: 4.9S, 152.1E.
														h about 82 km.
														New Britain
														Felt
														H = 09 04 33.5
														Mag. 4.8 (CGS)
14	3	iP	Z	20	54	12.8	0.5	1.0						USCGS: 14.9S, 167.1E.
		iS	NE		55	00.3								h about 95 km.
														New Hebrides Islands
														H = 19 08 15.2
														Mag. 4.9 (CGS)
15	3	iP	Z	22	45	40	0.4	1.4						Dilatation
		eS	ZN		55	30								
		eLq	ZNE	23	06.1									USCGS: 61.6N, 147.6W.
		eL	ZNE		08.2									h about 40 km.
														Prince William Sound
														Alaskan aftershock
														H = 22 33 42.2
														Mag. 6 (Pas), 6 $\frac{1}{4}$ -6 $\frac{1}{2}$ (Pal),
														5 $\frac{1}{4}$ (Brk), 5.7 (CGS)
16	3	iP	ZNE	23	20	37	7.1	1.5	4.6	1.8	3.6	1.9		Compression
		iS	NE		21	02								
17	4	iP	Z	01	21	02.6	0.5	1.0						Compression
		eS	NE		22	10								

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
18	4	eP	Z	05	05	49						77.0	USCGS: 60.1N, 146.7W. h about 40 km. Prince William Sound Alaskan aftershock H = 04 54 01.7 Mag. 5.6(CGS)	
		eS	N		15	30								
		eSS	ZN		20	20								
		eSSS	E		25.2									
		eL	ZNE		28.2									
		Surface waves about 30 min.												
19	4	eP	Z	08	51	55						72.0	USCGS: 56.5N, 152.6W. h about 15 km. Prince William Sound Alaskan aftershock H = 08 40 29.8 Mag. 6.0(Pal), 5.3(CGS)	
		eS	ZNE	09	01	10								
		eSS	E		05	54								
		eSSS	E		09.4									
		e	N		10.0									
		eL	ZN		13.0									
		eT	ZNE	10	10	14								
20	4	iP	Z	09	22	20.3	0.5	1.9				72.0	Compression USCGS: 56.9N, 152.7W. h about 15 km. Prince William Sound Alaskan aftershock H = 09 10 55.1 Mag. 5 ³ / ₄ -6(Pal), 5.9(CGS)	
		eS	N		32	20								
		eSSS	ZNE		40.2									
		eL	ZN		43.2									
		eT	ZNE	10	40	45								
21	4	eP	Z	17	30	42								
		eS	NE		31	54								
22	4	eP	Z	17	57	32	0.5	2.0				72.0	USCGS: 56.3N, 154.4W. h about 25 km. Prince William Sound Alaskan aftershock H = 17 46 08.6 Mag. 6 ¹ / ₂ (Pas), 5 ³ / ₄ -6(Brk), 6 ¹ / ₂ -6 ³ / ₄ (Pal), 5.7(CGS)	
		iS	NE	18	06	48								
		eSS	ZNE		11	00								
		eSSS	E		14.3									
		e	ZN		15.4									
		eL	ZN		18.2									
		Coda about 30 min.												
23	4	eP	Z	18	11	09	0.4	2.0				72.0	USCGS: 56.4N, 154.5N. h about 25 km. Alaskan aftershock H = 17 59 43.3 Mag. 5 ¹ / ₄ (Brk), 6 ¹ / ₂ -6 ³ / ₄ (Pal), 5.5(CGS)	
24	4	eP	Z	18	19	40						6.8	USCGS: 19.7S, 175.3W. h about 57 km. Tonga Islands H = 18 18 02 Mag. 4.3 (CGS)	
		iS	NE		20	47								
		eT	ZNE		24	42								
25	4	eL	ZN	22	51.1							76.0	USCGS: 59.4N, 145.2W. h about 10 km. Alaskan aftershock H = 22 16 54.5 Mag. 5 ¹ / ₂ -5 ³ / ₄ (Pal), 5.1(CGS)	
26	5	eP	Z	01	33	40	0.6	2.1				72.0	USCGS: 56.2N, 153.5W. h about 25 km. Alaskan aftershock H = 01 22 13.3 Mag. 6-6 ¹ / ₄ (Pal), 5.4(CGS)	
		eS	ZNE		42	52								
		eSS	ZN		46	36								
		eSSS	N		49	28								
		e	NE		51	24								
		eL	ZN		54.7									
		eT	ZNE	02	51	25								



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
27	5	eP	Z	01	53	04							72.0	USCGS: 56.2N, 153.3W. h about 35 km. Alaskan aftershock H = 01 41 45.0 Mag. $5\frac{3}{4}$ -6(Pal), 5.2(CGS)
28	5	eP eS eT	Z NE ZNE	02	22 23	02 40								Samoa Islands region
29	5	iP iS eT	Z NE ZNE	04	34 35	23 55	1.7	1.4						Samoa Islands region
30	5	eP iS	Z NE	07	53	10 53								
31	5	eL	ZN	11	55.2								80.0	USCGS: 41.9S, 83.7W. h about 33 km. Off coast of southern Chile H = 11 18 38.9 Mag. 5.3 (CGS)
32	5	eP eL	Z ZN	19 20	40 02.8	09							77.0	USCGS: 60.2N, 146.7W. h about 15 km. Alaskan aftershock H = 19 28 18.1 Mag. $5-5\frac{1}{4}$ (Brk), $5\frac{1}{2}$ (Pal), 5.8(CGS)
33	5	eP	Z	22	26	21							15.5	USCGS: 28.1S, 178.2W. h about 31 km. Kermadec Islands H = 22 22 45.0 Mag. 4.5 (CGS)
34	6	iP eS	Z NE	01	25 27	26 23	0.3	1.2					12.4	USCGS: 23.4S, 180.0 h about 268 km. Fiji Islands region H = 01 22 44 Mag. 4.5 (CGS)
35	6	eP iS	Z NE	02	36 37	08 11							6.4	USCGS: 19.0S, 175.5W. h about 177 km. Tonga Islands H = 02 34 37 Mag. 4.2 (CGS)
36	6	iP iS	Z NE	04	36	29 48	5.0	1.0						Samoa Islands region
37	6	iP iS	Z NE	04	51 52	38 00								Samoa Islands region
38	6	iP iS	Z NE	06	08 09	59.8 13								Samoa Islands region
39	6	iP iS	Z NE	07	14 15	59 17								Samoa Islands region
40	6	eP e(S)	Z NE	13	55 56	33 38								





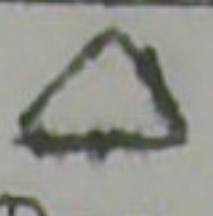
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						$\triangle$ (Deg.)	Remarks
41	6	e(S)	NE	22	03	00								
42	6	iS	NE	22	37	38								
43	6	iP	Z	22	58	53								
		i	ZNE		59	06								
		e(S)	ZNE			59								
44	6	eS	NE	23	31	08								
45	6	eS	NE	23	55	00						34.8	USCGS: 5.1S, 154.0E. h about 116 km. New Ireland region N = 23 43 01.7 Mag. 4.8 (CGS)	
46	7	eP	Z	11	25	47								
		eS	NE		26	58								
47	7	iP	Z	13	28	52	1.3	2.4				66.0	Dilatation USCGS: 0.1N, 123.2E. h about 150 km. Northern Celebes H = 13 18 18.9 Mag. 5.9 (CGS)	
48	7	eL	Z	18	35.3							72.0	USCGS: 57.3N, 151.1W. h about 20 km. Alaskan aftershock H = 18 02 24.7 Mag. 4.8 (CGS)	
49	8	iP	Z	04	13	11.3								Samoa Islands region
		iS	NE			28								
50	8	eL	Z	09	03.3							117.0	USCGS: 6.8S, 68.9E. h about 33 km. Chagos Archipelago region H = 08 08 11.8 Mag. 5.7 (CGS)	
51	8	eS	ZN	11	18	14						68.0	USCGS: 45.8N, 150.8E. h about 40 km. Kurile Islands H = 10 58 09.1 Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (Brk), $6\frac{1}{4}$ - $6\frac{1}{2}$ (Pal), 5.5(CGS)	
		eSS	Z		22.3									
		eSSS	ZNE		26.0									
		eL	ZNE		29.0									
52	8	iP	Z	14	53	57	1.6	1.0						
		i	Z		54	19								
53	8	eP	Z	23	52	57						10.1	USCGS: 21.9S, 178.2W. h about 323 km. Fiji Islands region H = 23 50 37 Mag. 4.2 (CGS)	
		eS	NE		54	46								
54	9	eP	Z	02	00	12								Samoa Islands region
		eS	NE			40								

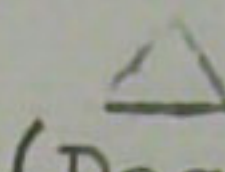


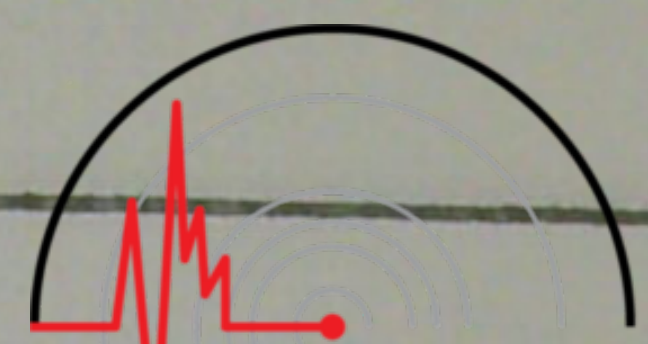
No	Date	Phase		Time									△ (Deg.)	Remarks
				(G.M.T.)			Az	Tz	An	Tn	Ae	Te		
55	9	iP	Z	21	22	39								Samoa Islands region
		iS	NE			59								
56	10	iP	ZN	04	44	40.6								Compression
		iS	ZNE		45	01						2.2		USCGS: 15.7S, 172.8W. h about 32 km. Samoa Islands region H = 04 44 08.0 Mag. 4.2 (CGS)
57	10	iP	Z	21	55	52.3	2.0	2.0					75.0	Dilatation
														USCGS: 60.1N, 153.7W. h about 10 km. Alaskan aftershock H = 21 44 06.7 Mag. 5 ¹ / ₂ -5 ³ / ₄ (Pal), 5.6(CGS)
58	11	iP	ZN	01	08	01							16.6	Compression
		eS	ZNE		10	44								USCGS: 29.0S, 178.9W. h about 302 km. Kermadec Islands H = 01 04 30.2 Mag. 5.3 (CGS)
		eT	ZNE		20	42								
59	11	iP	Z	07	38	46.2								Samoa Islands region
		eS	ZNE		39	13								
60	12	eP	Z	01	35	59							72.0	USCGS: 56.6N, 152.2W. h about 22 km. Alaskan aftershock H = 01 24 31.2 Mag. 5.6 (CGS)
		eS	ZNE		45	12								
		eSS	Z		49	44								
		eSSS	E		53.5									
		e	N		54.0									
		eL	ZN		57.0									
		Surface waves about 30 min.												
61	12	eP	Z	06	05	48	0.7	2.0					21.6	USCGS: 13.6S, 166.0E. h about 33 km. New Hebrides Islands H = 06 00 46.4 Mag. 5.0 (CGS)
		eS	Z		09	38								
		eSS	N		10	08								
		eL	Z		11.3									
62	12	eL	ZN	10	08.4								72.0	USCGS: 56.6N, 152.1W. h about 20 km. Alaskan aftershock H = 09 34 44.1 Mag. 5.1 (CGS)
63	12	eP	Z	10	54	02								Samoa Islands region
		iS	NE			30								
64	12	iP	ZNE	11	15	32.2	4.2	2.0	2.5	2.0	1.1	2.0	21.3	Compression
		eS	ZNE		19	12								USCGS: 33.9N, 179.8W. h about 89 km. Kermadec Islands H = 11 10 54.8 Mag. 5.4 (CGS)
		eT	ZNE		35	00								
65	12	eP	Z	11	51	26								Samoa Islands region
		eS	NE			51								

No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						△ (Deg.)	Remarks
66	12	eS eL	ZN ZN	13	09.5 26.6							72.0	USCGS: 56.6S, 151.3W. h about 33 km. Alaskan aftershock H = 12 48 02.2 Mag. 5.1 (CGS)
67	12	eL	ZN	17	56.7							76.0	USCGS: 60.2N, 145.6W. h about 20 km. Alaskan aftershock H = 17 22 02.2 Mag. 5.0 (CGS)
68	12	iP	Z	20	41	05	1.0	1.5				8.1	USCGS: 16.4S, 179.8W. h about 509 km. West of Tonga Islands (Fiji Islands?) H = 20 39 06 Mag. 3.6 (CGS)
69	13	eP eS	ZNE NE	03	05 07	27 29	2.0	1.3				12.0	USCGS: 23.7S, 179.0W. h about 360 km. South of Fiji Islands H = 03 02 46.3 Mag. 4.5 (CGS)
70	13	iP eS	Z ZNE	06	25 27	32.5 05	1.5	0.8				8.0	USCGS: 19.5S, 177.7W. h about 574 km. Tonga Islands region H = 06 23 34.1 Mag. 4.4 (CGS)
71	13	eiP eS	Z ZNE	08	01 02	28 16	1.9	1.1					
72	13	ePKP eL	Z Z	08 09	49 39.2	48						146.0	USCGS: 45.3N, 18.1E. h about 33 km. Northern Yugoslavia Two killed and about 100 injured in northern Yugoslavia. Extensive property damage in northern Yugoslavia and southern Hungary H = 08 30 03.6
73	13	iP iS	Z NE	11	32 33	52.2 12							Samoa Islands region
74	13	eS eSSS eL	NE E ZN	12 13	48 56.4 00.0	10						77.0	USCGS: 59.4N, 143.9W. h about 40 km. Alaskan aftershock H = 12 25 36 Mag. 4.9 (CGS)
75	13	eP eL	Z ZN	14	16 38.0	35						72.0	USCGS: 57.6N, 151.2W. h about 25 km. Alaskan aftershock H = 14 05 00.0 Mag. 4 ³ / ₄ (Brk), 5-5 ¹ / ₄ (Pal), 5.5(CGS)

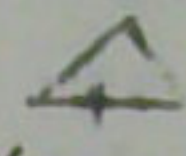
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
76	13	eL	ZN	16	47	30							72.0	USCGS: 56.6N, 152.1W. h about 33 km. Alaskan aftershock H = 16 14 06.3 Mag. 5.1 (CGS)
77	13	eL	ZN	21	58.4								73.0	USCGS: 57.5N, 153.9W. h about 30 km. Alaskan aftershock Felt: Kodiak H = 21 25 33.0 Mag. 5.5 (CGS)
78	13	eL	ZN	22	17.5								76.0	USCGS: 59.4N, 143.1W. h about 33 km. Alaskan aftershock H = 21 43 16.5 Mag. 5.1 (CGS)
79	14	eL	ZN	01	36.4								68.0	USCGS: 49.4N, 155.5E. h about 60 km. Kurile Islands H = 01 04 28.8 Mag. 5.2 (CGS)
80	14	iP eS	Z NE	02	29 30	50.2 55							5.4	Dilatation USCGS: 15.8S, 177.0W. h about 362 km. Tonga Islands region H = 02 28 25 Mag. 4.1 (CGS)
81	14	iP eS eL	Z ZNE ZE	09	03 07 08	14.8 10 10	0.5	2.0					20.0	Dilatation USCGS: 17.5S, 167.9E. h about 33 km. New Hebrides Islands Felt: Vila, Norsup and Epi H = 08 58 41.9 Mag. 4.6 (CGS)
82	14	iP eS	Z NE	10	46 47	15.3 55								Compression
83	14	eL	ZN	16	30.4								77.0	USCGS: 61.3N, 147.3W. h about 30 km. Alaskan aftershock Felt: Anchorage H = 15 55 10.9 Mag. 5.4 (CGS)
84	14	eP eS	Z NE	22	48 49	13 33							7.6	USCGS: 19.8S, 176.7W. h about 235 km. Tonga Islands H = 22 46 25 Mag. 4.3 (CGS)
85	14	eP eL	Z ZN	23	07 28.3	03							75.0	USCGS: 58.0N, 152.6W. h about 30 km. Alaskan aftershock H = 22 55 31.3 Mag. 5.1 (CGS)

No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
86	15	iP iS	Z NE	03 09	08 03	31.8							Compression
87	15	eP	Z	05	43	08							
88	15	eP eS eSSS eL	Z ZE E ZN	15 16	42 51 59.3 02.8	09 26					72.0	USCGS: 56.5N, 154.4W. h about 35 km. Alaskan aftershock H = 15 30 47.1 Mag. 5.5 (CGS)	
Surface waves for about 30 min.													
89	15	eP e	Z ZNE	16	57 59	52 48					25.7	USCGS: 37.7S, 177.5E. h about 41 km. Off east coast of North Island, New Zealand H = 16 52 26.0 Mag. 5.5 (CGS)	
90	15	iP iS	Z NE	21	10	53 58							Samoa Islands
91	15	eP eS	ZN ZNE	21	36 38	56 05					7.0	USCGS: 19.7S, 175.6W. h about 172 km. Tonga Islands H = 21 35 18.2 Mag. 4.2 (CGS)	
92	15	eP eS eT	Z NE ZNE	23	07 10	00 34 22							
93	16	eS eL	ZN ZN	01	24.3 34.5						66.0	USCGS: 37.0N, 142.7E. h about 38 km. Off east coast of Honshu, Japan H = 01 04 34.5 Mag. 5.1 (CGS)	
94	16	eP eS	Z NE	02	06 07	47 34							
95	16	iP eS	Z NE	02	39 43	58 50	2.2	1.9			18.5	Dilatation USCGS: 21.5S, 170.5E. h about 110 km. Loyalty Islands region H = 02 35 48.9 Mag. 4.6 (CGS)	
96	16	eP eS	Z NE	11	48 50	20 25					12.6	USCGS: 23.8S, 180.0 h about 530 km. South of Fiji Islands H = 11 45 36.9 Mag. 4.5 (CGS)	
97	16	eS eL	N ZNE	14	02.8 10.1						65.0	USCGS: 52.1N, 169.4W. h about 33 km. Fox Islands, Aleutian Islands H = 13 43 08.9 Mag. 4.9 (CGS)	

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
98	16	iP	Z	14	11	41							32.6	Compression USCGS: 7.0S, 155.7E. h about 78 km. Solomon Islands Felt: Kieta and Omori H = 14 05 14.9 Mag. 5.4 (CGS)
99	16	eP	Z	19	38	19							72.0	USCGS: 56.4N, 152.9W. h about 30 km. Alaskan aftershock H = 19 26 57.4 Mag. 5.5 (CGS)
		eS	ZNE		47	36								
		eSSS	N		54	38								
		eL	NE		56	30								
		eL	ZN		59.2									
100	16	eP	Z	22	28	21								
		eS	NE		30	33								
101	17	eP	Z	05	00	57							72.0	Alaskan aftershock USCGS: 56.4N, 152.9E. h about 25 km. Alaskan aftershock H = 04 49 30.5 Mag. 5.3 (CGS)
		eS	ZNE		10	10								
		eSSS	E		18.4									
		eL	ZN		22.0									
102	17	iP	Z	06	06	30.6	0.5	1.1					33.6	Compression USCGS: 6.6S, 154.9E. h about 85 km. Solomon Islands Felt: Buin and Omori H = 06 00 00.2 Mag. 5.4 (CGS)
		eS	ZE		12	00								
		eSS	ZNE		14.0									
		eL	ZE		16.0									
103	17	eP	Z	09	20	37	0.5	2.0					72.0	USCGS: 57.7N, 151.4E. h about 20 km. Alaskan aftershock H = 09 09 07.8 Mag. 5.4 (CGS)
		eL	N		39.0									
		eL	ZN		43.0									
104	18	eS	N	05	47	42							68.0	USCGS: 45.5N, 151.1E. h about 33 km. Kurile Islands H = 05 27 44.6 Mag. 5.3 (CGS)
		eL	ZN		58.0									
105	18	eL	ZN	08	31.2								71.0	USCGS: 29.0N, 129.8E. h about 33 km. Ryukyu Islands H = 07 58 26.9 Mag. 4.9 (CGS)
106	18	eP	Z	12	04	48								
		eS	NE		05	28								
107	18	iP	ZE	17	56	58.2	13.2	1.2			2.5	1.8	2.6	Compression USCGS: 15.0S, 174.3W. h about 90 km. Samoa Islands region H = 17 56 16.2 Mag. 4.2 (CGS)
		iS	NE		57	25								
108	18	iP	Z	18	35	29.7								Compression





No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
109	18	eS e(SS) eL	ZN ZN ZN	20	37 41.1 48.5	00						72.0	USCGS: 56.1N, 153.7W. h about 30 km. Alaskan aftershock H = 20 16 16.3 Mag. 4.9 (CGS)	
110	19	iP iS	ZNE NE	03	56 57	50 13						2.5	Compression from south- west USCGS: 15.4S, 173.7W. h about 51 km. Tonga Islands H = 03 56 13.7 Mag. 4.2 (CGS)	
111	19	eSS eL	NE ZNE	04	05.9 08.2							53.0	USCGS: 55.1S, 128.5W. h about 33 km. South Pacific Ocean H = 03 44 55 Mag. 4.5 (CGS)	
112	19	eS eL	ZNE ZNE	05	35 49.1	08						80.0	USCGS: 41.7S, 83.9W. h about 33 km. Off coast of southern Chile H = 05 13 01.6 Mag. 5.5 (CGS)	
113	19	eP	Z	08	40	08						20.0	USCGS: 17.7S, 167.8E. h about 15 km. New Hebrides Islands H = 08 35 31.6 Mag. 4.6 (CGS)	
114	19	iP	Z	14	04	45								Compression
115	19	eP eS eSS eSSS eLq eLr	Z ZNE ZNE ZE ZNE ZNE	14	25 36 42 45 48 51	29 00 18 40 56 40						88.0	USCGS: 60.5S, 58.3W. h about 33 km. Near South Shetland Islands H = 14 12 21.9 Mag. 5.4 (CGS)	
116	20	iP eS eSSS eL	Z ZNE E ZNE	12	08 18 28.3 32.0	46 28	1.3	2.1				77.0	Compression USCGS: 61.4N, 147.3W. h about 30 km. Alaskan aftershock Felt: Anchorage; USC&GSS Surveyor, anchored at 61° 06.4'N, 146° 20.6'W H = 11 56 41.6 Mag. 6½(Pas), 6¾(Brk), 6-6¼(Pal), 5.7(CGS)	
Surface waves about 30 min.														
117	20	iP iS	Z NE	14	16 17	58 48								
118	20	eP	Z	15	31	43	1.4	2.0						

No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
119	20	eL	ZN	16	53.8							77.0	USCGS: 60.7N, 145.3W. h about 15 km. Alaskan aftershock H = 16 18 26.4 Mag. 4.9 (CGS)
120	21	iP iS	Z NE	02	29 30	47.6 03.6							Samoa Islands region
121	21	eL	ZN	05	36.6							77.0	USCGS: 61.5N, 147.4W. h about 40 km. Alaskan aftershock Felt: Anchorage; USC&GSS Surveyor, anchored at 61° 06.4'N, 146° 20.6'W H = 05 01 35.7 Mag. 6(Pas), 4 $\frac{3}{4}$ -5(Bks), 5.4(CGS)
122	21	iP iS	Z NE	16	35	21.5 57							
123	21	iP eS	Z NE	21	49 52	20.4 41	2.6	1.9					
124	22	iP iS	Z NE	02	24	02.8 24.8							Samoa Islands region
125	22	eP eS	Z NE	13	26 27	48 06							Samoa Islands region
126	22	iP eS	Z NE	19	38 39	33 05						2.7	USCGS: 16.1S, 173.4W. h about 33 km. Tonga Islands H = 19 37 53.2 Mag. 5.0 (CGS)
127	22	eP ipP eS	Z ZE NE	20	04 05 08	48 25 16	3.0	2.0				20.1	USCGS: 15.5S, 167.5E. h about 123 km. New Hebrides Islands H = 20 00 22.8 Mag. 5.0 (CGS)
128	22	eP	Z	23	08	37						20.5	USCGS: 13.2S, 167.1E. h about 218 km. New Hebrides Islands H = 23 04 13.8 Mag. 4.0 (CGS)
129	23	iP ePP eS eSS iSSS iL	ZE ZE ZNE ZN N ZE	03	42 44 49 53 55 58	15 20 44 30 51 56	5.5	2.0				55.0	Dilatation from east USCGS: 5.3S, 134.0E. h about 33 km. Aru Islands region Felt: Darwin, Australia H = 03 32 50.3 Mag. 6.4 (CGS)
130	23	eP eS	Z NE	03	54 55	47 13							Samoa Islands region

Surface waves about 1 hour

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No	Date	Phase		Time										Remarks
				(G.M.T.)			Az	Tz	An	Tn	Ac	Te		
131	23	eP eL	Z ZE	10	39 48.7	20							33.4	USCGS: 6.6S, 155.1E. h about 60 km. Solomon Islands region Felt: Buin H = 10 32 47.9 Mag. 5.3 (CGS)
132	23	eP eS eT	Z NE ZNE	13	20 21 26	04 12 42								
133	23	iP	Z	13	34	42.9								Compression
134	24	eP eS	Z NE	03	20 21	17 53							8.5	USCGS: 20.1S, 177.8W. h about 393 km. Fiji Islands H = 03 18 16.3 Mag. 3.7 (CGS)
135	24	eL	ZNE	04	23.5								76.0	USCGS: 59.5N, 144.5W. h about 33 km. Alaskan aftershock H = 03 51 05.0 Mag. 5.2 (CGS)
136	24	iP iPP iPcS eS iSS iL iL	ZE ZE Z ZNE ZNE ZE ZE	06	04 06 09 10 14 17 19	11 12 40 30 00 36 12	8.0	2.0			5.5	2.0	44.3	Dilatation from east USCGS: 5.1S, 144.2E. h about 106 km. North-East New Guinea Slight damage at Hagen, felt widely H = 05 56 10.1 Mag. $6\frac{1}{2}$ - $6\frac{3}{4}$ (Bks), 6.3(CGS)
137	24	eP	ZE	06	17	35	0.6	2.0						
138	24	eP iS	Z NE	09	37 38	27 07								
139	24	eP eS	Z NE	10	06 07	44 58	0.4	1.0						
140	24	eP eS	Z NE	10	37 39	31 03								
141	24	eP eS	Z NE	11	15 17	45 28							10.1	USCGS: 23.1S, 175.9W. h about 33 km. Tonga Islands H = 11 13 23.1 Mag. 4.5 (CGS)
142	24	eS	ZE	15	03	16							87.0	USCGS: 13.3N, 88.8W. h about 158 km. Near coast of El Salvador, Felt H = 14 40 28.3 Mag. 6(Pal), 5.1(CGS)
143	24	iP iS	Z NE	17	19 20	40.4 22								



No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
144	25	e	ZNE	05	41	14								
		eL	ZNE		52.8									
145	25	e(L)	ZE	06	34.7									
146	25	eP	Z	14	17	02								Samoa Islands region
		iS	NE			20								
147	25	iP	Z	14	55	45								
		iS	NE		56	31.3								
148	26	iP	Z	02	22	25.3								Compression
		iS	NE			39								Samoa Islands region
149	26	iP	Z	09	25	14								
		eS	NE		26	13								
150	26	iP	Z	14	11	42							83.0	Compression
														USCGS: 5.8S, 105.OE.
														h about 90 km.
														Southern Sumatra
														H = 13 59 27.7
														Mag. 5.6 (CGS)
151	26	iP	Z	14	44	10.4	4.5	1.0						Compression
		iS	NE			35.6								Samoa Islands region
152	26	iP	ZNE	14	54	12	14.11.3	8.7	1.6	6.0	1.9		9.0	Dilatation
		iS	ZNE		55	48.4								USCGS: 20.6S, 178.OW.
														h about 490 km.
														Fiji Islands region
														H = 14 52 07.6
														Mag. 5.1 (CGS)
153	26	eP	Z	22	00	58								
		e(L)	ZE		24.1									
154	26	eL	ZNE	23	39.7									
155	27	iP	Z	02	45	00								Samoa Islands region
		iS	NE			19								
156	27	eP	Z	06	53	40							56.0	USCGS: 60.1S, 151.OE.
		eS	ZNE	07	01	28								h about 33 km.
		eSS	NE		05	04								Balleny Islands region
		eSSS	ZNE		07	08								H = 06 44 25.1
		eL	ZN		09	45								Mag. 5.0 (CGS)
157	28	eL	Z	15	04.5								11.6	USCGS: 11.9S, 166.2E.
		eL	ZE		05.6									h about 42 km.
														Santa Cruz Islands
														H = 14 55 25.5
														Mag. 4.2 (CGS)
158	28	iP	Z	20	02	01								
		iS	NE			30								
159	28	iP	Z	22	27	25								Compression
160	28	eP	Z	23	31	25								
		eS	NE		32	57								



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
161	29	iP	Z	01	40	47.5	1.3 0.9						Compression
		eS	NE		42	16							
162	29	ePKP	Z	04	41	00	143.0						USCGS: 39.3N, 23.7E. h about 33 km. Aegean Sea Extensive property damage Skopelos Island H = 04 21 06.7 Mag. 5.1 (Pal), 5.1 (CGS)
163	29	iP	ZN	06	52	13.8	8.3 0.7						Dilatation Samoa Islands region
		iS	NE			34							
164	29	iP	Z	07	27	57.6	0.6 2.0						Dilatation USCGS: 7.2S, 155.7E. h about 78 km. Solomon Islands H = 07 21 30.2 Mag. 5.2 (CGS)
165	29	eiP	Z	09	22	29							Samoa Islands region
		eS	NE			54							
166	29	eiP	Z	17	21	38							
		eS	NE		23	06							
167	30	iP	Z	02	32	30							
		eS	NE		33	04							
168	30	iP	ZNE	03	42	37	10.0 2.0 5.5 2.0 6.0 2.0						Dilatation from north-east USCGS: 15.5S, 174.7W. h about 224 km. Tonga Islands H = 03 41 42.3 Mag. 4.2 (CGS)
		iS	NE		43	17							
169	30	iP	Z	04	51	44.8	2.0 2.0						Dilatation USCGS: 19.7S, 177.8W. h about 339 km. Fiji Islands H = 04 49 48.0 Mag. 4.0 (CGS)
		iS	NE		53	12.3							
170	30	eP	Z	16	10	29							USCGS: 4.6S, 153.2E. h about 78 km. New Ireland region Felt: Londolovit, Rabaul H = 16 03 31.4 Mag. 5.2 (CGS)
		epP	Z			44							
		eS	ZNE		16	00							
		eSS	ZNE		18.2								
		eL	ZE		20.2								
171	30	eL	ZNE	18	01.2								USCGS: 60.1N, 142.2W. h about 33 km. Alaskan aftershock H = 17 26 30 Mag. 4.9 (CGS)

No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						△ (Deg.)	Remarks
172	30	eSS	ZN	19	12.2							21.8	USCGS: 11.8S, 166.0E. h about 40 km. Santa Cruz Islands H = 19 03 08
173	30	eS	ZN	21	46.2							22.6	USCGS: 12.5S, 165.1E. h about 33 km. Santa Cruz Islands H = 21 37 04 Mag. 4.0 (CGS)

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

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John Milne
OBSERVER-IN-CHARGE



NEW ZEALAND
Department of Scientific and Industrial Research
Geophysics Division
APIA OBSERVATORY
FINAL SEISMOLOGICAL BULLETIN
STANDARD SEISMIC STATION (AFI)
AFIAMALU, WESTERN SAMOA.

Latitude: 13° 54' 33.6"S Longitude: 171° 46' 38.1"W
Height above mean sea level: 705.6 metres, 2315 ft.
Geocentric direction cosines: a. - 0.961 070
b. - 0.138 883
c. - 0.238 862

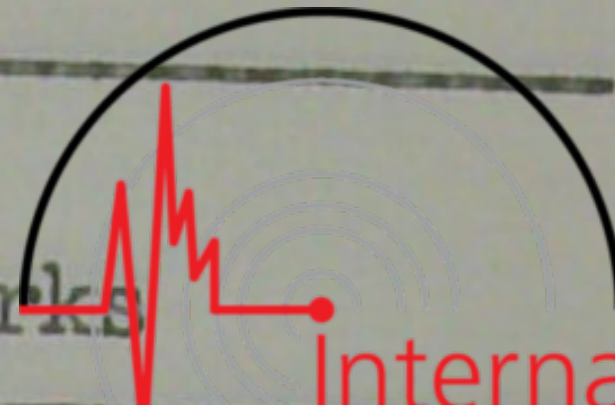
Lithological Foundation: Basaltic Lava Flows
Instruments: World-wide standard seismograph system
Benioff short period seismometers
To = 1.0 sec. Tg = 0.75 sec.
Sprengnether long period seismometers
To = 30 sec. Tg = 100 sec.
Nominal Magnifications: S.P. 12500
L.P. 750

MAY 1964 *

No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
1	1	eS eL	NE ZN	06	23.4 37.1							76.0	USCGS: 60.5N, 145.6W. h about 20 km. Alaskan aftershock H = 06 01 55.4 Mag. 5.4 (CGS)
2	1	iP eS	Z NE	11	13 45 14 00								Samoa Islands region
3	1	eL	ZNE	23	56.5							19.7	USCGS: 32.3S, 179.5W. h about 33 km. Kermadec Islands H = 23 47 35.3 Mag. 4.8 (CGS)
4	2	eP eS	Z NE	15	11 32 12 00								
5	2	eP iS eSS eSSS eL	Z ZNE ZN ZE ZNE	16	22 00 31 00 34 42 38.3 41.7							77.0	USCGS: 45.5N, 150.3E. h about 35 km. Kurile Islands H = 16 11 00.2 Mag. 5.7 (CGS)
6	2	iP eS	Z NE	16	37 00 39 29							15.0	Compression USCGS: 27.3S, 178.9W. h about 369 km. Kermadec Islands H = 16 33 47.9 Mag. 4.5 (CGS)

* See note at end

No	Date	Phase		Time									(Deg.)	Remarks
				(G.M.T.)			Az	Tz	An	Tn	Ae	Te		
7	2	eP eS eT	Z NE ZNE	16 41 31 42 00 44 11										
8	2	eP oS	Z NE	16 53 49 55 36										
9	2	eP oS e(T)	Z NE ZNE	21 58 18 40 11										
10	2	iP iS	Z NE	22 14 51 15 22										
11	3	eP oS	Z NE	04 45 06 46 37							7.4	USCGS: 17.9S, 178.3W. h about 569 km. Fiji Islands region H = 04 43 12.4 Mag. 3.9 (CGS)		
12	3	iP iS	Z NE	14 11 13.4 48										
13	4	iP iS	Z NE	15 35 44.4 36 04										
14	4	eP iS eT	Z E ZNE	15 39 51 40 27 42 56										
15	4	eL	Z	17 54.3							110.0	USCGS: 55.8S, 4.4W. h about 33 km. Bouvet Islands region H = 17 05 20 Mag. 5.4 (CGS)		
16	4	eP iS	Z NE	21 57 22 58 02.3										
17	5	eL	ZN	08 32.6							77.0	USCGS: 45.5N, 150.1E. h about 40 km. Kurile Islands H = 08 01 48.4 Mag. 4.9 (CGS)		
18	5	eSS eL	ZN ZE	08 58.6 09 00.0							31.4	USCGS: 9.0S, 156.6E. h about 33 km. Solomon Islands H = 08 44 59.1 Mag. 5.1 (CGS)		
19	5	eP eS	Z NE	12 22 46 24 50										
20	5	eP iS	Z NE	21 04 31 05 00.6										
21	6	iP eS	Z NE	05 09 07.4 10 46						0.5 1.7		Dilatation		



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No	Date	Phase	Time (G.M.T.)		Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
22	6	eL ZN	05	13.6							73.0	USCGS: 57.5N, 149.3W. h about 33 km. Alaskan aftershock H = 04 44 13 Mag. 4.2 (CGS)
23	6	iP ZE eS ZNE iL N	08	16 15 20 42 21 46	3.2	2.2	1.4	2.0			25.6	Dilatation USCGS: 11.1S, 162.2E. h about 40 km. Solomon Islands H = 08 10 47.5 Mag. 5.1 (CGS)
24	6	iP ZN e(S) N	08	53 02.2 54 10								Compression
25	6	eP Z eS ZNE eSSS E eL ZN	15	38 05 47 20 55.7 59.3							72.0	USCGS: 56.7N, 152.1W. h about 15 km. Alaskan aftershock H = 15 26 35.5 Mag. 5.4 (CGS)
26	6	iP Z iS NE	15	55 16 37								
27	6	eP Z iS NE	17	11 20 12 26.3								
28	6	eP Z eS NE	20	36 07 39 27								
29	7	iP ZNE eS NE	00	36 29.2 37 39	11.4	2.0	09.4	2.0	7.7	2.0	6.4	Compression from south- west USCGS: 18.2S, 176.6W. h about 300 km. Fiji Islands region H = 00 34 57.2 Mag. 5.4 (CGS)
30	7	ePKP Z ePP Z e E eSKSPZ e Z e NE eSSS ZNE eL ZNE eL ZNE	06	05 15 08.3 15 42 18 54 24 16 27 50 32 25 44.5 48.0	3.3	2.3					149.0	USCGS: 4.0S, 34.9E. h about 33 km. Tanganyika 1 killed at Baboti, 19 injured at Mbulu Extensive property damage, H = 05 45 29.5 Mag. $6\frac{1}{4}$ - $6\frac{1}{2}$ (PAL), 6.4(CGS)
31	7	iP Z iS NE	07	20 08.6 26								Samoa Islands region
32	7	iP ZN iPP ZN eS ZNE iSS Z iSSS NE iL NE iL ZNE	08	09 29 12 18 18 40 23 26 26 50 27 52 29 32							70.5	Compression USCGS: 40.4N, 139.0E. h about 33 km. Off coast of northern Honshu, Japan Felt: Northern Honshu and Hokkaido H = 07 58 14.3 Mag. 7(Pas), 7(Brk), $6\frac{1}{2}$ - $6\frac{3}{4}$ (Pal), 6.2(CGS)

Surface waves for about 2 hours

No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
33	7	eP eS eSS eSSS eL eL	Z ZNE Z ZNE E ZNE	20 24 33 38 41.4 42 44.2	06 18 04	1.1	2.0					70.5	USCGS: 40.5N, 139.0E. h about 33 km. Off west coast of Honshu, Japan; minor damage in Akita Province H = 20 12 49.3 Mag. 5.9 (CGS)
34	7	eP eS	Z NE	23 01 03	42 14								
35	7	eP eS	Z NE	23 16 20	49 11	0.5	2.0					20.0	USCGS: 32.9S, 178.3W. h about 33 km. Kermadec Islands H = 23 12 21.3 Mag. 4.4 (CGS)
36	8	eP eS	Z NE	02 02 04	58 53								
37	8	eP eS	Z NE	03 12 14	07 30								
38	8	eP eS	Z E	03 40 44	26 10	0.5	2.0					19.8	USCGS: 32.7S, 178.3W. h about 40 km. Kermadec Islands H = 03 35 59.9 Mag. 4.5 (CGS)
39	8	eP S	Z NE	04 00 02	31 15								
40	8	e	ZN	04	08.0								Part of No. 39 (?)
41	8	eP eS	Z NE	04 08 09	26 45								
42	8	eP eS	Z NE	12 10 11	06 16								
43	8	iP iS	Z NE	13 24 25	55.2 07								Samoa Islands region
44	8	eP iS	Z NE	16 04 05	30 03								
45	8	eP eS eSS eSSS eL	Z ZNE Z E ZN	16 33 42 47.0 50.8 54.0	20 40							71.0	USCGS: 56.7N, 154.0W. h about 25 km. Alaskan aftershock H = 16 21 49.8 Mag. 5.3 (CGS)
46	8	eL	ZN	22	09.7							77.0	USCGS: 60.8N, 143.6W. h about 35 km. Alaskan aftershock H = 21 34 40.6 Mag. 5.4 (CGS)

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
47	8	iP	Z	23	21	36							Samoa Islands region
		iS	NE		22	02							
48	9	eS	ZNE	00	00	22							USCGS: 52.2N, 169.5W. h about 20 km. Andreanof Islands H = 23 40 44.1 Mag. 5.2 (CGS)
		e	E		07.2								
		eSSS	ZN		08.0								
		eL	ZN		09.9								
49	9	eLq	E	02	29.5								USCGS: 52.2N, 169.6W. h about 25 km. Andreanof Islands H = 02 02 28.8 Mag. 5.1 (CGS)
		eLr	ZN		32.2								
50	9	eP	Z	12	15	00							USCGS: 21.6S, 174.6W. h about 33 km. West of Tonga H = 12 13 04.9 Mag. 4.5 (CGS)
		eS	NE		16	25							
		eL	ZNE		17.0								
		eT	ZNE		23	02							
51	9	iP	Z	18	21	01.3	1.4	2.0					Compression USCGS: 13.7S, 166.6E. h about 41 km. New Hebrides Islands H = 18 16 17.5 Mag. 5.0 (CGS)
		eS	ZNE		25	10							
		eL	ZNE		26.4								
52	9	iP	Z	21	14	01.3	0.9	2.3					Compression USCGS: 9.2S, 156.7E. h about 26 km. Solomon Islands region H = 21 07 41.6 Mag. 5.4 (CGS)
		eL	ZN		22.7								
53	11	iP	Z	02	55	14.4	1.0	1.2					Dilatation USCGS: 21.2S, 179.0W. h about 553 km. Tonga Islands region H = 02 52 55.6 Mag. 3.6 (CGS)
		eS	NE		57	04							
54	11	eP	Z	05	32	05							USCGS: 24.6S, 179.9E. h about 515 km. Fiji Islands region H = 05 29 16.6 Mag. 4.8 (CGS)
		eS	NE		34	21							
55	11	iP	Z	09	14	39	0.7	1.0					Compression
		eS	NE		15	49							
56	11	eP	Z	14	41	14							USCGS: 22.5S, 175.8W. h about 50 km. Tonga Islands region H = 14 39 04 Mag. 5.3 (CGS)
		eS	NE		42	52							
		eL	ZNE		43	08							
57	11	iP	Z	20	39	12							Compression USCGS: 17.1S, 174.4W. h about 104 km. Tonga Islands H = 20 38 11.5 Mag. 4.2 (CGS)
		iS	NE			54							

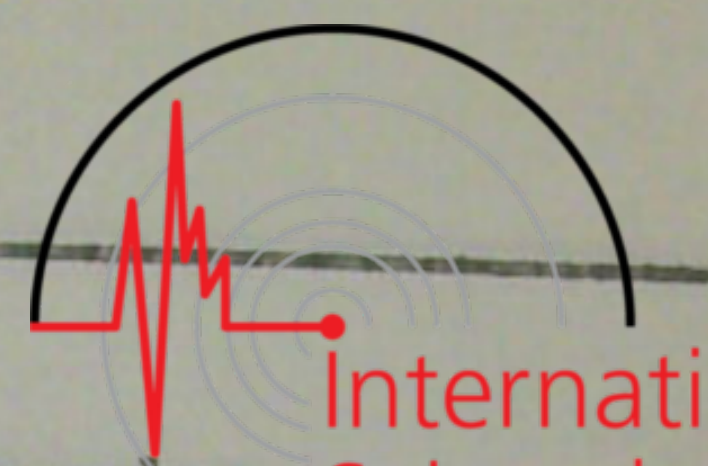


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No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
58	12	iP eS	Z NE	01 41 43	10 40		3.1 2.1						15.5	USCGS: 26.2S, 178.3E h about 607 km Fiji Islands region H = 01 37 59.5 Mag. 4.6 (CGS)
59	12	eP eS	Z NE	06 47 49	29 19								9.4	USCGS: 22.3S, 176.3W. h about 33 km. Tonga Islands H = 06 45 13.3 Mag. 4.5 (CGS)
60	12	eP eS eT	Z NE ZNE	10 03 05 10	58 00 10								6.4	USCGS: 19.9S, 173.9W. h about 33 km. Tonga Islands H = 10 02 27.1 Mag. 5.1 (CGS)
61	12	iP iS	Z NE	14 15	16 37									Samoa Islands region
62	12	iP eS eL eT	Z NE ZN ZNE	18 18 19 20.0 25	36 45 00								6.4	USCGS: 19.9S, 173.9W. h about 33 km. Tonga Islands H = 18 17 07.7 Mag. 5.5 (CGS)
63	12	eL	Z	18 49.2									72.0	Phases masked by coda of preceding USCGS: 56.6N, 152.4W. h about 10 km. Alaskan aftershock H = 18 16 41.9 Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (BRK), 6- $6\frac{1}{4}$ (PAL), 5.3(CGS)
64	12	eP eS	Z NE	21 37 38	35 19									
65	13	eP eS	Z NE	00 03 05	53 38									
66	13	eP eS	ZE ZNE	00 08 09	11 16		1.0 2.0 1.2 2.0						4.9	USCGS: 14.8S, 176.7W. h about 33 km. Samoa Islands region H = 00 07 01.8 Mag. 4.7 (CGS)
67	13	iP iS	Z NE	01 36 37	41.4 21									
68	13	iP eS	Z NE	05 29 33	53 18		4.4 2.0						19.9	USCGS: 32.8S, 178.3W. h about 33 km. Kermadec Islands region H = 05 25 26.1 Mag. 5.3 (CGS)
69	13	iP eS	Z NE	11 08 10	43 37		2.0 1.5						11.0	USCGS: 21.8S, 179.6W. h about 578 km. West of Tonga Islands H = 11 06 16.4 Mag. 4.6 (CGS)

No	Date	Phase		Time										Remarks
				(G.M.T.)			Az	Tz	An	Tn	Ae	Te		
70	13	eP eS	Z NE	16 47 50	13 38							20.0	USCGS: 32.7S, 178.6W. h about 33 km. Kermadec Islands region H = 16 42 48.3 Mag. 5.1 (CGS)	
71	13	iP eS	Z NE	20 42 45	13.4 28	1.0	1.9					19.5	Compression USCGS: 32.4S, 178.3W. h about 70 km. Kermadec Islands region H = 20 37 54 Mag. 4.9 (CGS)	
72	14	iP eS	Z NE	01 08 09	13.1 41								Compression	
73	14	iP eS	Z NE	01 09 13	56.5 04	1.5	2.2					20.1	Dilatation USCGS: 32.9S, 178.8W. h about 309 km. Kermadec Islands region H = 01 05 47.6 Mag. 4.6 (CGS)	
74	14	eP eS	Z NE	09 56 57	20 21							5.7	USCGS: 18.7S, 174.8W. h about 47 km. Tonga Islands H = 09 54 58 Mag. 4.2 (CGS)	
75	14	iP eS	ZNE NE	20 03 05	22 13	9.3	1.9	4.0	1.9	3.0	1.9	10.3	Compression USCGS: 21.3S, 179.3W. h about 606 km. Fiji Islands region H = 20 01 01.0 Mag. 4.7 (CGS)	
76	15	iP iS	Z NE	06 35 36	52 15								Samoa Islands region	
77	15	eS eSSS eL	NE ZNE ZE	11 04 07 09.0	08 12							40.0	USCGS: 3.5S, 149.1E. h about 44 km. Bismarck Sea H = 10 50 21 Mag. 4.7 (CGS)	
78	16	eP eS eL	Z NE ZN	16 12 15 17.6	13 52							19.9	USCGS: 32.8S, 178.3W. h about 33 km. Kermadec Islands region H = 16 07 46.2 Mag. 6.0(PAS), 5.4(CGS)	
79	16	e(P)	Z	16	14	19								
80	17	eL eL	E ZN	01 24.0 25.6								76.0	USCGS: 59.4N, 142.7W. h about 35 km. Alaskan aftershock H = 00 50 17.9 Mag. 5 ³ / ₄ (PAS), 6-6 ¹ / ₄ (BRK), 6 ¹ / ₄ -6 ¹ / ₂ (PAL)	

No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
81	17	eS eL	N ZN	05	02 11.8	00						67.0	USCGS: 53.9N, 159.7W. h about 33 km. South of Alaska H = 04 41 44 Mag. 5.5 (CGS)
82	17	eP eS	Z NE	11	16 18	49 08						7.5	USCGS: 19.5S, 176.7W. h about 266 km. Tonga Islands region H = 11 15 03.7 Mag. 4.3 (CGS)
83	17	eP eS eL	Z NE ZNE	17	09 13 15.3	56 40						20.3	USCGS: 33.2S, 178.4W. h about 33 km. Kermadec Islands region H = 17 05 24.8 Mag. 4.6 (CGS)
84	17	ePPPS eSS eSSS e eL eL	ZN NE ZNE ZN ZE N	20	01 06 11 21 29.0 30.0	50 20 10 30						134.0	USCGS: 35.2N, 35.9W. h about 33 km. North Atlantic Ocean H = 19 26 20.6 Mag. $6\frac{1}{2}$ (PAS), $5\frac{3}{4}$ -6(BRK), 6- $6\frac{1}{4}$ (PAL), 5.6(CGS)
85	18	eP iS eT	Z NE ZNE	14	13 15 21	57 18 29						7.7	USCGS: 21.2S, 174.5W. h about 33 km. Tonga Islands region H = 14 12 10.1 Mag. $4\frac{1}{2}$ (BRK) 5.6(CGS)
86	18	e(L)	Z	18	18.7								
87	18	iP	Z	23	01	48							
88	19	iP iS	Z NE	02	09	17 35	4.5	0.9					Compression
89	19	eL	ZN	11	10.2							67.0	USCGS: 45.5N, 150.3E. h about 33 km. Kurile Islands H = 10 39 24.8 Mag. 5.4 (CGS)
90	19	eS e eSSS eL eL	ZNE ZE ZN Z ZE	23	27 28 33 37 45.2	16 52 31 22						91.0	USCGS: 0.7S, 80.2W. h about 54 km. Near coast of Ecuador H = 23 03 41.8 Mag. $5\frac{1}{2}$ (PAL), $5\frac{1}{4}$ - $5\frac{1}{2}$ (BRK), 5.4(CGS)
91	21	eLq eLr	Z ZN	16	06 09.7	46						75.0	USCGS: 59.0N, 153.5W. h about 15 km. Alaskan aftershock H = 15 36 01.5 Mag. $5\frac{3}{4}$ -6(BRK), 5.3(CGS)
92	21	eP iS	Z NE	17	07	00 31							



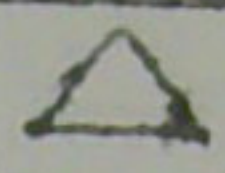
No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						 (Deg.)	Remarks
93	22	eS eL	ZNE NE	00	35.2 37.6							22.0	USCGS: 34.7S, 179.6W. h about 58 km. Kermadec Islands region H = 00 26 44.8 Mag. 4.5 (CGS)
94	22	e(L)	ZNE	02	18.7								
95	22	eP iS	Z NE	10	34 24 54								
96	22	eL	ZN	13	20.3								
97	22	eP eS eT	Z NE ZNE	15	01 02 05	46 28 18							
98	22	iP eS	Z NE	17	33 35	35.2 07	0.7	1.3					
99	23	eP iS	Z NE	07	31 32	31 18							
100	23	iP	Z	11	32	22	0.5	1.8				64.0	Compression USCGS: 28.6N, 139.4E. h about 409 km. Bonin Islands region H = 11 22 33.3 Mag. 5.1 (CGS)
101	23	iP iS	Z NE	12	29 30	44.6 03							Samoa Islands region
102	23	eP iS	Z NE	12	36 37	36 09							
103	23	iP	Z	17	42	03	1.0	1.2					
104	24	eP iS eT	Z NE ZNE	04	15 16 23	05 32 12						9.1	USCGS: 22.6S, 174.1W. h about 33 km. Tonga Islands region H = 04 13 05.3 Mag. 5-5.4(BRK), 5.7(CGS)
		Coda for about 30 min.											
105	24	eS eSSS eL	ZNE ZNE ZNE	10 11	51 58 01.0	10 26						65.0	USCGS: 34.3N, 141.1E. h about 33 km. Near east coast of Honshu, Japan H = 10 31 24.1 Mag. 5.2 (CGS)
106	24	eP iS	Z NE	20	34 35	31 58						7.8	USCGS: 19.1S, 177.9W. h about 441 km. Fiji Islands H = 20 32 36.3 Mag. 3.6 (CGS)
107	24	eP eS	Z NE	22	27 29	39 27							



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
108	25	eP eS	Z ZNE	05 03 06	46 37							17.6	USCGS: 30.6S, 178.0W. h about 33 km. Kermadec Islands H = 04 59 39.6 Mag. 4.3 (CGS)
109	25	iP iS	ZE NE	08 33 34	48.4 32							3.6	USCGS: 15.7S, 174.9W. h about 269 km. Tonga Islands region H = 08 32 49.0 Mag. 4.5 (CGS)
110	25	eSSS eL	ZN Z	20 24.5 30.0								97.0	USCGS: 9.1S, 88.9E. h about 33 km. Indian Ocean H = 19 44 07.0 Mag. 3.9 (CGS)
111	26	eP eS	Z NE	08 06 08	12 15								
112	26	eP e ePP eS iPKKP iSS iSSS iL iL	Z Z ZNE ZNE Z ZNE ZNE E E	11 13 16 17 24 28 32 36 39 42	13 24 26 18 59 06 16 46 40		0.5 2.0					105.0	USCGS: 56.2S, 27.8W. h about 120 km. Sandwich Islands H = 10 59 12.3 Mag. $7\frac{1}{2}$ - $7\frac{3}{4}$ (Pas), $7\frac{1}{2}$ - $7\frac{3}{4}$ (BRK), 7- $7\frac{1}{4}$ (Pal)
113	26	eP iS	NE NE	23 31	09 30								
114	27	eS eSS eSSS eL	Z Z Z Z	01 23.7 29.0 33.6 39.0								105.0	USCGS: 56.1S, 27.6W. h about 105 km. Sandwich Islands H = 00 56 42.5 Mag. 5(PAL), 5.6(CGS)
115	27	iP eS	NE NE	07 07 10	57 10		0.8 1.9 1.3 1.9						
116	27	eL	ZN	07 18.0								105.0	USCGS: 56.2S, 27.4W. h about 116 km. Sandwich Islands H = 06 30 57.7 Mag. 5.8 (CGS)
117	27	eP eS	NE NE	09 00 02	08 24							13.4	USCGS: 25.7S, 178.4W. h about 274 km. Fiji Islands region H = 08 57 07.7 Mag. 3.9 (CGS)
118	27	eP i iS eT	NE NE NE NE	11 21 22 26	36 50 20 09							4.8	USCGS: 18.4S, 173.1W. h about 33 km. Tonga Islands region H = 11 20 26.8 Mag. 4.6 (CGS)
119	27	eP eS	NE NE	13 27 29	57 15								

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
120	27	eP eS eT	NE NE NE	15 50 57	05 22 50								7.5	USCGS: 21.0S, 174.5W. h about 33 km. Tonga Islands H = 15 48 17.3 Mag. 4.1 (CGS)
121	27	eP eS e(T)	NE NE NE	18 47 55	13 26 06									
122	27	eP eS e(T)	NE NE NE	19 06 14	14 37 04									
123	28	eP eS	Z NE	03 04	58 00	56 13							6.5	USCGS: 16.8S, 177.7W. h about 388 km. Fiji Islands region H = 03 57 19.0 Mag. 4.4 (CGS)
124	29	eiP iS	Z NE	06	01	39 57								Samoa Islands region
125	29	eP eS	Z NE	12	27 28	08 32							7.5	USCGS: 18.6S, 177.8W. h about 462 km. Fiji Islands H = 12 25 16.9 Mag. 4.2 (CGS)
126	29	eP eS	Z NE	18	38 40	11 44	2.0	2.0					15.5	USCGS: 26.2S, 178.3E. h about 614 km. Fiji Islands region H = 18 35 02.3 Mag. 5.4 (CGS)
127	29	eP eS	Z NE	18	45 47	30 44							15.5	USCGS: 26.2S, 178.3E. h about 605 km. Fiji Islands region H = 18 42 19.3 Mag. 3.9 (CGS)
128	29	eP eS	Z NE	19	05 07	08 40							15.5	USCGS: 26.1S, 178.3E. h about 613 km. Fiji Islands region H = 19 01 57.0 Mag. 4.1 (CGS)
129	31	e	ZNE	02	05	49								Traces only
130	31	eP eS	Z NE	13 14	58 00	41 35								
131	31	iP iS	Z NE	15	45	43 52								Local



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
132	31	eP	Z	17	19	07							15.6	USCGS: 13.6S, 172.1E. h about 73 km. New Hebrides Islands region H = 17 15 26.8 Mag. $4\frac{3}{4}$ -5(BRK), 5.0(CGS)

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.
- (iii) Missing records : All components Apr. 20th and 30th
LP components Apr. 31st.

John Milne
OBSERVER-IN-CHARGE

June 64

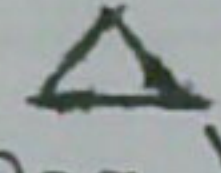


NEW ZEALAND
Department of Scientific and Industrial Research
Geophysics Division
APIA OBSERVATORY
FINAL SEISMOLOGICAL BULLETIN
STANDARD SEISMIC STATION (AFI)
AFIAMALU, WESTERN SAMOA.

Latitude: 13° 54' 33.6"S Longitude: 171° 46' 38.1"W
Height above mean sea level: 705.6 metres, 2315 ft.
Geocentric direction cosines: a. - 0.961 070
b. - 0.138 883
c. - 0.238 862

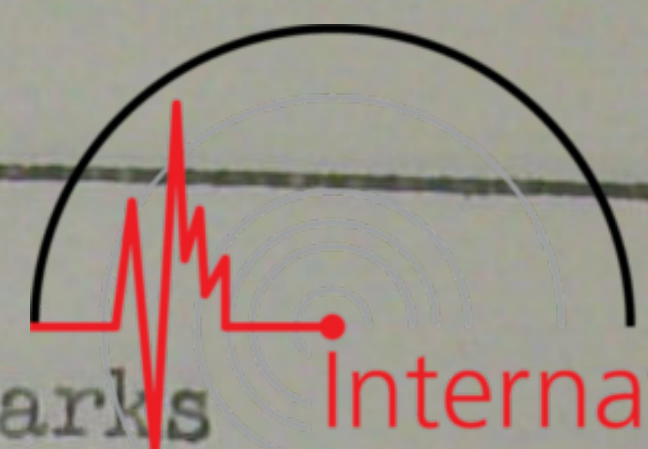
Lithological Foundation: Basaltic Lava Flows
Instruments: World-wide standard seismograph system
Benioff short period seismometers
To = 1.0 sec. Tg = 0.75 sec.
Sprengnether long period seismometers
To = 30 sec. Tg = 100 sec.
Nominal Magnifications: S.P. 12500
L.P. 750

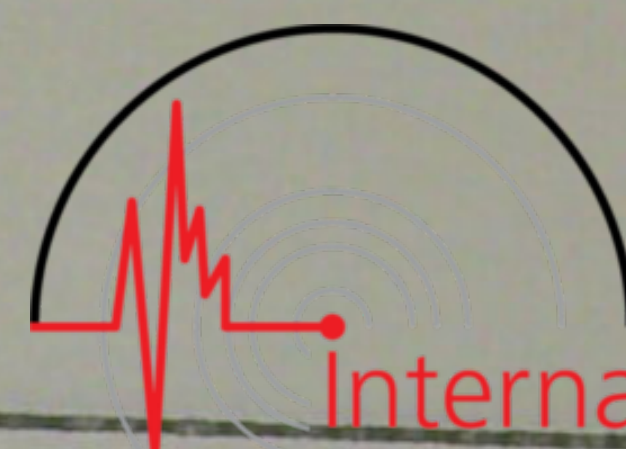
JUNE 1964 *

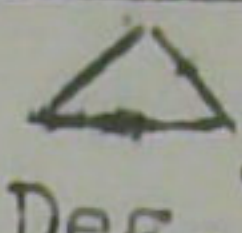
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
1	1	iP	Z	06	09	34.7	4.0	2.0					20.2	Dilatation USCGS: 14.6S, 167.4E. h about 176 km. New Hebrides Islands H = 06 05 07.6 Mag. 5.2 (CGS)
2	1	iP	Z	13	19	15	1.0	2.1					8.1	Compression USCGS: 21.0S, 175.7W. h about 35 km. Tonga Islands H = 13 17 20.7 Mag. 5.2 (CGS)
3	1	iP	Z	19	58	46								Samoa Islands region
		iS	NE			58								
4	1	eP	Z	23	16	51								Samoa Islands region
		e(S)	NE		17	28								
5	2	iP	Z	03	48	44								Samoa Islands region
		iS	NE		49	02								
6	2	eP	Z	04	03	46								Samoa Islands region
		iS	NE		04	37								
7	2	eS	N	08	47	16								

* See note at end

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
8	2	eP	Z	23	17	16						20.6	USCGS: 14.7S, 167.0E. h about 82 km. New Hebrides Islands H = 23 12 37.8 Mag. 4.7 (CGS)
9	3	iP	Z	06	57	00							Samoa Islands region
		iS	NE			19							
10	3	eP	Z	10	14	43							Samoa Islands region
		iS	NE		15	06							
11	3	eP	Z	20	06	34							Samoa Islands region
		iS	NE			57							
12	3	iP	Z	11	59	40.5							Samoa Islands region
		iS	NE			53							
13	3	iP	Z	12	55	30							Samoa Islands region
		iS	NE			48							
14	3	eP	Z	17	55	30						5.4	USCGS: 18.8S, 173.7W. h about 33 km. Tonga Islands H = 17 54 14.7 Mag. 4.8 (CGS)
		iS	NE		56	23							
		eT	ZNE	18	00	30							
15	4	eP	Z	00	19	33							
		iS	NE		20	02							
16	4	eS	E	04	50.6							76.0	USCGS: 17.5N, 100.8W. h about 22 km. Near Coast of Guerrero, Mexico H = 04 28 54.7 Mag. 4.7 (CGS)
		eL	ZE	05	04.0								
17	4	eP	Z	11	24	30	0.5	2.0				38.5	USCGS: 6.1S, 149.9E. h about 54 km. New Britain Felt H = 11 17 11.8
		eS	ZNE		30	20							
		eSS	ZNE		33.4								
		eL	ZE		34.6								
18	4	iP	Z	11	54	58.9	1.6	1.0				4.0	Dilatation USCGS: 14.7S, 176.0W. h about 303 km. Tonga Islands region H = 11 53 50 Mag. 3.9 (CGS)
		eS	NE		55	57							
19	5	eP	Z	01	06	20						12.7	USCGS: 25.6S, 176.5W. h about 33 km. Kermadec Islands H = 01 03 26 Mag. 4.4 (CGS)
		eS	NE		08	25							
		eT	ZNE		18	02							
20	5	eP	Z	09	16	08	0.7	2.0				10.9	USCGS: 16.2S, 177.3E. h about 25 km. Fiji Islands region H = 09 13 20.0 Mag. 5.2 (CGS)
		eS	NE		17	55							
		eL	Z		18.4								

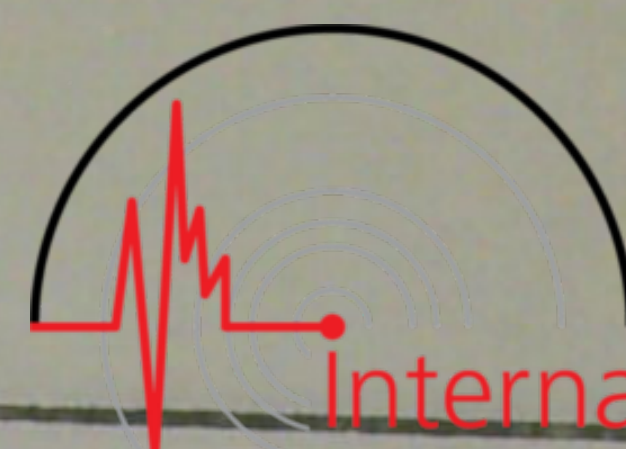




No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						 (Deg.)	Remarks
21	5	eL	Z	10	25.7							77.0	USCGS: 60.4N, 146.0W. h about 15 km. Alaskan aftershock H = 09 50 35.0 Mag. 5.2 (CGS)
22	5	eP eS	Z NE	14	34 35								
23	5	eP eS eT	Z NE ZNE	16	37 40								
24	5	eL	Z	22	40							75.0	USCGS: 58.1N, 152.1W. h about 15 km. Alaskan aftershock H = 22 06 53.0 Mag. 5.0 (CGS)
25	6	eP iS	Z NE	00	18 19								
26	6	iP eS eSSS eL	Z ZE E ZE	19	17 25 30 32.6	1.7	2.5					55.0	Dilatation USCGS: 26.6S, 114.4W. h about 33 km. Easter Island region H = 19 07 51.4 Mag. 5.8 (CGS)
27	6	iP iS	Z NE	21	18 05.4 29								
28	7	eP eS eT	Z NE ZNE	08	22 23 27								
29	7	iP iS	Z NE	10	09 10								
30	7	eP iS eL eT	Z NE ZNE ZNE	13	09 04 51 10.0 13							4.9	USCGS: 18.4S, 173.7W. h about 33 km. Tonga Islands H = 13 07 53.2 Mag. 4.5 (CGS)
31	7	eP eS eT	Z NE ZNE	16	49 50 54								
32	7	eS eL	ZN ZN	20 21	54.1 02.2							68.0	USCGS: 45.3N, 150.9E. h about 33 km. Kurile Islands H = 20 30 55.5 Mag. 5.0 (CGS)
33	8	eP iS	Z NE	02	29 31	0.7	1.9					11.1	USCGS: 22.1S, 179.5W. h about 54 km. Tonga Islands region H = 02 26 42.3 Mag. 4.7 (CGS)
34	8	iP eS	Z NE	16	49 50								

No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						△ (Deg.)	Remarks
35	8	eL	ZE	18	13.8								
36	8	iP	Z	23	02	18						52.0	Compression USCGS: 17.7N, 145.7E. h about 163 km. Mariana Islands H = 22 53 21.7 Mag. 5.4 (CGS)
37	9	iP	Z	00	29	50.9							Samoa Islands region
		iS	NE		30	10							
38	9	eP	Z	03	56	58	1.0	0.8					
		eS	NE		58	58							
39	9	iP	Z	05	59	43	2.9	1.8					Dilatation
		iS	NE	06	00	02							
40	9	iP	ZNE	08	01	24	3.5	1.9	1.6	1.8	1.1	1.9	Samoa Islands region
		iS	NE			40							
41	9	iP	Z	15	04	17.2	1.3	1.0				7.7	Dilatation USCGS: 19.2S, 177.6W. h about 556 km. Fiji Islands H = 15 02 21.6 Mag. 4.6 (CGS)
		iS	NE		05	48							
42	9	iP	Z	19	51	05.8	2.5	0.8					Samoa Islands region
		iS	NE			26							
43	10	iP	Z	07	42	31							Samoa Islands region
		iS	NE			48							
44	10	iP	Z	10	57	30.8							Dilatation
		iS	NE		59	04							
45	10	eP	Z	11	24	15							
		eS	NE			58							
		eT	ZNE		29	04							
46	10	iP	Z	19	18	23.3	2.0	2.2				20.0	Dilatation USCGS: 18.0S, 167.9E. h about 47 km. New Hebrides Islands Felt: Port Vila H = 19 13 52.0 Mag. 5.3 (CGS)
		eS	N		22.0								
		eL	ZE		23	46							
47	10	iP	Z	22	27	06	1.0	2.0				64.0	Dilatation USCGS: 5.0N, 127.4E. h about 146 km. Talaud Islands region Felt: Gen, Santos and Hinatuan, Philippines H = 22 16 44.8 Mag. 5.5 (CGS)
		ePcP	Z			28							
		eS	NE		35	30							
		eSS	E		38.4								
		eSSS	NE		42.5								
		eL	NE		45.0								

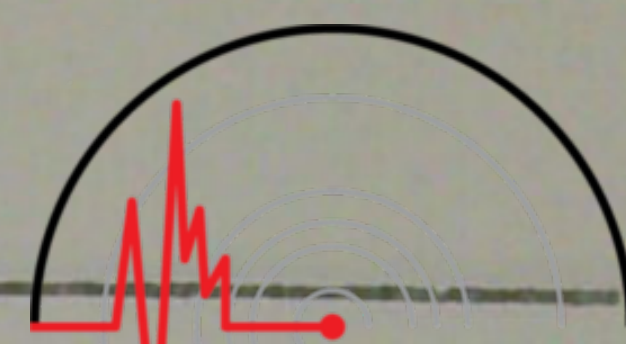
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks	
48	11	iS	NE	01	07	30							6.6	P lost during record . change USCGS: 19.5S, 175.4W. h about 272 km. Tonga Islands H = 01 05 20.2 Mag. 4.5 (CGS)	
49	11	iP	Z	14	14	55									
		iS	NE		15	44									
50	11	eP	Z	17	10	32							48.4	USCGS: 2.0S, 140.8E. h about 18 km. Near north coast of western New Guinea H = 17 01 48.5	
		eS	E		17	40									
		eSS	N		21.4										
		eL	E		24.2										
51	12	iP	Z	09	01	52									Samoa Islands region
		iS	NE		02	19									
52	12	eP	Z	10	17	38									
		eS	NE		19	32									
53	12	eP	Z	10	58	45	1.1						48.0	USCGS: 2.1S, 141.1E. h about 33 km. Near north coast of western New Guinea H = 10 50 09.1 Mag. 5.5 (CGS)	
		eS	E	11	05	56									
		eSS	E		09.6										
		eL	E		12.3										
		eL	E		16.6										
54	12	iP	Z	18	15	28							15.8	USCGS: 26.5S, 178.3E. h about 648 km. South of Fiji Islands H = 18 12 20.5 Mag. 5.3 (CGS)	
		i													
		iS	NE		18	05									
55	13	iP	Z	11	17	47	1.0 2.0						14.7	USCGS: 27.3S, 178.0W. h about 34 km. Kermadec Islands region H = 11 14 26.5 Mag. 4.8 (CGS)	
		eS	E		21	00									
		eL	E		21.7										
56	13	e(S)	E	15	59	28									
57	13	eP	Z	22	35	04							15.1	USCGS: 27.6S, 178.3W. h about 94 km. Kermadec Islands region H = 22 31 53.5 Mag. 5.2 (CGS)	
		eS	NE		37	32									
		iL	E		39	04									
58	13	eP	Z	23	48	27							7.0	USCGS: 19.3S, 176.5W. h about 285 km. Tonga Islands H = 23 46 44.5 Mag. 4.4 (CGS)	
		iS	NE		49	42									
59	14	iP	Z	01	23	17							14.7	USCGS: 27.5S, 177.5W. h about 33 km. Kermadec Islands region H = 01 19 57.7 Mag. 4.5 (CGS)	
		eS	NE		26	34									
		iL	E		27	12									



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						(Deg.)	Remarks
60	14	e(S) iL	NE E	05	20	00 58								
61	14	eP iS	Z NE	19	53 54	27 21.1								
62	15	eS eSS eL	NE NE NE	00	30 38 50.7	00 10						92.0		USCGS: 5.4N, 97.0E. h about 33 km. Northern Sumatra H = 00 05 31.1 Mag. 5.5 (CGS)
63	15	iP iS	Z NE	02	06 07	46 32						4.7		USCGS: 17.4S, 174.9W. h about 148 km. Tonga Islands region H = 02 05 37.1 Mag. 4.5 (CGS)
64	15	eP iS	Z NE	06	13 14	31 05								
65	16	iP iPcP i iPP iS iSS iSSS	Z ZN E NE NE NE NE	04	12 13 15 22 26 29	48.2 04 09 46 00 08 50						70.0		Dilatation USCGS: 38.3N, 139.1E. h about 57 km. Near west coast of Honshu, Japan 25 killed, many injured, and extensive property damage at Niigata 7 foot tsunami along coastal areas H = 04 01 44.3 Mag. $7\frac{1}{4}$ - $7\frac{1}{2}$ (Pas), $7\frac{1}{4}$ (PAL), 6.1 (CGS)
		Surface waves about 3 hr.												
66	16	iP iS	Z NE	08	01 02	50 24								
67	16	eP eS	Z NE	08	36 37	16 49						9.0		USCGS: 22.0S, 175.8W. h about 33 km. Tonga Islands H = 08 34 08.7 Mag. 4.6 (CGS)
68	16	iP eS	Z NE	09 10	58 00	38 11						6.7		USCGS: 17.3S, 178.7W. h about 502 km. Fiji Islands H = 09 56 46.1 Mag. 4.3 (CGS)
69	16	eL	NE	11	39.3							48.0		USCGS: 2.0S, 141.1E. h about 13 km. Near north coast of New Guinea H = 11 16 03.1 Mag. 5.9 (CGS)
70	16	eP iS	Z NE	11	49	01 20								Samoa Islands region
71	16	iP eS	Z NE	18	40 42	07 32	0.8	1.5						Dilatation



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
72	16	iP iS	ZNE NE	22	03	39 58						1.7	Dilatation USCGS: 15.3S, 172.8W. h about 33 km. Samoa Islands region H = 22 03 14 Mag. 4.7 (CGS)
73	17	eP iS	Z NE	13	26	11 45							
74	17	iP eS	ZN NE	22	20 22	19 24	2.5	1.5	1.4	2.0		12.6	USCGS: 23.8S, 179.7W. h about 504 km. Fiji Islands region H = 22 17 37.9 Mag. 4.8 (CGS)
75	18	eL eL	N E	18	37.5 38.6							68.0	USCGS: 47.5N, 154.9E. h about 33 km. Kurile Islands H = 18 01 47.6 Mag. 5(PAL), 5.3(CGS)
76	18	eP iS	Z NE	21	24 25	27 21							
77	19	iP eS	Z NE	00	09 10	11 58	0.6	1.4					
78	19	eP iS	Z NE	04	50	14 48							
79	19	iP iS	Z NE	11	17 18	18 08							
80	20	iP iS	ZE NE	04	48	34.2 55							Samoa Islands region
81	20	eP iS eT	Z NE ZNE	10	00 01 07	40 44 13						6.5	USCGS: 19.9S, 174.1W. h about 33 km. Tonga Islands region H = 09 59 08.9 Mag. 4.7 (CGS)
82	20	iP eS	Z NE	12	34 36	10 04	0.5	1.9				10.2	Compression USCGS: 21.2S, 179.2W. h about 600 km. Fiji Islands region H = 12 31 49.7 Mag. 4.4 (CGS)
83	21	iP iS	Z NE	19	04	07 25							Samoa Islands region
84	21	eP eS	ZE NE	22	23 25	49 40				0.7	2.0	10.2	USCGS: 16.3S, 178.0E. h about 18 km. Fiji Islands H = 22 21 22.7 Mag. 5.0 (CGS)
85	21	eP eS	ZNE NE	22 23	59 00	15.7 46				0.9	1.9	13.9	USCGS: 20.8S, 175.6E. h about 33 km. Fiji Islands region H = 22 56 00 Mag. 4.7 (CGS)



No	Date	Phase		Time (G.M.T.)			Δ						(Deg.)	Remarks
							Az	Tz	An	Tn	Ae	Te		
86	22	iP	Z	00	16	56.3	1.5	0.8					2.3	USCGS: 15.7S, 172.8W. h about 33 km. Samoa Islands H = 00 16 27.4 Mag. 5.1 (CGS)
		iS	NE		17	22								
		Coda about 30 min.												
87	22	iP	Z	03	09	12	0.9	2.0					26.7	USCGS: 10.4S, 161.1E. h about 70 km. Solomon Islands H = 03 03 37.9 Mag. 5.4 (CGS)
		eS	NE		13	44								
		eL	NE		14.0									
88	22	eiP	ZNE	07	44	43	5.7	1.5	2.0	1.8	1.8	1.8	10.5	USCGS: 24.3S, 176.8W. h about 75 km. Fiji Islands region H = 07 42 02.5 Mag. 5.7 (CGS)
		eS	NE		46	31								
89	22	eiP	Z	13	42	53							11.6	USCGS: 25.1S, 177.4W. h about 121 km. Fiji Islands H = 13 40 02.8 Mag. 5.1 (CGS)
		eS	NE		44	56								
90	23	iP	ZNE	01	37	34.1	1.5	2.1	1.2	2.0	1.2	2.0	67.0	Dilatation USCGS: 43.3N, 146.1E. h about 77 km. Kurile Islands H = 01 26 37.0 Mag. 7(PAS), 6 $\frac{3}{4}$ -7(BRK) 6 $\frac{3}{4}$ (PAL), 6.2(CGS)
		eS	NE		46	32								
		eSS	E		51	22								
		eSSS	NE		54	24								
		iL	NE		57	16								
91	23	e(P)	Z	02	52	06								
		i	NE			51								
92	23	eP	Z	09	20	05							5.0	USCGS: 18.4S, 173.6W. h about 33 km. Tonga Islands H = 09 18 56.2 Mag. 4.5 (CGS)
		eS	NE		21	00								
		eT	ZNE		24	50								
93	23	eP	Z	09	31	37								
		eS	NE		32	00								
		eT	ZNE		34	00								
94	23	iP	Z	17	03	01	2.0	1.9					6.4	Compression USCGS: 18.9S, 175.8W. h about 204 km. Tonga Islands region H = 17 01 28.9 Mag. 4.3 (CGS)
		eS	NE		04	08								
95	23	iP	Z	19	53	41.2								Compression
		eS	NE		54	18								
96	24	eP	Z	00	02	32								Samoa Islands region
		eS	NE			48								
97	24	iP	Z	11	01	05.2								Samoa Islands region
		eS	NE			25								
98	24	iP	Z	11	18	50.5	1.3	2.0						

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
99	25	eP eS	Z NE	11 04 06	24 08									
100	25	iP	Z	14	19	38	0.9	1.2						Compression
101	26	eP eS	Z NE	02 51 52	44 26									
102	26	eP iS	Z NE	07 38 39	39 11									
103	26	eP eL	Z E	13 14 46.8	07		1.0	1.9				18.4		USCGS: 12.6S, 169.4E. h about 648 km. New Hebrides Islands region H = 13 10 28.9 Mag. 4.9 (CGS)
104	27	iP eS	Z NE	11 30	03.7 23									Samoa Islands region
105	27	iP iS	Z NE	11 46 48	31 18		0.9	1.9				9.4		Dilatation USCGS: 20.2S, 178.9W. h about 603 km. Tonga Islands region H = 11 44 21.4 Mag. 4.5 (CGS)
106	28	eP eS eSS eL eL Coda about	Z NE NE NE E	12 59 13 05 08 10 11	15 20 20 08 30							40.0		USCGS: 1.7S, 149.6E. h about 7 km. New Ireland region Felt H = 12 51 34.6 Mag. 5 ³ / ₄ -6(BRK), 6.4(CGS)
107	28	iP eS	Z NE	14 46	19 44		3.5	0.9						Samoa Islands region
108	28	iP	Z	14	56	32.4	2.5	1.9				20.5		Dilatation USCGS: 13.2S, 167.1E. h about 215 km. New Hebrides Islands H = 14 52 08.4 Mag. 5.4 (CGS)
109	28	eSS eL	E E	18 09.3 33.8								139.0		USCGS: 4.0N, 32.4W. h about 33 km. North Atlantic Ocean H = 17 27 59.8 Mag. 5 ¹ / ₄ -5 ¹ / ₂ (PAL), 5.3(CGS)
110	28	eL	N	19	43.8							75.0		USCGS: 58.3N, 150.2W. h about 23 km. Alaskan aftershock H = 19 09 05.4 Mag. 5.5 (CGS)
111	29	eP eS eT	Z NE ZNE	07 13 16	04 49 40							4.1		USCGS: 17.5S, 173.5W. h about 33 km. Tonga Islands H = 07 12 06 Mag. 4.1 (CGS)



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
112	29	eL	N	07	58.0							77.0	USCGS: 62.7N, 152.0W. h about 33 km. Southern Alaska Felt: College, Alaska H = 07 21 32.8 Mag. 5.6 (CGS)
113	29	eP eS	Z NE	10	35 36	27 04							
114	29	iP iS	Z NE	12	38	05.3 25							Samoa Islands region
115	30	eP eS	ZNE NE	05	31 34	10 03						17.2	USCGS: 29.8S, 178.7W. h about 214 km. Kermadec Islands H = 05 27 28.7 Mag. 4.5 (CGS)
116	30	eP i eS eT	Z N NE ZNE	10	16 17 22	14 24 22 38						6.4	USCGS: 19.8S, 173.9W. h about 33 km. Tonga Islands H = 10 14 45.8 Mag. 4.8 (CGS)
117	30	iP eS	Z NE	10	28 29	02.5 37							
118	30	eP eS eSS eSSS eL	Z NE NE N E	13 14	57 06 09.2 13.6 18.6	09 00	3.9 2.5					67.0	USCGS: 0.8S, 122.5E. h about 36 km. Northern Celebes H = 13 46 21.6 Mag. 6.3 (CGS)
119	30	eS eL	E NE	16	07.7 19.2							66.0	USCGS: 44.7N, 150.4E. h about 33 km. Kurile Islands H = 15 47 41.1 Mag. 5.1 (CGS)
120	30	eP	Z	17	55	35						14.0	USCGS: 14.3S, 173.6E. h about 607 km. New Hebrides Islands region H = 17 52 35.6 Mag. 4.3 (CGS)
121	30	eP	Z	22	17	10	0.5 1.8					25.4	USCGS: 11.1S, 162.4E. h about 9 km. Solomon Islands H = 22 11 38.5 Mag. 4.9 (CGS)

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.
- (iii) Missing records : All LP components Jun. 1st and 3rd
LPZ from Jun. 11th to 30th incl.

John Milne
OBSERVER-IN-CHARGE

July 64

NEW ZEALAND

Department of Scientific and Industrial Research

Geophysics Division

APIA OBSERVATORY

FINAL SEISMOLOGICAL BULLETIN

STANDARD SEISMIC STATION (AFI)

AFIAMALU, WESTERN SAMOA.

Latitude: $13^{\circ} 54' 33.6''$ S Longitude: $171^{\circ} 46' 38.1''$ W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

Sprengnether long period seismometers

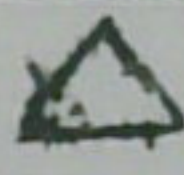
To = 30 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

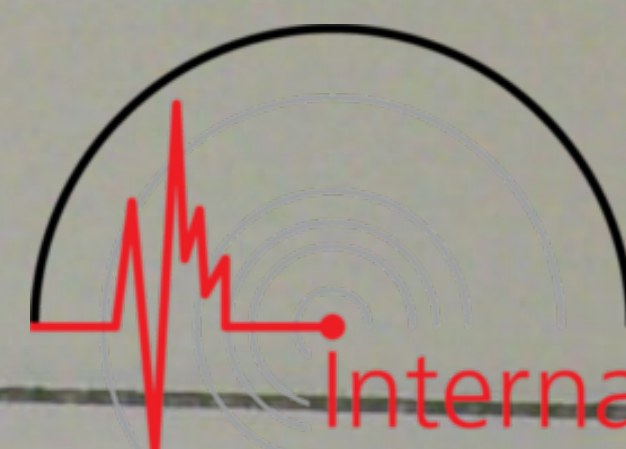
JULY 1964 *



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
1	1	iP iS	Z ZNE	09 01	02.2 22.3		1.9 1.0							Samoa Islands region
2	1	eL	N	10	18.3								67.0	USCGS: 45.2N, 150.3E. h about 75 km. Kurile Islands H = 09 46 49.6 Mag. 5-5 $\frac{1}{4}$ (PAL), 4.8(CGS)
3	1	eP iS	Z NE	21	18 40									Samoa Islands region
4	2	eP eS	Z NE	22	11 12	22 33							7.4	USCGS: 20.2S, 175.6W. h about 157 km. Tonga Islands H = 22 09 37.3 Mag. 4.5 (CGS)
5	3	eP iS	Z NE	06	45 58									
6	3	iP iS	Z NE	07	36 37	43.8 15								
7	3	eP iS	Z NE	09	26 27									Samoa Islands region

* See note at end

No	Date	Phase		Time (G.M.T.)		Az	Tz	An	Tn	Ae	Te	Δ (Deg.)	Remarks
8	4	eS	ZNE	11	05.6							51.0	USCGS: 11.7N, 144.5E. h about 33 km. Mariana Islands H = 10 49 28.8 Mag. 6.0 (CGS)
		eSS	ZNE		09.4								
9	5	iP	Z	03	34								Samoa Islands region
		iS	NE		22.3								
					40.2								
10	5	eL	Z	03	51.2							77.0	USCGS: 60.8N, 144.9W. h about 30 km. Alaskan aftershock H = 03 14 33.3 Mag. 5(PAL), 4.9(CGS)
11	5	eP	Z	06	27							6.3	USCGS: 19.9S, 173.3W. h about 452 km. Tonga Islands H = 06 26 09.0 Mag. 3.9 (CGS)
		iS	NE		28								
		eT	ZNE		31								
					46								
					41								
					18								
12	5	eS	ZNE	19	28							72.0	USCGS: 26.2N, 110.2W. h about 29 km. Gulf of California H = 19 07 57.8 Mag. 5 $\frac{3}{4}$ -6(BRK), 6-6 $\frac{1}{4}$ (PAL), 6.0(CGS)
		eSS	ZNE		32.8								
		eSSS	NE		37.0								
		eL	ZNE		40.2								
13	5	iP	ZNE	20	47	13.5	1.2						Dilatation
		iS	NE		48								
					21								
14	5	eS	ZNE	23	56							67.0	USCGS: 44.8N, 149.6E. h about 54 km. Kurile Islands H = 23 36 01.5 Mag. 6 $\frac{1}{4}$ (PAS), 6-6 $\frac{1}{4}$ (PAL), 5.5(CGS)
		eSSS	ZNE	00	03.1								
		eL	ZNE		06.4								
15	6	eP	Z	02	25							72.0	USCGS: 26.2N, 110.4W. h about 33 km. Gulf of California H = 02 14 36.0 Mag. 6-6 $\frac{1}{4}$ (BRK), 6-6 $\frac{1}{4}$ (PAL), 5.4(CGS)
		eS	ZNE		35								
		e	Z		39.2								
		eSS	NE		41.0								
		eL	Z		47.0								
16	6	eP	Z	07	33							76.0	USCGS: 18.3N, 100.4W. h about 100 km. Guerrero, Mexico More than 30 killed, many injured and considerable property damage at Guerrero H = 07 22 11.7 Mag. 6 $\frac{3}{4}$ -7(PAS), 6 $\frac{3}{4}$ -7(BRK), 7 $\frac{1}{4}$ -7 $\frac{1}{2}$ (PAL), 6.3(CGS)
		iPcP	Z		34								
		ePP	ZE		37								
		iS	ZNE		43								
		eSS	ZNE		48								
		eSSS	ZNE		52								
		eLq	ZNE		54								
		eLr	ZNE		57								
		Surface waves about 2 hr.											
17	6	iP	Z	09	48							5.0	Compression USCGS: 18.0S, 174.7W. h about 80 km. Tonga Islands H = 09 47 26.0 Mag. 4.4 (CGS)
		iS	NE		49								
					30								
18	6	iP	Z	14	29	2.0	2.0					58.0	Dilatation USCGS: 6.9S, 129.6E. h about 100 km. Banda Sea H = 14 19 46.3 Mag. 5.8 (CGS)



No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						△ (Deg.)	Remarks
31	8	eS	NE	08	04.5							61.0	USCGS: 3.2N, 128.4E. h about 50 km. Molucca Passage H = 07 45 48.6 Mag. 5.5 (CGS)
		eSS	N		08.2								
		eSSS	N		11.6								
		eL	ZNE		15.0								
32	8	eP	Z	10	07	48							
		iS	NE		08	25							
33	8	eS	ZNE	12	01.1							33.6	USCGS: 6.4S, 154.8E. h about 73 km. New Britain region Felt H = 11 49 23.7 Mag. 5.1 (CGS)
		eSS	ZNE		03.2								
34	8	iP	ZE	12	05	18	4.0	2.0				58.0	Compression USCGS: 5.5S, 129.8E. h about 165 km. Banda Sea H = 11 55 39 Mag. 6.5 (CGS)
		iS	ZNE		13	06							
		e	N		14	12							
		iSS	N		16	16							
		eL	ZNE		19.2								
35	8	iP	Z	13	24	16.5							Samoa Islands region
		iS	NE			42							
36	8	iP	Z	15	26	03						7.6	USCGS: 18.0S, 178.5W. h about 558 km. Fiji Islands region H = 15 24 08.3 Mag. 4.0 (CGS)
		eS	NE		27	30							
37	9	eP	Z	03	00	34							Samoa Islands region
		iS	NE			59							
38	9	eL	ZNE	06	21.8							74.0	USCGS: 15.4N, 119.8E. h about 53 km. Near west coast of Luzon, Philippine Islands Felt: Manila H = 05 47 09.2 Mag. 5.5 (CGS)
39	9	iP	Z	08	45	20.2							Samoa Islands region
		iS	NE			41							
40	9	iP	Z	11	24	21.3	1.4	1.8				10.2	Compression Felt: Tongan Islands USCGS: 23.3S, 175.7W. h about 43 km. Tonga Islands H = 11 22 05.4 Mag. 5 ¹ / ₂ -5 ³ / ₄ (BRK), 5.7(CGS)
		i	ZNE			29							
		eS	ZNE		26	00							
		eT	ZNE		33	18							
		Coda about 1 ¹ / ₂ hr.											
41	9	eP	Z	12	12	59						66.0	USCGS: 34.2N, 140.9E. h about 49 km. Off east coast of Honshu, Japan Felt H = 12 02 11.9 Mag. 5.0 (CGS)

No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
42	9	iP ZNE iS ZNE Surface waves about 4 hr.	16	44	16							20.0	Compression USCGS: 15.5S, 167.6E. h about 121 km. New Hebrides Islands H = 16 39 49.3 Mag. $7\frac{1}{2}$ (Pas), $7\frac{1}{2}$ - $7\frac{3}{4}$ (Brk), 6.6(CGS)
43	9	iP Z iS NE	17	45	36								Samoa Islands region
44	9	eP Z	21	52	26							47.6	USCGS: 1.8S, 141.6E. h about 33 km. Off coast of North- East New Guinea H = 21 43 46.3
45	9	eS NE	23	30	28								
46	10	eP Z iS NE	02	42	40								
47	10	eP Z eS NE	04	46	20								Samoa Islands region
48	10	eP Z eS NE eT ZNE	13	08	18								
49	10	eP Z eS NE eT ZNE	21	18	03							6.7	USCGS: 20.1S, 174.2W. h about 33 km. Tonga Islands H = 21 16 26 Mag. 4.6 (CGS)
50	10	eP Z e(S) NE	23	43	20								
51	11	eP Z eL N	01	43	47							40.0	USCGS: 7.3S, 148.0E. h about 58 km. Near coast of North- East New Guinea H = 01 36 16.3 Mag. 5.1 (CGS)
52	11	iP Z iS NE	05	56	27	2.3	1.2					11.4	Dilatation USCGS: 23.8S, 177.4W. h about 215 km. Tonga Islands region H = 05 53 53.4 Mag. 4.2 (CGS)
53	11	iP Z iS NE	07	48	54.8								Samoa Islands region
54	11	eL ZN	10	19.0								76.0	USCGS: 59.7N, 146.1W. h about 33 km. Alaskan aftershock H = 09 44 18.7 Mag. 5(Pal), 5.3(CGS)
55	11	iP Z iS NE	10	55	52.2								Samoa Islands region



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
56	11	eP iS	Z NE	14 22 23	15 05.3									
57	11	eP eS eT	Z NE ZNE	17 08 11	24 58 28							3.3	USCGS: 16.9S, 172.8W. h about 33 km. Tonga Islands region H = 17 07 38.9 Mag. 4.7 (CGS)	
58	11	iP iS	Z NE	18 40	14.2 32								Samoa Islands region	
59	11	eS eSS eL	ZNE ZNE ZNE	20 48 52 59	40 14 52							76.0	USCGS: 59.7N, 146.2W. h about 40 km. Alaskan aftershock H = 20 25 40.3 Mag. 5-5 $\frac{1}{4}$ (BRK), 5 $\frac{1}{2}$ -5 $\frac{3}{4}$ (PAL), 5.6(CGS)	
60	11	iP iS	Z NE	23 48 49	55 15								Samoa Islands region	
61	12	iP eS eSS eSSS eL	Z ZNE ZN ZN ZN	01 56 02 05 10 13 16.6	36 56 20 44	1.2 2.7						70.0	Dilatation USCGS: 38.6N, 139.2E. h about 13 km. Near west coast of Honshu, Japan H = 01 45 25.6 Mag. 5 $\frac{1}{4}$ -5 $\frac{1}{2}$ (PAL), 6.0(CGS)	
62	12	eP eS	Z NE	06 18	18 49									
63	12	iP eS	Z NE	09 51 52	50 10								Samoa Islands region	
64	13	eP eS	Z NE	01 16 18	47 32	1.2 2.0						9.6	USCGS: 20.7S, 178.7W. h about 575 km. Fiji Islands H = 01 14 33.5 Mag. 4.9 (CGS)	
65	13	iP eS	Z NE	10 06 09	42 04	0.9 1.5						13.5	Compression USCGS: 25.0S, 179.9W. h about 424 km. Fiji Islands H = 10 03 45.3 Mag. 4.5 (CGS)	
66	13	eS	ZNE	10	16.5							19.8	USCGS: 15.9S, 167.9E. h about 33 km. New Hebrides Islands H = 10 08 07.2	
67	13	iP	ZNE	14	57	41.1	0.9 1.9 0.9 2.0 1.3 2.0					19.0	Dilatation USCGS: 20.9S, 169.9E. h about 89 km. New Hebrides Islands (Loyalty Islands?) H = 14 53 27.0 Mag. 5.1 (CGS)	

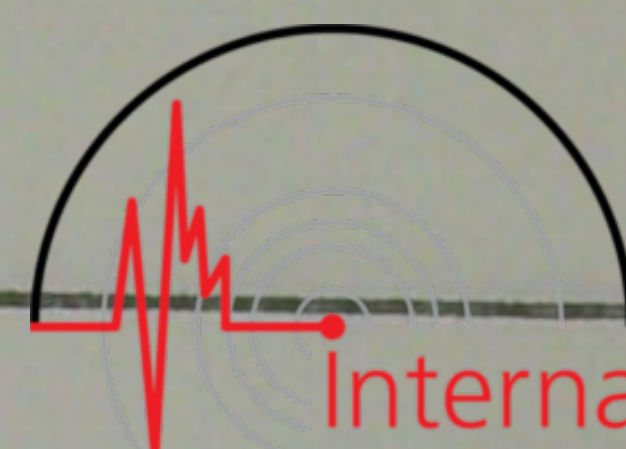
International
Seismological
Centre



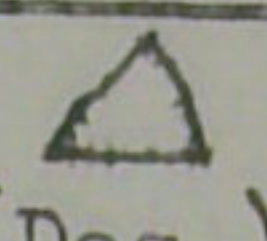
No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						(Deg.)	Remarks
80	17	eL eL	N ZN	23	22.6 25.3							67.0	USCGS: 44.6N, 149.2E. h about 33 km. Kurile Islands H = 22 54 42.2 Mag. 5(PAL), 5.4(CGS)
81	18	eP iS	Z NE	00	11 20 40								Samoa Islands region
82	18	ePKP	Z	04	00 38	1.0	2.0					152.0	USCGS: 36.3N, 26.1E. h about 115 km. Dodecanese Islands H = 03 40 21.5 Mag. 4.9 (CGS)
83	18	iP iS	Z NE	04	50 51 19								Samoa Islands region
84	18	iP	Z	17	33 11	2.0	1.9						Compression
85	18	iP eS	Z NE	19	20 14.6 34								Samoa Islands region
86	18	iP eS	Z NE	21	03 05 40 14	2.0	2.0						Dilatation
87	18	iP iS	ZNE NE	23	03 04 42 24								Dilatation
88	19	iP iS	Z NE	02	27 28 44 01								Samoa Islands region
89	19	iP	Z	06	54 45.3	2.0	2.0					20.6	Compression USCGS: 13.8S, 167.0E. h about 232 km. New Hebrides Islands H = 06 50 22.3 Mag. 4.6 (CGS)
90	19	iP eS	Z NE	07	34 35 29.5 02								
91	19	iP iS	ZNE ZNE	13	40 36.4 57							2.0	Compression from south-west USCGS: 15.1S, 173.4W. h about 33 km. Tonga Islands H = 13 40 06.6 Mag. 4.7 (CGS)
92	19	iP iS	Z NE	14	02 24.8 43	3.5	0.8						Samoa Islands region
93	19	iP iS	Z NE	16	46 12.5 50	2.5	1.0						
94	20	eP eS eL	Z NE ZNE	10	27 31 43 52 34.0	1.0	1.7					22.5	USCGS: 35.2S, 179.8W. h about 108 km. Northeast of North Island, New Zealand H = 10 22 53 Mag. 4.8 (CGS)



No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						△ (Deg.)	Remarks
95	20	eS	N	19	10.6							70.0	USCGS: 19.8N, 109.0W. h about 33 km. Revilla Ggedo Islands region H = 18 49 43.5 Mag. $4\frac{1}{2}$ - $4\frac{3}{4}$ (BRK), 5(PAL), 5.1(CGS)
		eSSS	N		18.2								
		eL	ZE		21.1								
96	20	eP	Z	22	47	46	0.8	2.1				23.0	USCGS: 35.5S, 179.7E. h about 223 km. Off north coast of North Island, New Zealand H = 22 43 15 Mag 4.9 (CGS)
		eS	ZNE		51	58							
		eSS	ZN		53.5								
		eL	ZN	23	03.5								
		eL	E		04.5								
97	20	iP	Z	23	26	24							Samoa Islands region
		iS	NE			48							
98	21	eS	NE	01	30	18						70.0	USCGS: 19.8N, 108.8W. h about 31 km. Off coast of Jalisco, Mexico H = 01 09 25.8 Mag. $4\frac{3}{4}$ -5(BRK) 4.9(CGS)
		eSS	N		37.0								
		eL	ZNE		39.7								
99	21	eP	Z	02	51	43						19.0	USCGS: 31.3S, 180.0 h about 433 km. Kermadec Islands H = 02 47 48.6 Mag. 4.0 (CGS)
		eS	ZNE		55	04							
100	21	iP	Z	03	51	50						13.5	USCGS: 26.0S, 178.0W. h about 222 km. Fiji Islands region H = 03 48 59.1 Mag. $6\frac{1}{2}$ (Pas), $5\frac{1}{4}$ - $5\frac{1}{2}$ (BRK), 5.8(CGS)
		i	ZNE			52							
		iS	NE		54	07							
		eT	ZNE	04	02	08							
101	21	iP	Z	09	21	01							Samoa Islands region
		iS	NE			16							
102	21	eS	E	13	34.2							71.0	USCGS: 11.5N, 121.9E. h about 34 km. Panay, Philippine Islands Felt H = 13 13 00.2
		eSS	E		37.4								
		eSSS	N		41.5								
		eL	Z		45.4								
103	21	eL	ZNE	21	17.1							35.6	USCGS: 4.6S, 153.3E. h about 60 km. New Britain region Felt: Rabaul H = 21 01 49.5 Mag. 4.9 (CGS)
104	22	eL	ZNE	07	47.4							20.0	USCGS: 16.3S, 167.7E. h about 6 km. New Hebrides Islands H = 07 37 52.4



No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
117	24	iP Z	13 54 23.4	1.5	2.0					33.6	USCGS: 6.6S, 154.8E. h about 62 km. Solomon Islands H = 13 47 48.6 Mag. 5.6 (CGS)
118	24	iP Z e NE e(L) Z	16 39 33.6 40 42 17 05.8	2.5	2.0						Compression
119	24	eS ZNE eSS ZNE eSSS ZNE eL ZNE Surface waves about 1 hr.	17 22 48 26 00 30 00 33.2							68.0	USCGS: 47.1N, 153.6E. h about 33 km. Kurile Islands H = 17 02 49.2 Mag. 6 $\frac{1}{2}$ (Pas), 6(BRK), 5.8(CGS)
120	24	eP Z eS NE	21 01 55 03 47								
121	25	iP Z eS NE	03 54 43.7 57 21	1.8	1.9						Dilatation
122	25	eP Z eS NE	04 46 22.6 49 03								
123	25	eP Z iS ZNE	05 24 05 23								Samoa Islands region
124	25	iP Z eS NE	07 08 08 27								Samoa Islands region
125	25	iP Z eS NE	10 12 36.3 13 24								
126	25	iP Z iS NE	11 58 15 29								Samoa Islands region
127	25	eiP ZNE iS NE	12 22 07 23 20							7.4	USCGS: 19.9S, 176.2W. h about 205 km. Tonga Islands H = 12 20 22.2 Mag. 5.3 (CGS)
128	25	eP Z iS NE eT ZNE	14 49 01 41 52 30								
129	25	eP Z iS NE eT ZNE	18 18 57 19 38 22 37							3.5	USCGS: 17.1S, 172.9W. h about 33 km. Tonga Islands region H = 18 18 09 Mag. 4.6 (CGS)
130	25	ePcP Z ePPP Z eS ZNE eS ZNE eSS ZNE eL ZN eL ZNE	19 44 18 48.3 54 50 56 44 20 01 44 08.2 13 46							92.0	USCGS: 27.9S, 70.9W. h about 26 km. Northern Chile Felt: Copiapo and Valenar H = 19 31 07.0 Mag. 6 $\frac{1}{2}$ (PAS), 6(BRK), 6.1(CGS)

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
131	26	eP eS	Z NE	06 31 33	14 17	1.0 2.0						12.4	USCGS: 23.4S, 180.0 h about 555 km. Fiji Islands region H = 06 28 32.7 Mag. 4.9 (CGS)	
132	26	eP iS	Z NE	08 13	31 51									Samoa Islands region
133	26	iP iS	Z ZNE	08 29	27.4 45									Samoa Islands region
134	26	e eL	Z ZN	08 49.4 50.8										
135	27	eP eS eT	Z ZNE ZNE	00 41 44	13 44 25							3.4	USCGS: 17.0S, 172.7W. h about 33 km. Samoa Islands region H = 00 40 26.2 Mag. 4.7 (CGS)	
136	27	eP eS eT	Z ZNE ZNE	02 28 29 32	46 17 04	0.7 1.0						3.3	USCGS: 16.4S, 173.8W. h about 33 km. Tonga Islands H = 02 28 00 Mag. 4.5 (CGS)	
137	27	iP iS	Z NE	21 02 03	26.7 37	1.2 0.9						7.4	Dilatation USCGS: 20.1S, 175.7W. h about 163 km. Tonga Islands H = 21 00 43.5 Mag. 3.9 (CGS)	
138	27	eS eL	Z Z	23 20.6 31.1								67.0	USCGS: 46.8N, 153.8E. h about 33 km. Kurile Islands H = 23 00 36.3 Mag. 5.3 (CGS)	
139	28	eP eS eT	Z NE ZNE	08 43 46	12 51 47									
140	28	eP eS eT	Z NE ZNE	10 24 25 28	48 19 02									
141	28	eP iS	ZN NE	10 46	31 55							2.5	USCGS: 16.0S, 172.9W. h about 33 km. Samoa Islands region H = 10 46 00.6 Mag. 4.6 (CGS)	
142	28	eP ePP eS eSS eSSS eL	Z Z ZNE ZNE ZNE ZNE	18 49 51 57 19 00 02 05.5	28 34 10 20 40							54.0	USCGS: 51.2S, 139.0E. h about 33 km. About 1000 km southwest of Tasmania H = 18 40 04.3 Mag. 5.3 (CGS)	
														Surface waves about 30 min.

No	Date	Phase	Time (G.M.T.)							Δ (Deg.)	Remarks	
				Az	Tz	An	Tn	Ae	Te			
143	28	iP e eS eT	Z ZNE ZNE ZNE	21 07 37 08 02 09 56								
144	28	eS eSS eSSS eL	Z ZN ZN ZN	22 03.4 09.2 13.4 19.0							95.0	USCGS: 14.3N, 96.2E. h about 33 km. Andaman Islands region H = 21 38 43.5 Mag. 5.5 (CGS)
145	29	eP iS	Z NE	18 17 13 31.4								Samoa Islands region
146	29	e(L)	Z	22 08.3								
147	30	iP iS	Z NE	00 39 25.4 45								Samoa Islands region
148	30	iP eS	ZNE NE	01 24 25 04.3 37	6.7	2.0	1.2	2.0	1.5	2.0	7.3	Compression USCGS: 17.7S, 178.2W. h about 643 km. Fiji Islands region H = 01 22 10.1 Mag. 4.3 (CGS)
149	30	eiP iS eT	Z ZNE ZNE	04 03 05 32 05 23								Samoa Islands region
150	30	eS eL eL	ZE N ZNE	05 39 30 52.3 56.3							90.0	USCGS: 11.1N, 86.2W. h about 42 km. Near west coast of Costa Rica Felt: Balboa Heights, Canal zone H = 05 16 03.3 Mag. $5\frac{3}{4}$ -6(PAL), 5.7(CGS)
151	30	iP iS	Z NE	08 38 48 39 13								Samoa Islands region
152	30	iP eS	Z ZNE	14 21 17.2 32								Samoa Islands region
153	30	iP iS	Z ZNE	15 44 04 19								Samoa Islands region
154	31	eP ePP eS eSS eL	ZNE ZNE ZNE ZNE ZNE	05 59 40 06 01 25 05 24 08 20 10 24	2.0	1.9					39.0	USCGS: 6.1S, 149.4E. h about 63 km. New Britain H = 05 52 18.8 Mag. 5.9 (CGS)
Surface waves about 30 min.												
155	31	iP iS	Z NE	06 29 31 31 50	1.0	0.8					14.1	Compression USCGS: 25.7S, 179.6W. h about 429 km. South of Fiji Islands Mag. 5.1 (CGS)

14.

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
156	31	iP	Z	06	34	29								Samoa Islands region
		iS	NE			48								
		eT	ZNE		36	20								

NOTE:

NOTE:

(i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.

(ii) * Readings to be incorporated in the New Zealand Seismological Report for 1964.

John Milne
OBSERVER-IN-CHARGE

NEW ZEALAND
Department of Scientific and Industrial Research
Geophysics Division
APIA OBSERVATORY



FINAL SEISMOLOGICAL BULLETIN
STANDARD SEISMIC STATION (AFI)
AFIAMALU, WESTERN SAMOA.

Latitude: $13^{\circ} 54' 33.7''$ S Longitude: $171^{\circ} 46' 37.9''$ W

Height above mean sea level: 705.6 metres, 2315 ft.

Geocentric direction cosines: a. - 0.961 070

b. - 0.138 883

c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

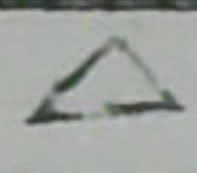
Sprengnether long period seismometers

To = 30 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

AUGUST 1964 *

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
1	1	eP	Z	02	29	33							9.8	USCGS: 20.0S, 179.8W. h about 553 km. South of Fiji Islands. H = 02 27 13.6 Mag. 4.4 (CGS)
		iS	NE		31	17								
2	1	eP	Z	03	26	15								
3	1	iP	Z	05	41	39								Samoa Islands region
		iS	NE			55								
4	1	iP	Z	06	07	31	1.0	1.9						
5	1	iP	Z	12	36	38								Samoa Islands region
		iS	NE			58								
6	1	eP	Z	16	49	28								
		eS	NE		50	07								
		eT	ZNE		53	11								
7	2	eP	Z	06	39	10								
		iS	ZNE			59								
8	2	eS	ZN	08	57.4								73.0	USCGS: 56.2N, 149.9W. h about 31 km. Alaskan aftershock H = 08 36 16.9 Mag. 6(PAS), 4 $\frac{3}{4}$ -5(BRK), 5 $\frac{1}{4}$ (PAL), 5.4(CGS)
		eL	E	09	06.1									
		eL	ZN		08.5									
9	2	iP	Z	12	21	26								Samoa Islands region
		iS	NE			51								

* See note at end



No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	(Deg.)	Remarks
10	3	iP	ZNE	01	49	07.2	6.5	1.1	3.5	1.5	1.5	1.7		Compression
		iS	NE			30								
11	3	eL	ZE	02	40.0								104.0	USCGS: 19.8N, 70.7W. h about 7 km. Dominican Republic region H = 01 48 23.3 Mag. 5(PAL), 5.2(CGS)
12	3	iP	Z	04	19	17.8	1.5	1.4						
		iS	NE			56								
13	3	eS	ZE	08	06.7								75.0	USCGS: 22.6N, 121.3E. h about 33 km. Near south coast of Taiwan H = 07 44 44.3 Mag. 5.4 (CGS)
14	3	eP	ZNE	10	17	15								
15	4	iP	ZNE	12	39	07.3							3.5	Dilatation USCGS: 15.9S, 174.5W. h about 134 km. Tonga Islands H = 12 38 15.3 Mag. 4.2 (CGS)
		iS	ZNE			42								
16	4	eP	Z	16	29	44								Samoa Islands
		iS	NE		30	05								
17	4	iP	Z	17	35	24	1.0	2.5					68.0	Compression USCGS: 46.5N, 151.1E. h about 101 km. Kurile Islands, H = 17 24 29.2 Mag. 5 ¹ / ₂ -5 ³ / ₄ (BRK), 5.9(CGS)
		eS	NE		44	24								
		eL	ZNE		55.2									
18	5	eP	Z	01	49	07	0.7	2.0					6.0	USCGS: 17.8S, 176.4W. h about 16 km. Fiji Islands region H = 01 47 39.1 Mag. 4.9 (CGS)
		eS	ZNE		50	02								
19	5	iP	Z	09	34	34	2.0	1.1						
		e	NE		35	15								
20	5	iP	Z	09	49	57	1.7	1.8					5.7	Compression USCGS: 15.1S, 177.7W. h about 398 km. Fiji Islands region. H = 09 48 25.4 Mag. 4.8 (CGS)
21	5	iP	ZNE	11	10	12.5	2.5	2.3					19.8	Dilatation USCGS: 32.1S, 179.8E. h about 235 km. South of Kermadec Islands H = 11 06 02.6 Mag. 6 ³ / ₄ (PAS), 5 ¹ / ₂ (BRK), 5.8(CGS)
		eS	ZNE		13	27								



No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	Δ (Deg.)	Remarks
22	5	ePP	Z	11	17	37							87.0	USCGS: 39.0S, 74.5W. h about 26 km. Off coast of Central Chile H = 11 01 16.5 Mag. 5.1 (CGS)
23	5	iP	Z	22	35	52.6	0.6	2.0					86.0	USCGS: 41.1S, 74.9W. h about 33 km. Off coast of southern Chile H = 22 23 13.0 Mag. $6\frac{3}{4}$ (PAS), $6\frac{1}{2}$ (BRK), 6.1(CGS)
		ePP	Z		39	12								
		e	Z		42	28								
		eS	ZNE		46	10								
		eSS	ZNE		51	30								
		eL	NE		58	16								
		eL	ZNE	23	02.2									
		Surface waves about 20 min.												
24	6	eP	Z	10	43	31								Samoa Islands region
		iS	NE			50								
25	6	eP	Z	13	50	16							48.4	USCGS: 4.2S, 140.5E. h about 50 km. West New-Guinea H = 13 41 36.5
26	6	iP	Z	17	06	01							11.4	Dilatation USCGS: 22.5S, 179.5W. h about 504 km. South of Fiji Islands H = 17 03 28.9 Mag. 5.3 (CGS)
		iS	NE		07	58.5								
27	6	eS	NE	18	45	30							72.0	USCGS: 56.9N, 152.1W. h about 39 km. Alaskan aftershock. H = 18 24 50.5 Mag. 5.6 (CGS)
		eSSS	E		53.4									
		eL	ZN		57.2									
28	6	eSS	ZNE	23	52.7								20.4	USCGS: 19.2S, 167.6E. h about 43 km. New Hebrides Islands region H = 23 42 45.7 Mag. 5.0 (CGS)
29	7	eP	Z	02	16	45							6.9	USCGS: 20.2S, 174.6W. h about 29 km. Tonga Islands. H = 02 15 04 Mag. 4.4 (CGS)
30	7	eP	Z	03	23	17								Samoa Islands region
		iS	NE			42								
31	7	iP	Z	17	32	05	3.0	1.3					1.5	Compression USCGS: 14.7S, 173.0W. h about 33 km. Samoa Islands H = 17 31 42 Mag. 4.6 (CGS)
		iS	NE			23								
32	7	iP	Z	22	30	40.7	2.0	0.8						Compression Samoa Islands region
		iS	NE		31	02								



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						(Deg.)	Remarks
33	8	eP eS eT	Z NE ZNE	09 23 25	21 46 43									Samoa Islands region
34	8	iP iS	Z NE	09 29 30	56.3 42.7		1.2	1.1						
35	8	eP eS	Z NE	10 29	02 56									
36	8	eP eL	Z ZNE	15 10 28.5	09							64.0		USCGS: 31.7N, 140.2E. h about 110 km. South of Honshu, Japan H = 14 59 41.2 Mag. 5.7 (CGS)
37	8	eP eS eL	Z NE ZNE	15 57 16 08 24.4	53 20							87.0		USCGS: 12.5N, 87.8W. h about 63 km. Off west coast of Nicaragua H = 15 45 10.9 Mag. 5.8 (CGS)
38	8	eP iS e	Z NE ZNE	18 42 45	39 57 49									Samoa Islands region
39	8	iP iS	ZE ZNE	21 00 01	54.6 45		8.5	1.0				4.8		Compression USCGS: 17.5S, 175.0W. h about 193 km. Tonga Islands H = 20 59 43.6 Mag. 4.8 (CGS)
40	9	iP eS	Z NE	01 50 51	07 38		2.0	2.0				7.6		Compression USCGS: 17.8S, 178.6W. h about 537 km. Fiji Islands region H = 01 48 12.8 Mag. 5.6 (CGS)
41	9	eP eS eT	Z ZNE ZNE	06 32 35	19 59 43							3.5		USCGS: 17.1S, 173.1W. h about 33 km. Tonga Islands H = 06 31 29.3 Mag. 4.5 (CGS)
42	9	eiP iS	Z NE	15 40	39 55									Samoa Islands region
43	9	eP eS eT	Z NE ZNE	22 13 14 17	52 31 17									
44	10	eL	Z	02 01.2								107.0		USCGS: 19.1N, 67.3W. h about 33 km. Mona Passage H = 01 10 12.4 Mag. 5.5 (CGS)

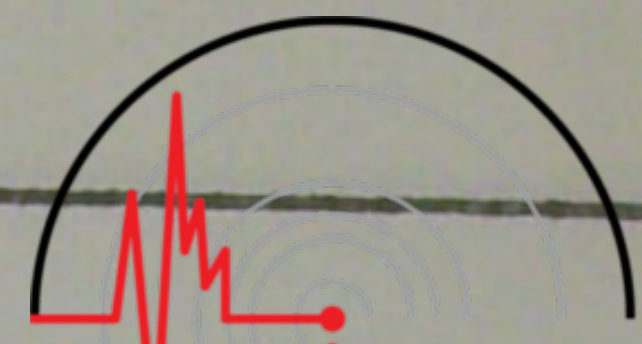
No	Date	Phase		Time (G.M.T.)		Az	Tz	An	Tn	Ae	Te	(Deg.)	Remarks
45	10	eSS eL	N ZE	21	53.7 56.2							34.0	USCGS: 6.2S, 154.5E. h about 105 km. Solomon Islands H = 21 40 10.4 Mag. 5.7 (CGS)
46	11	iP iS	Z NE	05	51 52	34 44.5	3.0	1.0				6.5	Dilatation USCGS: 18.0S, 176.9W. h about 329 km. Fiji Islands region H = 05 49 58.7 Mag. 4.3 (CGS)
47	11	iP iS	Z NE	12	17 18	45 04							Samoa Islands region
48	11	eP eS eT	Z NE ZNE	13	55 58	07 42 43							
49	12	eP eS eT	Z NE ZNE	07	04 05 08	49 15 08							
50	12	e(P) iS	Z NE	20	39 40	56 48							
51	13	eiP i iS iPcS isS iSS	Z ZN ZNE Z Z NE	00	37 41 42 43 44 45	29 31.2 30 07 40 13	3.5	2.0				34.5	USCGS: 5.4S, 154.3E. h about 383 km. Solomon Islands H = 00 31 14.1 Mag. 6.0 (CGS)
52	13	iP iS	Z NE	10	11 12	25 13	2.5	1.0					Compression
53	13	iP iS	Z NE	10	50 52	31 02	1.5	0.8				7.8	Dilatation USCGS: 19.3S, 177.6W. h about 551 km. Fiji Islands region H = 10 48 34 Mag. 4.3 (CGS)
54	14	eSSS	ZNE	21	57.3							19.8	USCGS: 18.8S, 168.2E. h about 26 km. New Hebrides Islands H = 21 48 31.2 Mag. 4.6 (CGS)
55	15	iP iS	Z NE	15	47	36 44							Samoa Islands region
56	15	iP iS	Z NE	16	05	00.2 16							Samoa Islands region
57	15	eP eS	Z NE	17	58 59	46 26							

No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	(Deg.)	Remarks
58	16	iP iS	ZNE ZNE	19	42	03.3 58				3.5 2.0	4.0 Compression USCGS: 15.0S, 175.8W. h about 332 km. Samoa Islands region H = 19 40 53.9 Mag. 4.6 (CGS)
59	17	iP iS	ZNE NE	11	46 48	58 31				5.5 2.0	7.5 Dilatation USCGS: 18.0S, 178.3W. h about 648 km. Fiji Islands region H = 11 45 01.2 Mag. 5.1 (CGS)
60	17	iP iS	Z NE	13	47	04 40					Samoa Islands region
61	17	e(S)	NE	15	20.0						
62	17	eP eS	Z NE	22	05 07	18 08				11.7	USCGS: 24.5S, 176.8W. h about 33 km. South of Fiji Islands H = 22 02 35.1 Mag. 4.5 (CGS)
63	18	eP ePP eS eS eSS eLq eLr	Z Z E ZNE ZNE ZNE ZNE	04 05	58 01 08.5 10 14 22.5 27.3	14 54				1.0 2.8	92.0 USCGS: 26.4S, 71.5W. h about 8 km. Off coast of northern Chile H = 04 44 58.0 Mag. 6(BRK), 6.4(CGS)
64	18	eP eS	Z NE	09	09 10	50 26					
65	18	iP eS	Z NE	21	53	00 57					
66	19	iP eS	Z NE	06	34	36 51					Samoa Islands region
67	19	iP eS	Z NE	07	56 57	05 44				0.7 1.2	
68	19	iP eS	Z NE	09	02 03	15.5 00					
69	19	iP eS	Z NE	10	12 13	39.8 00					Samoa Islands region
70	19	eP iS	Z NE	15	21 22	39 08					Samoa Islands region
71	19	iP iS	Z NE	19	27 28	43.6 37					
72	20	eL	Z	13	34.8						
73	20	iP iS	Z NE	13	50	16 40					Samoa Islands region
74	21	eL	ZE	03	35.6						



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
89	25	iP iS	Z NE	17 41 37 42 21										
90	25	eP e	Z NE	21 05 20 33								7.5	USCGS: 19.5S, 176.9W. h about 444 km. Fiji Islands region H = 21 03 30 Mag. 4.2 (CGS)	
91	26	iP eS	Z NE	19 33 35 48.4 30	1.0	1.0						9.0	USCGS: 20.3S, 178.3W. h about 510 km. Fiji Islands region H = 19 31 40.8 Mag. 4.3 (CGS)	
92	26	iP iS	Z NE	20 08 09 43 03									Samoa Islands region	
93	27	iP iS	Z NE	05 29 30.9 47									Samoa Islands region	
94	27	iP eS	Z NE	07 54 55 46.2 24	2.0	1.0						3.9	Dilatation USCGS: 17.5S, 173.0W. h about 33 km. Tonga Islands H = 07 53 54.8 Mag. $4\frac{1}{2}$ - $4\frac{3}{4}$ (BRK), 5.3(CGS)	
95	27	eP e(S)	Z NE	21 56 59 49 13										
96	27	eP eS	Z ZNE	23 50 51 23 54								8.5	USCGS: 21.6S, 175.3W. h about 60 km. Tonga Islands H = 23 48 26.3 Mag. 5.2 (CGS)	
97	28	eP eS	Z NE	04 24 26 29 15										
98	28	iP iS	ZN NE	04 37 39 30.3 05.8	3.9	1.5	3.5	1.9				8.5	Dilatation USCGS: 19.8S, 178.2W. h about 580 km. Fiji Islands region H = 04 35 29.3 Mag. 5.4 (CGS)	
99	28	eP eS	Z NE	08 26 27 24 12								5.1	USCGS: 18.2S, 174.6W. h about 70 km. Tonga Islands H = 08 25 08.9 Mag. 4.4 (CGS)	
100	28	iP	Z	11 24 24.4	1.0	1.0							Compression	
101	28	eP eS	Z NE	17 09 11 56										
102	28	iP iS	Z NE	17 24 31.4 54.3									Samoa Islands region	

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
103	29	eP	Z	00	34	44							
		eS	NE		35	22							
104	29	eP	Z	11	21	49							
		eS	NE		22	37							
105	29	eP	Z	17	28	36							
		eS	NE		29	48							
		eL	ZNE		30.4								
		eT	ZNE		35	45							
106	29	iP	ZNE	21	37	08							
		iS	NE			22							
107	30	iP	Z	08	12	44	3.4	1.2					
		iS	ZNE		13	30							
108	30	iP	Z	08	55	35.2	1.0	2.0					
109	30	iP	Z	10	28	41							
		iS	NE		29	00							
110	30	iP	Z	11	46	13							
		iS	NE			32							
111	30	eP	Z	13	11	29							
		eS	NE		13	20							
112	30	eL	ZNE	20	44.2								
113	30	iP	Z	21	46	35							
		iS	ZNE		47	48							
114	31	eSSS	E	02	41.0								
		eL	ZE		42.0								



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
115	31	iP iS	Z NE	08	54	41 59								Samoa Islands region
NOTE: (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds. (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.														

John Milne
OBSERVER-IN-CHARGE

Sept 64

NEW ZEALAND
Department of Scientific and Industrial Research
Geophysics Division
APIA OBSERVATORY
FINAL SEISMOLOGICAL BULLETIN
STANDARD SEISMIC STATION (AFI)
AFIAMALU, WESTERN SAMOA.



Latitude: $13^{\circ} 54' 33.6''$ S Longitude: $171^{\circ} 46' 38.1''$ W
Height above mean sea level: 705.6 metres, 2315 ft.
Geocentric direction cosines: a. - 0.961 070
b. - 0.138 883
c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows

Instruments: World-wide standard seismograph system

Benioff short period seismometers

To = 1.0 sec. Tg = 0.75 sec.

Sprengnother long period seismometers

To = 30 sec. Tg = 100 sec.

Nominal Magnifications: S.P. 12500

L.P. 750

SEPTEMBER 1964 *

No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
1	1	iP	Z	11	01	09.2								Compression Samoa Islands region
		iS	NE			33								
2	1	iP	ZNE	15	47	09.5								Compression from south-west Samoa Islands region
		iS	NE			26								
3	1	eP	Z	18	35	43								
		eS	NE		36	35								
4	2	iP	Z	21	36	49.5	1.0	1.9					18.6	Dilatation USCGS: 18.6S, 169.4E. h about 218 km. New Hebrides Islands H = 21 32 39.6 Mag. 4.9 (CGS)
5	3	eP	Z	06	06	25								Samoa Islands region
		iS	NE			45								
6	3	eP	Z	07	18	52								
		iS	NE		19	20								
7	3	e(S)	ZNE	10	23.7									
8	3	iP	Z	10	41	47								
		iS	NE		42	24								
9	3	iP	Z	12	59	13.4							7.3	USCGS: 17.9S, 178.0W. h about 567 km. Fiji Islands region H = 12 57 22.3
		eS	NE	13	00	41								

* See note at end.

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
10	3	eP	Z	16	44	00								
		eS	NE		45	06								
11	3	iP	ZNE	16	59	26.9							2.0	Compression from south-west Felt: Apia USCGS: 15.2S, 173.5W. h about 33 km. Tonga Islands H = 16 58 55.4 Mag. 5.1 (CGS)
		iS	ZNE			44								
12	3	iP	Z	20	51	03.9	0.9	1.8						Compression
		eS	NE		52	54								
13	4	iP	Z	10	43	57.8							56.8	Dilatation USCGS: 4.0S, 131.4E. h about 33 km. West New Guinea region H = 10 34 13.1 Mag. 5 ¹ / ₂ -5 ³ / ₄ (BRK), 5.9(CGS)
		eS	ZNE		51	52								
		eSS	ZN		55	48								
		eSSS	N		58.2									
		eL	ZE	11	01.3									
14	4	eP	Z	14	53	26							13.5	USCGS: 24.3S, 179.1E. h about 548 km. South of Fiji Islands H = 14 50 34
		eS	ZNE		55	49								
15	5	iP	Z	00	48	14								Samoa Islands region
		iS	NE			36								
16	5	iP	ZN	02	21	19							20.0	Dilatation USCGS: 32.2S, 179.5E. h about 397 km. South of Kermadec Islands H = 02 17 14.4 Mag. 4.6 (CGS)
		i	ZN			23								
		eS	ZNE		24	43								
17	5	iP	ZE	03	00	33	2.7	4.0					34.6	Compression USCGS: 5.8S, 154.0E. h about 69 km. Solomon Islands H = 02 53 50.6 Mag. 6.4 (CGS)
		ipP	Z			50								
		eS	ZNE		06	18								
		eSS	ZNE		08	14								
		eL	ZE		09.6									
18	5	iP	Z	13	06	44.8	1.0	2.1						Dilatation
		eL	ZNE		36.0									
19	6	iP	Z	00	02	37								Samoa Islands region
		iS	NE			52								
20	6	iP	Z	02	18	33.4								
		eS	NE		20	53								
21	6	eP	Z	02	30	26								
		iS	NE		31	03								
		eT	ZNE		33	32								
22	6	iP	Z	03	32	18	1.2	2.0						Dilatation
		eS	NE		35	52								



No	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	Δ (Deg.)	Remarks	
23	6	iP e	Z NE	09	23 25	34.7 20				0.5 1.0	9.5	Compression USCGS: 20.3S, 178.9W. h about 621 km. Fiji Islands region H = 09 21 22.4 Mag. 4.2 (CGS)
24	6	iP eS eL	Z ZNE NE	18 19	50 57 03.2	28 54				0.5 2.1	47.1	Dilatation USCGS: 10.ON, 140.2E. h about 33 km. West Caroline Islands H = 18 41 01.8 Mag. 5.1 (CGS)
25	6	iP iS	Z NE	21	52 53	54.3 13						Samoa Islands region
26	7	eP eS	Z NE	02	35 36	52 48						
27	8	eP eS	Z NE	05	57 58	12 46					7.8	USCGS: 20.5S, 176.2W. h about 33 km. Fiji Islands region H = 05 55 19 Mag. 4.5 (CGS)
28	8	iP	Z	08	05	21				1.0 2.2	65.0	Compression USCGS: 5.8N, 126.1E. h about 177 km. Mindanao, Philippine Islands Felt H = 07 54 57.9 Mag. 5.4 (CGS)
29	8	eP iS eT	Z NE ZNE	11	16 17 20	32 12 10					3.9	USCGS: 17.4S, 173.5W. h about 33 km. Tonga Islands H = 11 15 35 Mag. 5.0 (CGS)
30	8	eP	Z	13	44	20					11.7	USCGS: 24.1S, 177.6W. h about 165 km. South of Fiji Islands H = 13 41 44.1 Mag. 4.8 (CGS)
31	8	eP eS	Z NE	14	11 14	55 16				0.4 1.9	11.4	USCGS: 23.8S, 177.5W h about 213 km. South of Fiji Islands H = 14 09 19.2 Mag. 4.7 (CGS)
32	8	iP iS	Z ZNE	17	07 09	29.7 08				1.7 2.0	9.0	Compression USCGS: 20.4S, 178.3W. h about 539 km. Fiji Islands region H = 17 05 23.4 Mag. 5.4 (CGS)
33	8	iP iS	Z NE	22	44	16.5 36						Samoa Islands region

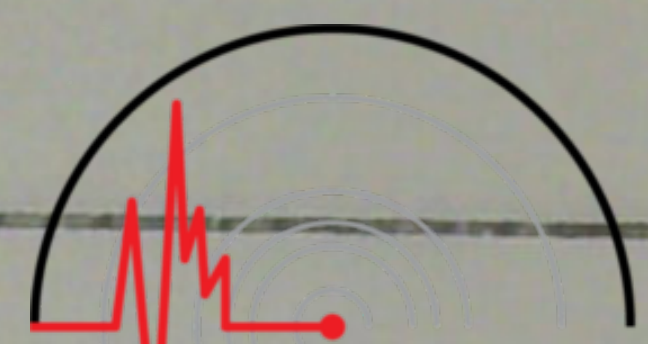
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
34	9	iP iS	Z NE	04 55 56	47 17									
35	9	iP	Z	16	15	28	1.0	2.0					Compression	
36	10	eP eS	Z NE	07 06 07	07 26		0.7	1.1						
37	10	iP iS	Z NE	17	39 54	27.7							Samoa Islands region	
38	10	iP eS eT	Z NE ZNE	21 25 26 29	38 12 06									
39	11	eP eS	Z NE	11 07 10	43 05		1.4	1.1				13.6	USCGS: 26.4S, 177.8W. h about 217 km. South of Fiji Islands H = 11 04 39.0 Mag. 4.7 (CGS)	
40	11	iP	Z	15	09	36	1.2	1.9					Compression	
41	11	iP iS	Z NE	15	58 44	09.5	7.7	1.0					Dilatation	
42	12	eP eS	Z N	02 34 35	40 36									
43	12	iP ipP eS eScS eL	Z Z NE ZNE ZNE	12 51 57 13 01 04.6	21.4 47.7 48 18							44.6	Dilatation USCGS: 4.4S, 144.0E. h about 120 km. Near north coast of New Guinea H = 12 43 19.0 Mag. 6 $\frac{1}{2}$ (Pas), 6 $\frac{1}{4}$ -6 $\frac{1}{2}$ (BRK), 6.3(CGS)	
44	12	iP eS	ZN NE	15 21 23	27 04		1.9	1.8	1.5	1.8		8.5	Dilatation USCGS: 17.4S, 179.9W. h about 561 km. Fiji Islands region H = 15 19 22.3 Mag. 4 $\frac{1}{4}$ -4 $\frac{1}{2}$ (BRK), 5.8(CGS)	
45	12	iP iS	ZN NE	15 47 48	40 00								Samoa Islands region	
46	12	iP iS iSS iL	ZNE ZNE NE Z	22 14 20 23 24	37 40 52 58		2.2	2.0				41.0	Compression USCGS: 49.1S, 164.2E. h about 33 km. Auckland Islands region H = 22 07 03.2 Mag. 7 $\frac{1}{2}$ (PAS), 7 $\frac{1}{2}$ (BRK), 6.9(CGS)	
Surface waves about 2 hours														
47	13	iP eS eT	Z NE ZNE	08 47 49	17 44 35							2.0	USCGS: 15.6S, 172.7W. h about 33 km. Samoa Islands region H = 08 46 46 Mag. 4.2 (CGS)	

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Centre

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
48	13	iP iS	Z NE	11 05 07	47 14		3.5 2.0						8.3	Compression USCGS: 19.8S, 177.7W. h about 357 km. Fiji Islands region H = 11 03 50.0 Mag. 5.2 (CGS)
49	13	iP eS	Z NE	12 43 44	36.2 57		1.5 1.1						7.1	Compression USCGS: 17.6S, 178.0W. h about 421 km. Fiji Islands region H = 12 41 50.6 Mag. 4.4 (CGS)
50	13	iP iS	Z NE	15 52 53	56 24		2.5 1.5						2.2	Dilatation USCGS: 15.8S, 172.9W. h about 33 km. Samoa Islands region H = 15 52 24 Mag. 4.7 (CGS)
51	14	iP iS	Z NE	11 44	12.5 32		2.5 1.0							Samoa Islands region
52	14	eL	Z	14	11.2								83.0	USCGS: 15.0N, 93.2W. h about 64 km. Near coast of Chiapas, Mexico Felt at Western El Salvador H = 13 33 33.7 Mag. 4.9 (CGS)
53	14	iP iS	Z NE	22 22	32 52									Samoa Islands region
54	15	iP eS eT	Z ZNE ZNE	01 01 05	15.4 06 05		2.0 1.8						4.4	Compression USCGS 15.6S, 175.9W. h about 9 km. Tonga Islands H = 01 00 08.0 Mag. 4.9 (CGS)
55	15	eS	ZNE	01	32	24								
56	15	e	Z	11	35	12	1.0 2.1							
57	15	eP eS	Z NE	11 46 48	20 00								9.0	USCGS: 22.2S, 175.2W. h about 33 km. Tonga Islands H = 11 44 13.7 Mag. 4.7 (CGS)
58	15	iP iS	ZN NE	12 44 45	44.8 14								2.5	Dilatation USCGS: 16.0S, 172.9W. h about 33 km. Samoa Islands region H = 12 44 12.2 Mag. 5.3 (CGS)
59	15	iP iS	Z NE	13 13	26.7 53								2.4	USCGS: 15.8S, 173.1W.. h about 33 km. Tonga Islands H = 13 12 54

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
75	18	iP eS	Z NE	20 00 01	42 01									Samoa Islands region
76	19	e eS eL	NE NE ZE	05	30.8 42.5 45.3							83.0		USCGS: 15.3N, 94.0W. h about 42 km. Near coast of Oaxaca, Mexico H = 05 08 15.1 Mag. 6(PAS), 5 $\frac{3}{4}$ -6(BRK), 5.3(CGS)
77	19	iP	Z	10	08	48.6	1.0	1.8				10.0		Compression USCGS: 20.8S, 178.3W. h about 434 km. Fiji Islands region H = 10 06 38
78	19	iP iS	Z NE	15	57 38	21 09								Samoa Islands region
79	19	eP eS	Z NE	21	36 38	28 09	0.4	0.8				10.0		USCGS: 22.1S, 177.6W. h about 251 km. South of Fiji Islands H = 21 34 10.2 Mag. 4.4 (CGS)
80	20	iP iS	Z NE	00	26 53									Samoa Islands region
81	20	eSSS eL eL	ZE E Z	04	51 57.2 58.2	22						57.0		USCGS: 49.6S, 116.2W. h about 33 km. Easter Island Cordillera H = 04 33 29.4 Mag. 5.2 (CGS)
82	20	eP iS	Z NE	08	50 51	16 11								
83	20	iP	Z	14	46	01						65.0		Dilatation USCGS: 30.ON, 138.1E. h about 454 km. South of Honshu, Japan H = 14 36 05.3 Mag. 4.9 (CGS)
84	21	eP iS	Z NE	03	43 51	38								Samoa Islands region
85	21	iP iS e	ZNE ZNE ZNE	04	25 27 32	44 39 33	13.5	1.5	5.0	1.8	4.0	1.9	10.9	Compression USCGS: 21.8S, 179.6W. h about 609 km. Fiji Islands region H = 04 23 19.7 Mag. 5.4 (CGS)
86	21	eP iS	Z NE	05	10 11	53 12								Samoa Islands region
87	21	iP	Z	05	47	34	1.5	2.0				58.0		Compression USCGS: 7.0S, 129.4E. h about 123 km. Banda Sea H = 05 37 48.9 Mag. 5.2 (CGS)

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
88	21	iP	Z	11	27	10.6								Samoa Islands region
		iS	NE			36								
89	21	eP	Z	13	23	05								Samoa Islands region
		iS	NE			27								
90	21	iP	Z	16	59	42	0.4	1.3				8.8	Compression	
		eS	NE	17	01	21							USCGS: 19.9S, 178.5W. h about 512 km. Fiji Islands region H = 16 57 36 Mag. 4.5 (CGS)	
91	21	iP	Z	18	14	38	1.0	2.0				17.7	Dilatation	
		eS	NE		17	39							USCGS: 30.1S, 179.5W. h about 319 km. Kermadec Islands H = 18 10 51.6 Mag. 5.2 (CGS)	
92	21	eP	Z	21	24	38						3.5	USCGS: 15.2S, 175.2W. h about 126 km. Tonga Islands H = 21 23 43	
		iS	NE			58								
93	21	iP	Z	23	18	39	1.5	0.4				8.6	Dilatation	
		iS	NE		20	14							USCGS: 20.2S, 177.8W. h about 511 km. Fiji Islands region H = 23 16 35.8 Mag. 4.4 (CGS)	
94	22	iP	ZNE	07	28	53							Compression	
		iS	N		29	13								
95	23	eP	Z	02	50	26						2.6	USCGS: 13.4S, 174.4W. h about 301 km. Samoa Islands region H = 02 49 33 Mag. 3.9 (CGS)	
		eS	ZNE		51	16								
96	23	eP	Z	03	03	06								
		iS	NE			40								
		eT	ZNE		06	15								
97	23	eP	Z	04	51	38								
		eS	NE		52	12								
		eT	ZNE		54	58								
98	23	ePcP	Z	05	11	08						66.0	USCGS: 53.6N, 163.9W. h about 29 km. Unimak Islands region H = 04 59 47.4 Mag. 5-5 ¹ / ₂ (BRK), 5.5(CGS)	
		eS	ZNE		19	40								
		eSS	Z		23	54								
		eL	E		27.2									
		eL	ZN		30.2									
99	23	eP	Z	10	27	22								
		eS	NE			53								
		eT	ZNE		30	38								
100	23	iP	Z	10	50	16.2								
		iS	NE			52								
		e	ZNE		52	31								
		e	ZNE		53	43								
		e	ZNE		55	22								



USCGS: 5.6S, 151.8E.
h about 35 km.
New Britain region
Felt: Keravat,
Palmalmal, Rabaul
H = 09 14 38.6
Mag. 5.3 (CGS)

Samoa Islands region

Samoa Islands region

Samoa Islands region

65.0

USCGS: 50.3N, 176.6E,
h about 30 km.
Rat Islands,
Aleutian Islands
H = 15 42 17.9
Mag. 5.5 (CGS)

Samoa Islands region

Samoa Islands region

18.5

Compression
USCGS: 30.7S, 179.9W.
h about 424 km.
Kermadec Islands
H = 23 27 49.7
Mag. 5.3 (CGS)

Samoa Islands region

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
131	29	iP eS	Z ZNE	05 32 33	20.5 17		1.0 1.9					5.5	USCGS: 18.1S, 175.4W. h about 197 km. Tonga Islands H = 05 30 59.5 Mag. 4.8 (CGS)	
132	29	iP eS	Z NE	07 08 09	54.2 13		3.7 0.9						Samoa Islands region	
133	29	eP eS eT	Z NE ZNE	08 31 32 35	25 05 05									
134	29	eP eS eT	Z ZNE ZNE	14 01 03 08	51 02 27							7.0	USCGS: 20.4S, 174.4W. h about 29 km. Tonga Islands H = 14 00 14.9 Mag. $6\frac{1}{2}$ (PAS), $5\frac{3}{4}$ (BRK), 5.7(CGS)	
135	29	eP eS eT	Z ZNE ZNE	15 38 39 41	28 03 54									
136	29	eP eS eT	Z NE ZNE	16 17 18 20	57 27 36									
137	29	iP iS	Z NE	17 58 59	44 02								Samoa Islands region	
138	29	eP eS	ZN NE	22 50 52	25 28									
139	30	eP eS	Z NE	03 49 51	35 30							11.5	USCGS: 22.9S, 179.1W. h about 368 km. South of Fiji Islands H = 03 47 00.3 Mag. 3.9 (CGS)	
140	30	eP iS	Z NE	08 50 51	58 52									
141	30	iP eS	Z NE	11 45 47	35 10								Dilatation	
142	30	iP eS	Z NE	12 42 43	13.3 42		1.2 1.0						Compression	
143	30	iP	Z	17 41	30.6								Compression	

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

John Milne
OBSERVER-IN-CHARGE

02764



NEW ZEALAND
Department of Scientific and Industrial Research
Geophysics Division
APIA OBSERVATORY
FINAL SEISMOLOGICAL BULLETIN
STANDARD SEISMIC STATION (AFI)
AFIAMALU, WESTERN SAMOA.

Latitude: $13^{\circ} 54' 33.6''$ S Longitude: $171^{\circ} 46' 38.1''$ W
Height above mean sea level: 705.6 metres, 2315 ft.
Geocentric direction cosines: a. - 0.961 070
b. - 0.138 883
c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows
Instruments: World-wide standard seismograph system
Benioff short period seismometers
To = 1.0 sec. Tg = 0.75 sec.
Sprengnether long period seismometers
To = 30 sec. Tg = 100 sec.
Nominal Magnifications: S.P. 12500
L.P. 750

OCTOBER 1964 *

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
1	1	eP eS	Z NE	01 55 06 52										
2	1	iP eS	Z NE	06 37 07.2 44	6.0 1.0						3.3	USCGS: 14.1S, 175.1W. h about 243 km. Samoa Islands region H = 06 36 12 Mag. 4.0 (CGS)		
3	1	eP eS eT	Z NE ZNE	12 35 36 05 38 10										
4	1	eP eS eT	Z NE ZNE	13 34 08 36 43										
5	1	iP iS	Z NE	16 11 47 12 29										
6	1	eP eS eT	Z NE ZNE	16 13 35 14 02 16 06										
7	2	eiP eS	ZNE NE	04 34 02 36 08	2.5 2.0 1.7 1.7 2.0 1.9						12.4	USCGS: 23.6S, 179.6W. h about 503 km. South of Fiji Islands H = 04 31 21.0		
8	2	e eS eL	NE NE ZE	09 57.3 58.2 10 00.0							25.5	USCGS: 10.4S, 162.4E. h about 58 km. Solomon Islands H = 09 47 27.2 Mag. 5.2 (CGS)		

* See note at end.

* See note at end.

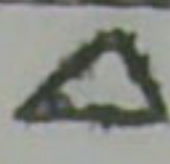
No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
9	2	iP iS iL	Z N ZNE	13 06 11	03.5 30 28		2.0 2.5						25.5	Compression USCGS: 10.5S, 162.4E. h about 68 km. Solomon Islands H = 13 00 39.7 Mag. 6.0 (CGS)
10	3	iP eS	Z ZNE	01 47	28.3 50									Dilatation Samoa Islands region
11	3	iP iS	Z NE	01 57 58	14 58		1.5 1.9						9.6	Dilatation USCGS: 21.0S, 178.5W. h about 547 km. Fiji Islands region H = 01 55 00.2 Mag. 5.0 (CGS)
12	3	eP	Z	09	36	02								
13	3	eP eS	Z NE	16 55 57	33 51								14.1	USCGS: 26.7S, 177.7W. h about 134 km. South of Fiji Islands H = 16 52 20.7 Mag. 4.5 (CGS)
14	3	iP eS	Z NE	17 04 06	40.2 14		5.5 2.0						8.0	Compression USCGS: 18.1S, 178.8W. h about 673 km. Fiji Islands region H = 17 02 48.0 Mag. 4.4 (CGS)
15	3	eP eS eT	Z NE ZNE	21 15 16 18	50 20 37									
16	3	eS eL	N ZE	22 09.7 12.0									24.0	USCGS: 10.3S, 164.5E. h about 66 km. Santa Cruz Islands region H = 22 00 53.8 Mag. 4.4 (CGS)
17	3	iP iS	Z NE	22 42 44	57.6 14		2.0 1.0						7.6	Compression USCGS: 20.2S, 176.3W. h about 219 km. Fiji Islands region H = 22 41 09.0 Mag. 4.4 (CGS)
18	4	e e(L)	ZNE ZNE	00 01	57.2 03.2									
19	4	iP iS	Z NE	05 17	01 23									Samoa Islands region
20	4	iP eS	Z NE	05 35 36	24 29									Compression
21	4	eiP eS	Z NE	12 29 31	30 00								7.4	USCGS: 17.7S, 178.3W. h about 576 km. Fiji Islands region H = 12 27 37.2 Mag. 4.0 (CGS)

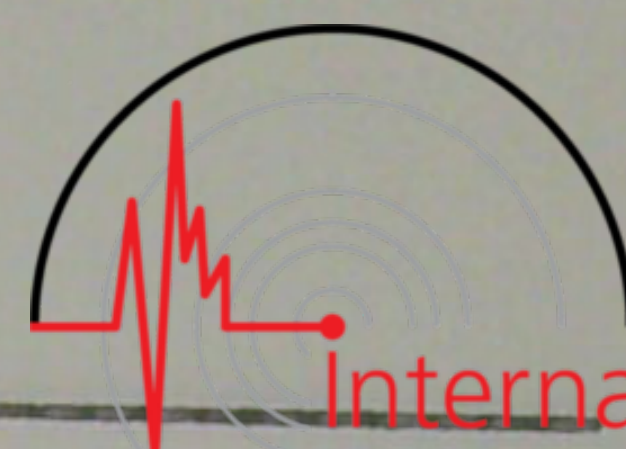


No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						 (Deg.)	Remarks	
22	5	eL	Z	04	06.6								70.0	USCGS: 42.6N, 142.6E. h about 38 km. Hokkaido, Japan region H = 03 35 08.4 Mag. 5.0 (CGS)
23	5	iP eS	Z NE	06	25 27	45.3 03	3.2	1.2					7.2	Dilatation USCGS: 18.2S, 177.7W. h about 33 km. Fiji Islands region H = 06 24 01.0 Mag. 4.7 (CGS)
24	5	eP eS	Z NE	08	26	27 58								
25	5	iP e iS	Z ZNE ZNE	08	31	03 28 50	3.9	2.0					3.5	Dilatation USCGS: 16.7S, 173.7W. h about 33 km. Tonga Islands H = 08 30 15.7 Mag. 5.1 (CGS)
26	5	iP iS	Z NE	12	25	01.2 38							3.6	Dilatation USCGS: 16.6S, 174.2W. h about 84 km. Tonga Islands H = 12 24 06.4
27	5	eP eS	Z NE	13	11	17 49								
28	5	eP eS eL eT	Z ZNE ZNE ZNE	14	01 02 03.2 09	06 37 10							9.2	USCGS: 22.2S, 175.8W. h about 33 km. Tonga Islands region H = 13 58 56.9 Mag. 5.1 (CGS)
29	5	eL	ZN	22	41.0								66.0	USCGS: 36.0N, 141.2E. h about 62 km. Near east coast of Honshu, Japan H = 22 10 16.5 Mag. 4.9 (CGS)
30	6	eL	ZNE	06	45.8								66.0	USCGS: 18.6N, 119.6E. h about 33 km. Philippine Islands region H = 06 11 32.6 Mag. 6.0 (CGS)
31	6	eS eSS eSSS eL eL	ZNE ZNE NE Z ZNE	07	37 41.6 45 46 48.0	32 14 00							66.0	USCGS: 36.2S, 100.9W. h about 33 km. Southern Pacific Ocean H = 07 17 57.1 Mag. 5.5 (CGS)
32	6	iPKP iPKP	Z Z	14	49	45 49	0.8 1.0	2.1 2.0					148.0	Dilatation USCGS: 40.2N, 28.1E. h about 10 km. Turkey H = 14 29 55.6 Mag. 5.1 (CGS)

No	Date	Phase	Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks	
33	6	iPKP Z ePP Z ePPP Z eSKSP ZNE e Z eSKKS NE e Z eSS ZE eSSP N e Z eSSS NE e N e E e NE e E e N e ZN e ZNE e E e ZE e ZNE	Z Z Z ZNE Z NE Z ZE N Z NE N E NE E N ZN ZNE E ZE ZNE	14 15	51 54 57 05 07 08 12 14 15 19 38 25 28 30.3 32.3 34 38 40 45 48 51.2	06 40 10 00 30 30 06 00 00 00 38 40 00 10 50 40 14 00						148.0	USCGS: 40.3N, 28.2E. h about 10 km. Turkey 19 killed, several injured, extensive property damage in Western Turkey. Crevasses and hot springs appeared in epicentral area. Felt widely throughout Black Sea region H = 14 31 19.2 Mag. $6\frac{3}{4}$ -7(PAS), $6\frac{3}{4}$ -7(BRK), $6\frac{1}{4}$ (PAL), 6.0(CGS)	
34	6	eP Z eS N eL Z	Z N Z	19	16 20 21.3	42 12							19.0	USCGS: 16.1S, 168.6E. h about 21 km. New Hebrides Islands H = 19 12 12.0 Mag. 5.4 (CGS)
35	6	iP Z	Z	23	41	49.4	1.5	2.0						Compression
36	7	eP Z eS ZNE	Z ZNE	01	26 28	50 24							9.0	USCGS: 20.7S, 177.8W. h about 328 km. Fiji Islands region H = 01 24 45.2 Mag. 4.4 (CGS)
37	7	eP Z	Z	03	58	43							33.3	USCGS: 6.8S, 155.2E. h about 70 km. Solomon Islands H = 03 52 11.3 Mag. 5.5 (CGS)
38	7	eP Z eS ZNE	Z ZNE	04	04	10 23								Samoa Islands region
39	7	iP Z eS NE	Z NE	12	10	37 56								Dilatation
40	7	eP Z eS NE	Z NE	15	14	28 45								Samoa Islands region
41	7	iP Z iS NE	Z NE	15	36	05 24								Samoa Islands region
42	7	eP Z eS NE eT ZNE	Z NE ZNE	21	22 23 29	33 50 49								
43	8	eP Z iS NE	Z NE	03	16 17	59 53							5.4	USCGS: 18.3S, 174.8W. h about 97 km. Tonga Islands H = 03 15 41.6 Mag. 4.7 (CGS)

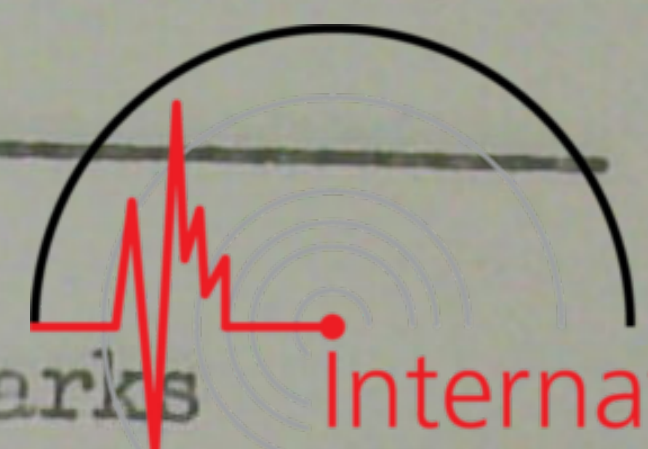


No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks	
44	8	iP	Z	05	45	28								Samoa Islands region	
		iS	NE			52									
45	8	iP	Z	12	48	29									
		eS	NE		49	21									
46	8	eP	Z	19	56	40									
		eS	NE		57	58									
		eL	ZN		58.3										
47	8	eP	Z	21	10	43									
		e	ZNE		11.3										
		e(S)	ZNE		14	03									
48	9	eP	Z	08	45	45									
		eS	NE		47	15									
49	9	iP	Z	08	52	36								Compression Samoa Islands region	
		iS	NE			55									
50	9	iP	Z	12	52	45.2						64.0		Dilatation USCGS: 28.4N, 138.8E. h about 520 km. Bonin Islands region H = 12 43 04.5 Mag. 4.9 (CGS)	
51	9	iP	ZNE	21	34	42						2.4		Dilatation Felt: Malua - about 14 miles from Afiamalu USCGS: 16.2S, 171.9W. h about 33 km. Samoa Islands region H = 21 34 09.2 Mag. 5 $\frac{1}{4}$ (BRK), 5.8(CGS)	
		iS	NE		35	08									
		Waves follow for several min.													
52	10	eP	Z	07	59	39	0.9	1.9				13.7		USCGS: 25.2S, 180.0 h about 432 km. South of Fiji Islands H = 07 56 40.5 Mag. 3.8 (CGS)	
		eS	NE		01	57									
53	10	eP	Z	08	33	53	0.6	1.9				12.5		USCGS: 23.8S, 179.7W. h about 441 km. South of Fiji Islands H = 08 31 07.7	
		eS	ZNE		36	02									
54	10	eP	Z	17	17	18						17.7		USCGS: 30.2S, 179.3W. h about 294 km. Kermadec Islands H = 17 13 30	
		eS	NE		20	19									
55	10	eP	Z	19	16	05									
56	10	eP	Z	19	50	40						77.0			
		eL	ZN	20	14.5										
														USCGS: 60.4N, 146.1W. h about 44 km. Southern Alaska H = 19 38 47.7 Mag. 4 $\frac{1}{2}$ -4 $\frac{3}{4}$ (BRK), 5.3(CGS)	

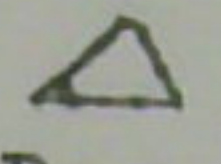


No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						 (Deg.)	Remarks
57	10	eL	ZN	20	41.5							77.0	USCGS: 60.5N, 145.4W. h about 31 km. Southern Alaska H = 20 06 39.8 Mag. 5.4 (CGS)
58	11	eP	Z	00	17 45							19.5	USCGS: 16.2S, 168.2E h about 17 km. New Hebrides Islands H = 00 13 13.4 Mag. 5.3 (CGS)
59	11	eP eS	Z NE	02	09 18 53								
60	11	iP i iS	Z NE ZNE	05	58 36 49 59 43								Dilatation
61	11	eP eSS eL	Z E ZNE	10	13 44 21 00 22.2	0.4	2.1					37.0	USCGS: 19.1N, 156.6W. h about 33 km. Hawaii region Felt throughout Islands H = 10 06 44.9 Mag. 4 ³ / ₄ -5(BRK), 5.3(CGS)
62	11	iP eS eL	ZE ZNE ZE	11	15 14 19 08 20 40	1.5	2.5			1.5	2.4	21.0	Compression USCGS: 13.6S, 166.6E. h about 68 km. New Hebrides Islands H = 11 10 33.6 Mag. 5.0 (CGS)
63	11	eP e(S)	Z NE	11	40 04 42 50	0.5	0.8						
64	11	eP	Z	20	56 31	0.6	1.9					20.0	USCGS: 15.1S, 167.6E. h about 241 km. New Hebrides Islands H = 20 52 14.0
65	11	iP eS eSS eL	Z ZNE Z ZE	21	25 58 35 00 39 30 47 50	1.1	2.0					67.0	Compression USCGS: 0.6S, 121.7E. h about 33 km. Northern Celebes H = 21 15 03.9 Mag. 6 ¹ / ₄ -6 ¹ / ₂ (PAL), 6.3(CGS)
Surface waves about 30 min.													
66	11	eP iS	Z NE	23	58 44 59 28								
67	12	eP eS	Z NE	01	50 40 52 11							9.3	USCGS: 21.6S, 177.1W. h about 188 km. Fiji Islands region H = 01 48 30.8 Mag. 4.4 (CGS)
68	12	eP eS	Z NE	05	36 51 37 13								

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
81	14	iP eS	Z NE	03 48 50	15 03		1.1 0.9					9.9	Dilatation USCGS: 21.4S, 178.5W. h about 481 km. Fiji Islands region H = 03 45 58.0 Mag. 4.5 (CGS)
82	14	eP eS eT	Z NE ZNE	13 27 28 31	57 36 58								
83	15	iP eS	Z NE	17 34	09.8 52								Dilatation
84	15	eP eS eL	Z ZNE ZNE	20 37 46 57.0	48 50							67.0	USCGS: 44.7N, 149.8E. h about 49 km. Kurile Islands H = 20 26 53.5 Mag. 5.2 (CGS)
85	16	eP eS	Z NE	00 13	30 54								Samoa Islands region
86	16	iP iS	Z NE	00 35	37 55								Samoa Islands region
87	16	eP eS eT	Z NE ZNE	05 56 58	14 33 42								Samoa Islands region
88	16	eiP eS	Z NE	06 18 19	06 57		3.0 1.0					11.4	USCGS: 23.6S, 177.6W. h about 178 km. South of Fiji Islands H = 06 15 31.5 Mag. 5.5 (CGS)
89	16	e	ZNE	07	04.0								
90	16	eP eS eS eSSS i eL Coda about	Z ZN E ZN E ZNE	07 10 19 27 30.0	38 36 46 12 42							67.0	USCGS: 44.3N, 149.5E. h about 33 km. Kurile Islands H = 06 59 38.6 Mag. 5.5 (CGS)
91	16	eS eL eL Coda about	ZNE ZNE ZN	08 38 46.2 48.8	26							67.0	USCGS: 44.6N, 149.4E. h about 33 km. Kurile Islands H = 08 18 28.3 Mag. 6-6 $\frac{1}{4}$ (PAL), 5.2(CGS)
92	16	eS eSSS eL Coda about	ZNE E ZN	09 38 46 48	20 18 38							67.0	USCGS: 44.5N, 149.1E. h about 33 km. Kurile Islands H = 09 18 16.6 Mag. 5.4 (CGS)
93	17	iP eS eSS eL	Z Z NE Z	01 45 50 53.0 54.0	04.4 30							32.6	Dilatation USCGS: 7.0S, 155.8E. h about 58 km. Solomon Islands H = 01 38 36.0 Mag. 4.7 (CGS)





No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
94	17	eP	Z	03	28	35							70.0	USCGS: 0.7N, 119.3E. h about 62 km. Northern Celebes H = 03 17 28.1 Mag. 5.4 (CGS)
95	17	eP	Z	05	59	55	1.0	1.8					18.0	USCGS: 22.3S, 171.5E. h about 116 km. Loyalty Islands region H = 05 55 54.4 Mag. 5.3 (CGS)
		eS	ZNE	06	03	10								
96	17	eS	E	10	10.3								18.0	USCGS: 21.8S, 170.2E. h about 33 km. Loyalty Islands region H = 10 02 37
		eSSS	N		11.0									
		eL	Z		11.9									
97	17	eP	Z	10	58	32								
		eS	ZNE			58								
98	17	eP	Z	15	10	58							59.0	USCGS: 7.1S, 129.4E. h about 117 km. Banda Sea H = 15 01 14.0 Mag. 5.5 (CGS)
99	17	iP	Z	16	04	22.9	2.0	1.8						Dilatation
		eS	ZNE		06	00								
100	17	eP	Z	20	34	32								
		eS	NE		35	05								
101	18	iP	Z	12	42	02.4							64.0	Compression USCGS: 7.0S, 124.0E. h about 574 km. Banda Sea H = 12 32 24.1 Mag. 5.8 (CGS)
		iPcP	Z			34								
		ipP	Z		44	08								
		eS	ZNE		49	52								
		esS	E		53.1									
		iSS	Z		54	09								
		eL	ZNE		57.0									
		eL	ZNE		59.7									
		Surface waves about 30 min.												
102	18	eP	Z	13	10	49								
103	18	eP	Z	13	30	07								
		eS	NE			32								
104	18	eP	Z	13	41	05								
		eS	NE			52								
105	18	iP	Z	20	04	30	4.0	1.9					3.5	Compression USCGS: 16.4S, 174.3W. h about 189 km. Tonga Islands H = 20 03 35 Mag. 4.2 (CGS)
		iS	NE		05	15								
106	18	eP	Z	21	19	02								
107	18	eP	Z	22	33	47	2.0	2.0					9.0	USCGS: 19.4S, 179.1W. h about 666 km. Fiji Islands region H = 22 31 37.7 Mag. 4.8 (CGS)
		eS	NE		35	30								

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Remarks
123	21	iP iS	Z NE	20	57	25.5 45						1.7	Compression Felt: Apia MM III USCGS: 15.1S, 173.0W. h about 33 km. Tonga Islands H = 20 56 59 Mag. 5.0 (CGS)
124	21	eS eS eSS eSSS e e eL eL	E NE NE N NE NE Z ZE	23	33 34 41 45 47 51	34 48 32 16 12 10						101.0	USCGS: 28.1N, 93.8E. h about 37 km. India-China border H = 23 09 18.8 Mag. 5.9 (CGS)
		Surface waves about 1 hour											
125	22	eL	ZNE	10	25.0							67.0	USCGS: 36.7N, 141.1E. h about 40 km. Near east coast of Honshu, Japan Felt Tokyo area H = 09 54 36.9 Mag. 4.8 (CGS)
126	22	iP eS	Z NE	18	08	07.3 25							Samoa Islands region
127	23	eP eS eT	Z NE ZNE	01	46 47 49	42 07 08							
128	23	ePKP ePP eSKS eS eS eSS eL eL eL	Z ZE E ZE ZE ZE E E ZE	02	14 16 21 25 27 32	50 06 43 50 12 50						118.0	USCGS: 19.8N, 56.0W. h about 31 km. North Atlantic Ocean Felt on board "R.V. Chain" at 19° 57'N., 55° 31'W. H = 01 56 03.2 Mag. 6 $\frac{3}{4}$ (PAS), 6 $\frac{1}{2}$ (BRK), 6.4(CGS)
		Surface waves about 1 hour											
129	23	eP eS	Z ZNE	09	42 45	39 18						15.3	USCGS: 28.2S, 177.3W. h about 68 km. Kermadec Islands H = 09 39 06.2 Mag. 4.6 (CGS)
130	23	eP eS	Z NE	16	06 07	47 16							
131	23	eL	ZNE	21	37.3							68.0	USCGS: 44.0N, 147.5E. h about 45 km. Kurile Islands H = 21 06 24.2 Mag. 5.9 (CGS)
132	24	eP eS	Z NE	03	44 45	43 03							Samoa Islands region
133	24	eP eS	Z NE	16	53	17 48							



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
134	25	eP eS	Z NE	00 41 54 42 53										
135	25	iP eS	ZNE NE	10 02 15.5 34								2.0	Dilatation USCGS: 15.3S, 173.3W. h about 33 km. Tonga Islands H = 10 01 48 Mag. 5.0 (CGS)	
136	25	eP e eS	Z ZNE ZNE	12 11 15 33 13 08								10.6	USCGS: 21.7S, 179.2W. h about 534 km. Fiji Islands region H = 12 08 46.9 Mag. 5.5 (CGS)	
137	26	iP iS	Z NE	03 42 27.7 48										
138	26	eP eS eL eL	Z NE N ZNE	14 33 22 42 10 49.3 52.8	1.0	2.1						64.0	USCGS: 2.2N, 126.8E. h about 48 km. Molucca Passage H = 14 22 57.8 Mag. 6.0 (CGS)	
139	26	iP iS	Z NE	18 54 29.2 52										
140	27	eP eS eL eT	Z NE ZNE ZNE	20 03 33 05 58 06.7 16 22								14.6	USCGS: 27.6S, 176.8W. h about 168 km. Kermadec Islands H = 20 00 35 Mag. 4.5 (CGS)	
141	27	eSS eL	ZN ZNE	21 52.2 22 02.3								82.0	USCGS: 45.6S, 96.1E. h about 33 km. Southeast Indian Rise H = 21 24 31.2	
142	28	iP eS eS	Z NE Z	05 50 51 09.4 12 36	1.0	2.0						6.0	Dilatation USCGS: 16.6S, 177.2W. h about 33 km. Fiji Islands region H = 05 48 45.4 Mag. 4.8 (CGS)	
143	28	iP iS	Z NE	21 36 00.7 21										
144	29	eP iS	Z NE	00 08 23 43										
145	30	eL	ZE	02 38.4								63.0	USCGS: 35.0S, 107.3W. h about 33 km. Easter Island Cordillera H = 02 10 37.6 Mag. 4.8 (CGS)	
146	30	eP eS	Z ZNE	16 35 36 34 44										

13.

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
147	31	eP	Z	04	18	43								
		eS	ZNE		20	23								
148	31	iP	ZNE	08	50	50							1.3	Dilatation USCGS: 14.4S, 173.0W. h about 235 km. Samoa Islands region H = 08 50 14.0 Mag. 4.1 (CGS)
		eS	NE		51	24								

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

John Milne
OBSERVER-IN-CHARGE

November 64

NEW ZEALAND
Department of Scientific and Industrial Research
Geophysics Division
APIA OBSERVATORY
FINAL SEISMOLOGICAL BULLETIN
STANDARD SEISMIC STATION (AFI)
AFIAMALU, WESTERN SAMOA.



Latitude: $13^{\circ} 54' 33.6''$ S Longitude: $171^{\circ} 46' 38.1''$ W
Height above mean sea level: 705.6 metres, 2315 ft.
Geocentric direction cosines: a. - 0.961 070
b. - 0.138 883
c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows
Instruments: World-wide standard seismograph system
Benioff short period seismometers
To = 1.0 sec. Tg = 0.75 sec.
Sprengnether long period seismometers
To = 30 sec. Tg = 100 sec.
Nominal Magnifications: S.P. 12500
L.P. 750

NOVEMBER 1964 *

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						(Deg.)	Remarks
1	1	eP	Z	00	48	00								
2	1	eP	Z	02	59	30	1.2	1.4					13.6	USCGS: 25.1S, 179.7W. h about 459 km. South of Fiji Islands H = 02 56 41.4 Mag. 5.0 (CGS)
3	1	eL	ZE	10	31.2								60.0	USCGS: 34.7S, 108.5W. h about 33 km. Easter Island Cordillera H = 10 03 28.6 Mag. 4.6 (CGS)
4	1	eP	Z	12	36	23	1.4	2.0					59.0	USCGS: 3.1N, 128.1E. h about 65 km. North of Halmahera H = 12 26 06.2 Mag. 5 $\frac{3}{4}$ -6(PAL), 6.3(CGS)
		eS	ZNE		44	44								
		eSS	ZN		48.7									
		eSSS	ZNE		51.4									
		eL	ZE		55.2									
5	1	eP	Z	13	25	30								Samoa Islands region
		eS	NE			56								
6	1	eP	Z	16	46	57							14.8	USCGS: 27.3S, 178.5W. h about 366 km. Kermadec Islands H = 16 43 41 Mag. 4.0 (CGS)
		eS	ZNE		49	17								

* See note at end.

* See note at end.



No	Date	Phase		(G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
7	1	iP	Z	19	00	53.6								Dilatation
8	2	iP	Z	07	04	39.9	1.5	2.0					94.0	Dilatation USCGS: 4.1S, 76.9W. h about 91 km. Northern Peru H = 06 50 58.2 Mag. 6 $\frac{3}{4}$ (PAS), 6.0(CGS)
		eS	ZNE		14.2									
		eSS	ZNE		21.5									
		eL	ZNE		30.9									
9	2	eP	Z	13	28	37								
		iS	NE		29	20								
10	2	eP	Z	18	39	31							9.4	USCGS: 20.9S, 178.2W. h about 604 km. Fiji Islands region H = 18 37 30 Mag. 4.4 (CGS)
		eS	ZNE		41	17								
11	3	eP	Z	05	31	04								Samoa Islands region
		eS	NE			28								
		e	ZNE		33	22								
12	3	eP	Z	09	06	29								Samoa Islands region
		eS	ZNE			56								
13	3	eL	Z	15	25.7								67.0	USCGS: 44.6N, 149.0E. h about 20 km. Kurile Islands H = 14 55 40.1 Mag. 5.0 (CGS)
14	3	eL	Z	18	48.3								40.0	USCGS: 1.7S, 149.8E. h about 35 km. New Ireland region Felt: Emira H = 18 28 58.6 Mag. 5.8 (CGS)
15	4	iP	Z	06	28	32							2.7	USCGS: 16.3S, 172.9W. h about 33 km. Samoa Islands region H = 06 27 54 Mag. 4.4 (CGS)
		eS	ZNE		29	01								
16	4	eP	Z	07	59	48								
		eS	NE	08	00	16								
17	4	eP	Z	17	13	15								
		eS	NE		14	02								
18	5	eP	Z	02	55	21								Samoa Islands region
		eS	NE			39								
19	5	eP	Z	04	27	08	1.5	1.9					41.3	USCGS: 5.5S, 147.2E. h about 197 km. East New Guinea region H = 04 19 39.5 Mag. 4.9 (CGS)
20	5	iP	Z	06	02	08.5								Compression Samoa Islands region
		eS	NE			29								

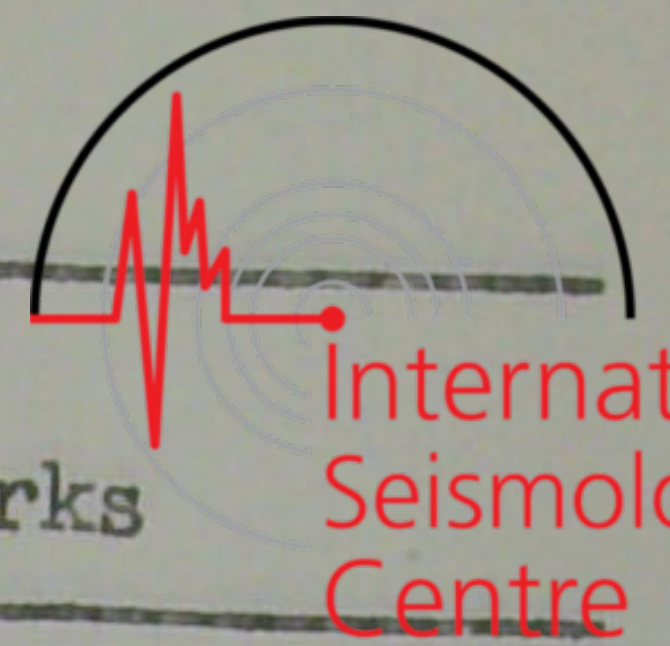


No	Date	Phase		Time G.M.T.)		Az Tz An Tn Ae Te						 (Deg.)	Remarks	
21	5	eL eL	ZN E	07	24.2 25.0							52.0	USCGS: 9.2N, 142.0E. h about 33 km. West Caroline Islands H = 07 01 15.3 Mag. 4.8 (CGS)	
22	5	eP eS eL eT	Z NE ZNE ZNE	09	09 10 11.1 15	09 15						6.7	USCGS: 20.3S, 174.0W. h about 15 km. Tonga Islands H = 09 07 32 Mag. 4.7 (CGS)	
23	5	eP iS	Z NE	11	58 59	57 18								Samoa Islands region
24	5	eS	NE	15	51	16								
25	6	eP eS eSSS eL	Z ZNE E ZNE	10	04 13.5 21.0 23.5	22						67.0	USCGS: 44.4N, 149.0E. h about 60 km. Kurile Islands H = 09 53 22.4 Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (PAL), 5.7 (CGS)	
26	7	eL	ZE	08	03.5							39.2	USCGS: 6.5S, 148.2E. h about 48 km. New Britain region H = 07 44 05.7 Mag. 5.3 (CGS)	
27	7	eL	ZN	15	20.3							67.0	USCGS: 45.5N, 150.3E. h about 33 km. Kurile Islands H = 14 49 13.4 Mag. 5.6 (CGS)	
28	7	eS eSS eL	Z Z Z	19	01.2 07.6 20.2							89.0	USCGS: 0.4N, 100.1E. h about 107 km. Northern Sumatra H = 18 37 43.7 Mag. 5.1 (CGS)	
29	7	eP eS	Z NE	23	43 45	50 17						6.7	USCGS: 19.9S, 177.4W. h about 281 km. Fiji Islands region H = 23 41 55.1 Mag. 4.5 (CGS)	
30	8	eP ePP eS eSS eL	ZNE ZNE ZNE ZNE ZN	02 03	51 53 57 00 04	34 12 44 40 14	1.0	1.5				42.0	USCGS: 49.0S, 163.7E. h about 33 km. Auckland Islands region H = 02 43 57 Mag. $6\frac{1}{2}$ (PAS), $6\frac{1}{4}$ - $6\frac{1}{2}$ (PAL)	
Surface waves about 1 hour														
31	8	eP eS	Z NE	04	32 34	37 08						7.7	USCGS: 18.1S, 178.5W. h about 643 km. Fiji Islands region H = 04 30 51.4 Mag. 3.5 (CGS)	
32	8	eP eS	Z NE	07	03 04	19 03								

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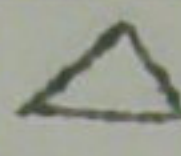


No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
33	8	eP eS	Z NE	08 31 43 59									Samoa Islands region	
34	8	eP eS eT	Z NE ZNE	14 48 49 54 14 20										
35	8	eP eS	Z NE	18 57 59 11										
36	8	eP eS	Z NE	21 43 44 07									Samoa Islands region	
37	9	eP eS	Z NE	15 30 31 12										
38	9	eL	Z	19 17.5								75.0	USCGS: 19.3N, 121.0E. h about 33 km. Philippine Islands region H = 18 43 38.6 Mag. 5.0 (CGS)	
39	9	eP eS	Z NE	20 12 13 25										
40	9	eP eS	Z NE	20 29 30 15									Samoa Islands region	
41	9	eP eS	Z NE	21 16 17 39						0.9 1.5				
42	9	eP	Z	23 37 40								10.0	USCGS: 14.0S, 177.9E. h about 421 km. Fiji Islands region H = 23 35 36 Mag. 3.8 (CGS)	
43	10	e(P)	Z	04 24 55										
44	11	e(L)	ZE	03 38.2										
45	11	eL eL	NE Z	08 33.3 36.2								76.0	USCGS: 59.4N, 144.6W. h about 10 km. Gulf of Alaska H = 08 01 26.1 Mag. 5.2 (CGS)	
46	11	eP eS	Z NE	11 21 23 49 42								11.6	USCGS: 23.7S, 178.0W. h about 332 km. South of Fiji Islands H = 11 19 39 Mag. 4.3 (CGS)	
47	11	eL	ZN	13 49.5								73.0	USCGS: 56.6N, 161.4E. h about 33 km. Near east coast of Kamohatka H = 13 17 37.5 Mag. 5.4 (CGS)	

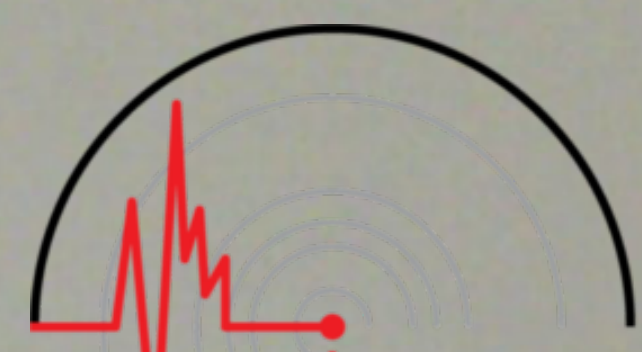


No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						(Deg.)	Remarks
48	11	eL	NE	14	19.0							16.6	USCGS: 29.4S, 178.2W. h about 89 km. Kermadec Islands region H = 14 11 05 Mag. 4.1 (CGS)
49	11	eL	NE	15	55.5								
50	11	eL	ZNE	17	16.9							73.0	USCGS: 56.6N, 161.4E. h about 33 km. Near east coast of Kamchatka H = 16 57 24.4 Mag. 5.2 (CGS)
51	11	eL	ZN	18	52.5							73.0	USCGS: 56.5N, 161.3E. h about 33 km. Near east coast of Kamchatka H = 18 18 52.7 Mag. 5.3 (CGS)
52	11	eL	ZN	19	40.4							73.0	USCGS: 56.5N, 161.3E. h about 33 km. Near east coast of Kamchatka H = 19 06 57.1 Mag. 5.6 (CGS)
53	12	eL	ZNE	01	21.3							20.6	USCGS: 33.0S, 179.7E. h about 8 km. South of Kermadec Islands H = 01 12 08
54	12	eP iS Coda about	Z NE 30 min.	05	34 35	39 44	1.0	2.1				6.2	USCGS: 18.2S, 176.4W. h about 107 km. Fiji Islands region H = 05 33 29 Mag. 5.2 (CGS)
55	12	eP eS	Z NE	07	54	05 41							
56	12	iP eS	ZNE ZNE	09	26 27	55.3 34						4.0	Compression from south-west Felt: Apia MM4 USCGS: 16.7S, 174.6W. h about 190 km. Tonga Islands H = 09 25 54.1 Mag. 4.8 (CGS)
57	12	eP eS	Z NE	09	47	11 54							
58	12	e(L)	Z	23	51.0								
59	13	eL	ZNE	00	09.8								



No	Date	Phase		Time (G.M.T.)		Az Tz An Tn Ae Te						 (Deg.)	Remarks	
60	13	eS	ZNE	00	38.2							7.0	USCGS: 18.5S, 177.1W. h about 329 km. Fiji Islands region H = 00 35 49 Mag. 4.2 (CGS)	
61	13	iP eS	ZNE NE	14	26	06.5 24								Compression from south-west Felt: Apia MM4
62	13	eP eS	Z NE	15	17 18	23 53						7.5	USCGS: 18.1S, 178.4W. h about 574 km. Fiji Islands region H = 15 15 27.4 Mag. 4.5 (CGS)	
63	13	eP eS eT	Z NE ZNE	20	00 03 16	33 07 45								
64	13	eP eS eL eT	Z NE ZNE ZNE	22	01 03 04.3 16	07 56 00	1.1	2.0				16.4	USCGS: 29.2S, 178.1W. h about 77 km. Kermadec Islands region H = 21 57 30 Mag. 5.4 (CGS)	
65	14	eP eS	Z NE	03	54 55	26 13								
66	14	eP eS eSSS eL	Z ZNE ZN ZNE	04	07 17.3 25.0 28.3	37						73.0	USCGS: 33.6N, 131.6E. h about 60 km. Kyushu, Japan H = 03 56 06.0 Mag. 5.3 (CGS)	
67	14	eL	ZNE	13	25.4							73.0	USCGS: 18.2N, 105.5W. h about 33 km. Off coast of Jalisco, Mexico H = 12 52 46.3 Mag. 5.3 (CGS)	
68	14	iP eS	Z NE	21	25	36 58								Samoa Islands region
69	15	eP	Z	01	15	41								
70	15	eP eS eT	Z NE ZNE	04	06 08 18	31 28 05								
71	15	eP eS	Z NE	07	24 25	03 34	2.0	1.9				7.5	USCGS: 18.0S, 178.3W. h about 608 km. Fiji Islands region H = 07 22 08.0 Mag. 4.2 (CGS)	
72	15	iP eS	Z ZNE	07	28	18.6 38	1.5	0.9						Compression Samoa Islands region
73	15	iP eS	Z NE	08	04	36.6 54	10.0	1.0						Compression Samoa Islands region

No.	Date	Phase	Time (G.M.T.)	Az	Tz	An	Tn	Ae	Te	Δ (Deg.)	Remarks
74	15	eS eS eL	E ZN ZNE	16	13.7 14.2 26.5					76.0	USCGS: 24.0N, 122.2E. h about 42 km. Taiwan region H = 15 52 21.5 Mag. 5.4 (CGS)
75	15	iP eS	Z ZNE	18	05 51	11.2				2.4 0.9	Dilatation
76	15	eP eS	Z NE	20	30 32	11 23					
77	16	eP eS	Z ZNE	05	52 53	44 00					Samoa Islands region
78	16	eP iS	Z NE	06	03 59	39					Samoa Islands region
79	16	eP eS	Z NE	07	33 34	45 04					Samoa Islands region
80	16	eP eS	Z NE	11	23 24	46 03					Samoa Islands region
81	16	eP eS	Z NE	21	21 22	54 26					
82	16	iP eS	Z NE	23	03 04	39 00					Compression
83	16	iP eS	ZNE ZN	23	06 28	06.5				2.3	Compression Felt: Apia USCGS: 15.8S, 173.0W. h about 12 km. Tonga Islands H = 23 05 29.2 Mag. 4.8 (CGS)
84	17	iP e eS	Z ZN ZN	00	02 23 36	01.2				2.4	Compression USCGS: 15.8S, 173.0W. h about 12 km. Tonga Islands Felt: Tonga Islands and Apia, W. Samoa H = 00 01 17.1 Mag. 5.4 (CGS)
85	17	iP iS	ZNE N	05	27 20	10.5	5.2 0.7				Dilatation from south-west Felt: Apia MM II Samoa Islands region
86	17	eP eS eL eT	Z ZE ZN ZE	08	10 12 13.4 20	42 23				10.4	USCGS: 23.5S, 175.7W. h about 320 km. Tonga Islands region H = 08 08 56.7 Mag. 4.4 (CGS)
87	17	iP iS iL	Z ZN ZN	08	22 28 31	53 44 30	10.0 2.0			37.7	Compression USCGS: 5.7S, 150.7E. h about 45 km. New Britain region H = 08 15 39.3 Mag. 7.4 (PAS), 7 (CGS)



No	Date	Phase	Time (G.M.T.)	Az Tz An Tn Ae Te	(Deg.)	Remarks
88	17	eP Z eS ZE eScP ZE Short period activity follows for several minutes	11 05 33 07 40 12 33	1.5 1.5	12.4	USCGS: 23.4S, 179.9W. h about 549 km. South of Fiji Islands H = 11 03 06.8 Mag. 5.5 (CGS)
89	17	eS ZN eL ZN	19 16 24 22.7		50.0	USCGS: 12.7N, 144.9E. h about 43 km. South of Mariana Islands H = 19 00 10.4 Mag. 5.1 (CGS)
90	18	iP Z eS E	12 09 50 10 33	3.0 1.1		Dilatation
91	18	iP Z eS ZN eSS ZN eL Z	14 42 27.5 48 32 50 40 54.0		42.0	Dilatation USCGS: 6.0S, 148.2E. h about 49 km. New Britain region H = 14 34 54.5 Mag. 6.1 (CGS)
92	18	eP Z eS ZE eL ZN e ZE eT ZE Coda about 1½ hours	22 22 33 23 45 24.0 27 47 29 00		6.7	USCGS: 20.2S, 174.1W. h about 33 km. Tonga Islands H = 22 21 01.9 Mag. 5.8 (CGS)
93	18	eP Z eS E eT ZE	23 36 37 37 48 43 04		6.6	USCGS: 20.1S, 174.3W. h about 33 km. Tonga Islands H = 23 35 03.9 Mag. 5.1 (CGS)
94	19	iP Z iS ZE	03 30 40.5 59			Compression Samoa Islands region
95	19	iP Z iS E	04 34 25 35 07	3.2 0.8		Dilatation
96	19	eSSS NE eL NE	16 01 58 04.0		38.0	USCGS: 3.4S, 150.1E. h about 38 km. New Ireland region H = 15 45 31.2 Mag. 5.7 (CGS)
97	19	eP Z eS NE	20 17 18 44			Samoa Islands region
98	19	iP Z eS ZNE iL ZNE Coda about 2½ hours	23 42 24.8 48 14 51 08	4.5 2.5	37.6	Dilatation USCGS: 6.0S, 150.8E. h about 3 km. New Britain region Slight damage at Walindi H = 23 35 06.0 Mag. 6 $\frac{3}{4}$ (PAS), 6 $\frac{3}{4}$ (BRK), 6.0(CGS)



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
99	20	eP	Z	00	02	26	0.8	2.0					38.0	USCGS: 6.9S, 149.9E. h about 33 km. New Britain region H = 23 55 06.8 Mag. 5.6 (CGS)
100	20	eP iS	Z NE	10	31	00 32								
101	20	eP eS	Z NE	13	01 03	52 26								
102	20	eP eS	Z NE	15	02	15 30								Samoa Islands region
103	20	eP e(S)	Z NE	16	41 43	35 51								
104	20	eP eS eT	Z NE ZNE	23	47 48 52	56 44 10								
105	21	eL eL	NE ZNE	00	01.2 03.5								67.0	USCGS: 44.6N, 149.7E. h about 33 km. Kurile Islands H = 23 33 08.9 Mag. 5.6 (CGS)
106	21	eP eS	Z NE	00	45	05 50								
107	21	eP eS	Z NE	08	45	05 42								
108	21	eP eS eL eT	Z NE E ZNE	15	44 46 47.9 57	35 57 02								
109	21	eL	ZNE	15	56.8								50.0	USCGS: 12.8N, 145.2E. h about 35 km. South of Mariana Islands H = 15 34 13.2 Mag. 5.2 (CGS)
110	21	eP eS	Z NE	18	52 54	12 02	0.5	1.1						
111	22	eP eS eT	Z NE ZNE	00	13 14 19	12 10 50								
112	22	iP eS	Z NE	02	40 41	24 53	1.3	2.0					7.5	Compression USCGS: 17.9S, 178.5W. h about 563 km. Fiji Islands region H = 02 38 29.0 Mag. 5.0 (CGS)
113	22	eP eS	ZNE ZNE	02	45 48	02 16	1.2	2.1	1.1	2.0	1.2	2.0	18.4	USCGS: 22.1S, 171.1E. h about 106 km. Loyalty Islands region H = 02 40 55.9 Mag. 5.3 (CGS)

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No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
114	22	iP eL	ZE ZE	05 06	53 05.6	47.7	1.0	2.2			0.9	2.0	38.0	Dilatation USCGS: 6.2S, 150.4E. h about 47 km. New Britain region H = 05 46 33.3 Mag. 5.4 (CGS)
115	24	eP eS	Z NE	06	37 39	30 13							9.5	USCGS: 20.2S, 179.2W. h about 660 km. Fiji Islands region H = 06 35 14.5 Mag. 4.8 (CGS)
116	24	eP eS	Z NE	09	21	26 46								Samoa Islands region
117	24	eP eS	Z NE	10	14 15	29 04								Samoa Islands region
118	24	eP	Z	10	53	30	2.5	2.0					80.0	USCGS: 6.8S, 107.4E. h about 125 km. Java H = 10 41 33.5 Mag. 6.0 (CGS)
119	24	eP eS eSSS iL eL iL	Z ZNE NE Z NE ZNE	12 13	52 01 08 12 36 18	02 00 48 28 36 26							69.0	USCGS: 13.1N, 124.7E. h about 5 km. Luzon, Philippine Islands H = 12 40 51.4 Mag. 6.1 (CGS)
120	24	eP eS	Z NE	13	17 18	26 05								
121	24	eP eS	Z NE	14	51 53	39 53							13.0	USCGS: 24.6S, 179.5W. h about 406 km. South of Fiji Islands H = 14 48 47 Mag. 4.2 (CGS)
122	24	eP eS	Z NE	19	48 49	36 21								
123	24	eP eS	Z NE	23	53 55	42 25							10.3	USCGS: 23.2S, 176.0W. h about 33 km. South of Fiji Islands H = 23 51 20 Mag. 4.7 (CGS)
124	25	iP iS	Z ZNE	08	32 33	38.7 27	3.2	1.0					4.0	Dilatation USCGS: 16.1S, 175.1W. h about 302 km. Tonga Islands H = 08 31 32.9 Mag. 4.7 (CGS)
125	25	eL	Z	13	17.0								28.0	USCGS: 9.5S, 158.8E. h about 38 km. Solomon Islands H = 13 02 41.7 Mag. 5.4 (CGS)

12.

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
142	30	ePP	Z	12	44	54							94.0	USCGS: 6.8N, 94.8E. h about 33 km. Nicobar Islands region H = 12 27 38.6 Mag. $6\frac{1}{2}$ - $6\frac{3}{4}$ (PAL), 5.7(CGS)
		eS	N		52.3									
		eS	Z		53.2									
		e	N		55.2									
		eSS	ZN		59	06								
		eSSS	ZN	13	02.6									
		e	N		04	56								
		eL	N		07.2									
		eL	ZN		12.0									
143	30	eP	Z	14	07	49								Samoa Islands region
		eS	NE		08	11								
144	30	eP	Z	16	10	20	1.5	1.4					13.1	USCGS: 23.8S, 179.3E. h about 481 km. South of Fiji Islands H = 16 07 30 Mag. 4.8 (CGS)
		eS	NE		12	32								
145	30	iP	Z	18	55	51.7	2.0	1.6					10.4	Dilatation USCGS: 24.0S, 179.9E. h about 550 km. South of Fiji Islands H = 18 53 11.4 Mag. 5.5 (CGS)
		eS	NE		58	02								

NOTE:

- (i) Trace amplitudes (A) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

John Milne
OBSERVER-IN-CHARGE

Dec 64

NEW ZEALAND
Department of Scientific and Industrial Research
Geophysics Division
APIA OBSERVATORY



FINAL SEISMOLOGICAL BULLETIN
STANDARD SEISMIC STATION (AFI)
AFIAMALU, WESTERN SAMOA.

Latitude: $13^{\circ} 54' 33.6''$ S Longitude: $171^{\circ} 46' 38.1''$ W
Height above mean sea level: 705.6 metres, 2315 ft.
Geocentric direction cosines: a. - 0.961 070
b. - 0.138 883
c. - 0.238 862

Lithological Foundation: Basaltic Lava Flows
Instruments: World-wide standard seismograph system
Benioff short period seismometers
To = 1.0 sec. Tg = 0.75 sec.
Sprengnether long period seismometers
To = 30 sec. Tg = 100 sec.
Nominal Magnifications: S.P. 12500
L.P. 750

DECEMBER 1964 *

No	Date	Phase		Time									(Deg.)	Remarks
				(G.M.T.)			Az	Tz	An	Tn	Ae	Te		
1	1	iP	Z	04	47	58	3.0	0.8						
		eS	NE		48	25								
2	1	eP	Z	04	54	50							6.4	USCGS: 18.9S, 175.8W. h about 232 km. Tonga Islands Felt: Leone, American Samoa H = 04 53 23.9 Mag. 5.5 (CGS)
		eS	ZN		55	36								
		Movement follows for several min.												
3	1	iP	ZNE	05	26	07								Dilatation
		eS	NE		27	06								
4	1	eP	Z	11	51	07							17.9	USCGS: 30.9S, 177.9W. h about 33 km. Kermadec Islands region H = 11 47 02.4 Mag. 4.9 (CGS)
		eS	NE		54	05								
		eT	ZNE	12	08	13								
5	2	eP	Z	06	37	56								
		eS	ZNE		38	45								
6	2	eL	Z	10	23.0								30.0	USCGS: 9.1S, 158.0E. h about 42 km. Solomon Islands H = 10 08 39.6 Mag. 5.6 (CGS)
* See note at end.														

* See note at end.



No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
7	2	eP eS	Z NE	11 35 37	40 10								8.6	USCGS: 21.9S, 175.2W. h about 33 km. Tonga Islands H = 11 33 36.6 Mag. 4.6 (CGS)
8	2	eL	ZN	13	49.6								66.0	USCGS: 53.8N, 165.4W. h about 35 km. Fox Islands Aleutian Islands H = 13 18 29.0 Mag. 5.0 (CGS)
9	2	eP eS	Z NE	15 22 23	08 37								8.2	USCGS: 19.6S, 177.8W. h about 396 km. Fiji Islands region H = 15 20 11.4 Mag. 4.3 (CGS)
10	3	eL	ZNE	04	45.3								116.0	USCGS: 15.0S, 66.8E. h about 46 km. Mid-Indian Rise H = 03 50 01.2 Mag. 6.1 (CGS)
11	3	eP eS	Z NE	19 15 18	45 32		1.0	1.9						
12	3	eP eS	Z NE	19 25 28	54 40		0.5	1.1						
13	3	eP	Z	21	03 28		0.5	2.0						
14	3	eP	Z	22	35 49									
15	4	eP eS eT	Z ZNE ZNE	00 39 40 42	33 05 20		3.2	2.0					2.6	USCGS: 15.4S, 173.9W. h about 33 km. Tonga Islands H = 00 38 54.7 Mag. 4.5 (CGS)
16	4	eL	ZNE	02	27.5								73.0	USCGS: 7.8N, 102.7W. h about 33 km. Off coast of Mexico H = 01 54 49.3 Mag. 4.9 (CGS)
17	4	eP eS	Z NE	09 37	10 53									
18	4	eP eS eT	Z NE ZNE	10 20 21 25	58 33 08									
19	4	eP eS eL eL	Z ZNE ZNE ZE	15 16 04 06.2	07 48 44								37.6	USCGS: 6.4S, 150.7E. h about 19 km. New Britain region H = 15 48 43.4 Mag. 5.2 (CGS)



No	Date	Phase		Time (G.M.T.)		Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
32	8	eS	NE	18	09.8							66.0	USCGS: 34.7N, 139.2E. h about 31 km. Near south coast of Honshu, Japan H = 17 49 46.3 Mag. 5.2 (CGS)
		eSSS	NE		17.2								
		eL	ZNE		20.0								
33	9	eP	Z	06	21							7.5	USCGS: 19.5S, 176.9W. h about 290 km. Fiji Islands region H = 06 19 33.3 Mag. 3.8 (CGS)
		eS	NE		22								
					40								
34	9	eS	ZNE	11	40							60.0	USCGS: 35.1S, 109.7W. h about 33 km. Easter Island Cordillera H = 11 22 22 Mag. 4.7 (CGS)
		eL	ZNE		48.7								
35	9	eSKS	NE	13	58							101.0	USCGS: 27.5S, 63.2W. h about 586 km. Santiago del Estero Province, Argentina H = 13 35 42.4 Mag. 5-5 $\frac{1}{4}$ (BRK), 6 $\frac{1}{4}$ (PAL), 5.9(CGS)
		eSP	ZNE	14	00								
		esS	NE		03.3								
		esSS	ZNE		09								
		eL	Z		16.3								
		eL	Z		21.6								
36	10	eP	Z	03	19								Samoa Islands region
		eS	NE										
					45								
37	10	eP	Z	11	28								
		eS	NE		30								
					27								
38	10	eP	Z	15	22	1.5	2.0					71.0	USCGS: 40.4N, 138.9E. h about 33 km. Eastern Sea of Java H = 15 11 05.5 Mag. 6 $\frac{3}{4}$ -7(BRK), 6(PAL), 6.0 (CGS)
		e	ZNE		28								
		eS	ZNE		31								
		e	E		34								
		e	N		35								
		eSS	ZNE		37								
		eL	NE		40								
		eL	ZNE		43								
39	11	eP	Z	06	13								Samoa Islands region
		eS	NE										
					43								
40	11	eP	Z	06	51								
		eS	NE										
					54								
41	11	eP	Z	16	15							76.0	USCGS: 38.9N, 130.0E. h about 550 km. Sea of Japan H = 16 04 58.2 Mag. 5.6 (CGS)
					47								
42	11	iP	Z	19	03							2.1	Compression USCGS: 15.3S, 173.4W. h about 33 km. Tonga Islands H = 19 03 26 Mag. 4.5 (CGS)
		iS	NE		04								
					16								

No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						Δ (Deg.)	Remarks
43	12	eP iS	Z NE	02 20 25 52									2.4	USCGS: 15.0S, 173.8W. h about 33 km. Tonga Islands H = 02 19 52.2 Mag. 5.0 (CGS)
44	12	eP eS eSSS eL	Z ZNE ZNE ZE	07 27 32 36 38.0	14 55 00								37.6	USCGS: 6.9S, 150.6E. h about 33 km. New Britain region Felt H = 07 20 00.0 Mag. 5.9 (CGS)
45	12	eP iS	Z NE	12 54 55	10 00									
46	12	iP eS eT	Z NE ZNE	19 47 49 57	40 43 51		3.6	2.0					12.9	Compression USCGS: 26.1S, 175.9W. h about 85 km. South of Tonga Islands H = 19 44 55.7 Mag. 4.9 (CGS)
47	12	eP eS eT	Z NE ZNE	22 17 18 24	22 32 04								6.6	USCGS: 20.2S, 174.0W. h about 33 km. Tonga Islands H = 22 15 51 Mag. 5.0 (CGS)
48	12	eL	Z	23 28.0									41.0	USCGS: 5.8S, 147.1E. h about 68 km. East New Guinea region H = 23 07 46.1 Mag. 5.0 (CGS)
49	13	eP eS eL	Z NE Z	00 18 24 25.2	25 10		1.5	2.0						
50	13	iP iS	Z NE	13 21 22	44.3 05									Compression Samoa Islands region
51	14	eL	ZNE	02 51.0									113.0	USCGS: 54.3S, 2.4W. h about 33 km. South Atlantic Ridge H = 01 59 05.6
52	15	iP iS	Z NE	01 17 18 37									2.3	Compression USCGS: 15.5S, 173.3W. h about 14 km. Tonga Islands Felt: Apia H = 01 16 41.7 Mag. 4.6 (CGS)
53	15	eL	ZE	12 51.4									85.0	USCGS: 14.7N, 91.7W. h about 118 km. Guatemala Felt H = 12 13 25.8 Mag. 5.4 (CGS)



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
54	15	iP eS	Z NE	22 16 17	41 00								Compression Felt: Apia Samoa Islands region	
55	16	eL	ZE	02	41.8							42.0	USCGS: 3.2S, 147.5E. h about 33 km. Bismarck Sea H = 02 21 30.7 Mag. 4.9 (CGS)	
56	16	eL	ZNE	03	25.5							42.0	USCGS: 3.2S, 147.3E. h about 33 km. Bismarck Sea H = 03 08 12.1 Mag. 4.8 (CGS)	
57	16	eP iS	Z NE	13 41 07 27									Samoa Islands region	
58	16	eP eS eL	ZN ZNE E	19 22 23 24.0	27 44	1.0	1.1	1.5	1.2			8.6	USCGS: 21.8S, 175.3W. h about 33 km. Tonga Islands H = 19 20 26.3 Mag. 5.4 (CGS)	
59	16	iP iS	Z NE	22 53 27 48									Compression Samoa Islands region	
60	17	eL	ZN	05	49.5							67.0	USCGS: 45.4N, 150.1E. h about 17 km. Kurile Islands H = 05 18 34.8 Mag. 5.3 (CGS)	
61	17	eP eS	Z NE	10 30 31 52		2.0	1.2					7.7	USCGS: 21.0S, 175.0W. h about 33 km. Tonga Islands H = 10 28 41.7 Mag. 4.4 (CGS)	
62	18	eS eL	ZNE ZNE	00 03 13.6	36							65.0	USCGS: 51.4N, 177.9W. h about 57 km. Andreanof Islands, Aleutian Islands H = 23 44 46.2 Mag. 5.5 (CGS)	
63	18	eP	Z	07	10	58								
64	18	iP	Z	09	41	05	1.5	1.8					Compression	
65	18	eP eS	Z NE	20 48 49	21 16									
66	19	eP e eS	Z NE ZNE	06 45 46 49	53 11 18							19.8	USCGS: 32.8S, 177.6W. h about 203 km. South of Kermadec Islands H = 06 41 27.3 Mag. 4.4 (CGS)	
67	19	e(P)	ZN	23	30	34								



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
68	20	eP	Z	08	34	30	1.0	1.8					7.5	USCGS: 18.7S, 177.6W. h about 628 km. Fiji Islands region H = 08 32 35 Mag. 4.6 (CGS)
69	20	iP iS	ZNE ZNE	11	28 30	33.3 05	10.7	1.8	6.0	1.9	5.0	1.9	8.5	Dilatation USCGS: 20.1S, 177.7W. h about 463 km. Fiji Islands region H = 11 26 32.6
70	20	iP iS	ZNE NE	12	12	28 46	8.0	1.3	5.0	1.8	4.0	1.9		Dilatation Samoa Islands region
71	20	iP eS	Z NE	17	36	18.9 40	5.8	0.9						Compression Samoa Islands region
72	21	eP eS	ZNE ZNE	01	35 36	10 44	1.3	1.9	0.6	1.8	1.5	2.0		
73	21	eP	Z	14	18	39								
74	21	eP e(S)	Z NE	16	35 37	07 19								
75	21	eP eS eT	Z NE ZNE	18	15 16 18	43 11 24								
76	22	eP eS	Z ZNE	02	33 35	19 06							9.3	USCGS: 20.7S, 178.2W. h about 85 km. Fiji Islands region H = 02 30 08.7 Mag. 4.7 (CGS)
77	22	eP eS	Z NE	06	07	22 40								Samoa Islands region
78	22	eP eS	Z NE	11	35	10 29								Samoa Islands region
79	22	eP i eS	ZE Z ZNE	12	00 02	35 41 32	1.0 2.5	2.0 1.9			1.5	2.0	11.4	USCGS: 22.2S, 179.7W. h about 600 km. South of Fiji Islands H = 11 58 10.1 Mag. 5.0 (CGS)
80	22	eP eS	Z NE	12	08 09	37 27	2.3	1.0						
81	22	eL eL	E ZNE	21	23.6 26.0								69.0	USCGS: 31.9N, 117.1W. h about 14 km. Off west coast of Baja California. Minor damage at Ensenada Mexico and San Diego. Felt at El Centro and Los Angeles. H = 20 54 35.3 Mag. 5.6(PAS), 6-6 $\frac{1}{4}$ (PAL), 6.3(CGS)



No	Date	Phase		Time (G.M.T.)			Az	Tz	An	Tn	Ae	Te	 (Deg.)	Remarks
82	23	eP	Z	06	53	16								
		eS	NE			44								
		e	ZNE		55	40								
83	23	iP	Z	14	14	40	2.2	1.0						Compression
		iS	NE		15	14								
84	23	iP	Z	15	44	17.2								Samoa Islands region
		iS	NE			36								
85	23	eP	Z	17	25	19								
		eS	NE			51								
86	23	eL	Z	20	21.3								71.0	USCGS: 30.3N, 131.1E. h about 33 km. Kyushu, Japan H = 19 47 59.3 Mag. 5.4 (CGS)
Bursts of microseismic activity (T=0.8 sec.) caused by heavy seas pounding the coast of Upolu during 24th.														
87	24	eP	ZNE	18	53	01							35.9	USCGS: 4.4S, 153.1E. h about 93 km. New Ireland region Felt: Rabaul and Londolovit H = 18 45 45.5 Mag. 6.1 (CGS)
		eL	ZNE	19	01.0									
88	24	iP	ZNE	18	54	29								Samoa Islands region
		eS	NE			48								
89	24	eP	Z	23	51	23							12.5	USCGS: 23.9S, 179.9W. h about 473 km. South of Fiji Islands H = 23 48 37.2 Mag. 4.6 (CGS)
		eS	NE		53	36								
90	25	iP	Z	03	17	19.8	8.0	1.0					1.9	Compression USCGS: 15.2S, 173.2W. h about 11 km. Tonga Islands H = 03 16 47.1 Mag. 4.5 (CGS)
		iS	NE			38								
91	25	eP	Z	04	27	52								Samoa Islands region
		eS	NE		28	10								
92	25	eP	Z	08	09	55								Samoa Islands region
		eS	NE		10	15								
93	25	eP	Z	13	02	30								Samoa Islands region
		eS	NE			50								
94	25	eP	Z	15	18	28								
		eS	NE		20	00								
95	25	iP	Z	20	51	02.4	4.5	1.5						Dilatation Samoa Islands region
		eS	NE			20								



No	Date	Phase		Time (G.M.T.)			Az Tz An Tn Ae Te						 (Deg.)	Remarks
110	30	iP eS	Z NE	03	31	21 35								Samoa Islands region
111	30	eP e eS eT	Z E ZNE ZNE	13	16 17 18 21	56 04 00 00						5.0		USCGS: 16.7S, 175.0W. h about 33 km. Tonga Islands H = 13 15 55 Mag. 4.8 (CGS)
112	30	eL	ZE	13	35	26						54.0		USCGS: 12.4N, 142.0E. h about 100 km. South of Mariana Islands H = 13 08 50.2 Mag. 4.9 (CGS)
113	30	eSS eL	E ZN	13	38.8 43.0							50.0		USCGS: 62.6S, 165.8E. h about 33 km. Balleny Islands region H = 13 19 47.4 Mag. 5.2 (CGS)
114	30	eP	Z	15	37	42	3.4	1.7				65.0		USCGS: 31.3N, 138.8E. h about 261 km. South of Honshu, Japan H = 15 27 25.8 Mag. 5.4 (CGS)
115	30	eP eS eScP ePcS	Z NE Z Z	21	33 35 40 41	34 36 25 18						12.1		USCGS: 23.3S, 179.9W. h about 547 km. South of Fiji Islands H = 21 30 58.8 Mag. 5.2 (CGS)
116	31	eP eS eT	Z NE ZNE	06	42 45	02 34 04								
117	31	eP eS eT	Z ZNE ZNE	11	25 26 28	28 02 23								
118	31	eP eS	Z NE	17	45 47	20 42	2.0	2.0						

NOTE:

- (i) Trace amplitudes (Δ) are expressed in millimetres and periods (T) in seconds.
- (ii) *Readings to be incorporated in the New Zealand Seismological Report for 1964.

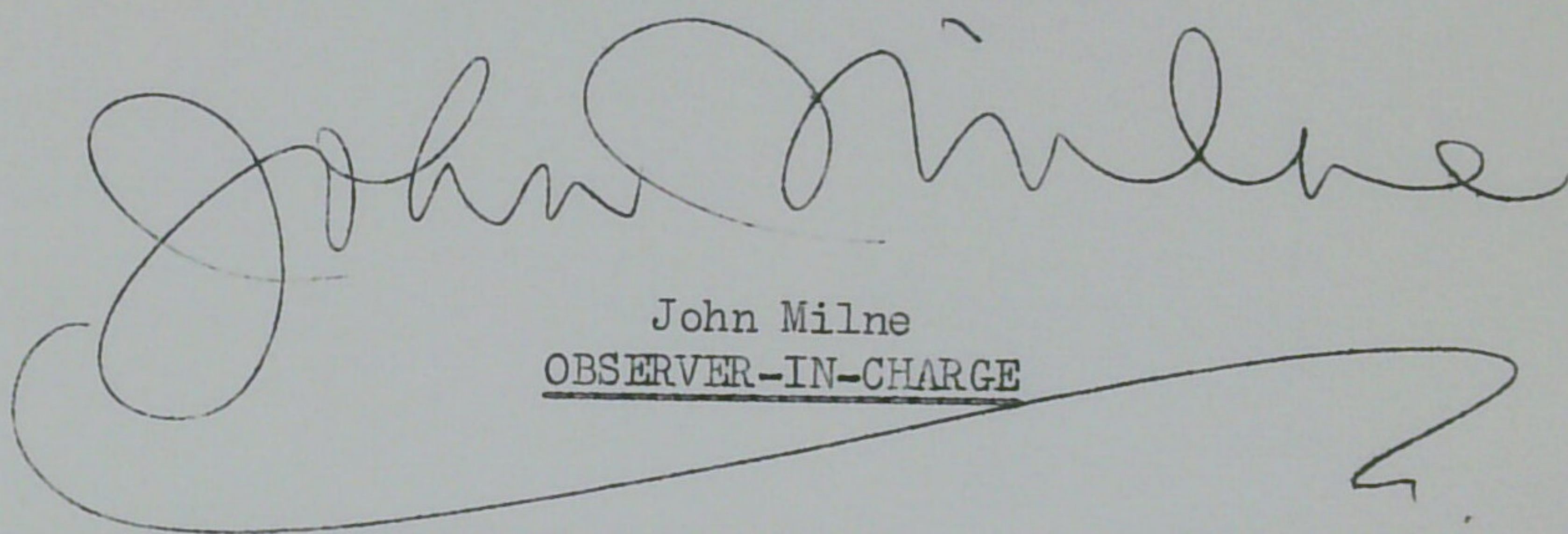
This completes the second successive year for which a final seismological bulletin has been prepared at Apia Observatory for the World Wide Standardized Seismograph Network Station operated by New Zealand at Afiamalu in Western Samoa.

For this achievement I am greatly indebted to the following colleagues and officers of the New Zealand Department of Scientific and Industrial Research for their

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continued active interest and generous encouragement : Dr F.F. Evison, Director of the Geophysics Division and formerly Superintendent of the Wellington Seismological Observatory, Dr R.D. Adams, the present Superintendent, and Mr G.A. Eiby, Senior Seismologist.

For the exacting, onerous and extremely important task of reading the seismograms, and for doing most of the work of compilation, I owe considerable thanks to my capable and enthusiastic Senior Seismic Observer, Iosa Anapu, who has been ably assisted by Trainee Observer Motu Pasefika. However, responsibility for production of the bulletin and all that it contains rests with the Observer-in-Charge.



John Milne
OBSERVER-IN-CHARGE