

1949

Apia Observatory, Western Samoa.

Preliminary Seismological Bulletin.



January - March, 1949:

No. 1, 1949:

Latitude: 13° 48' 26" S.
 Longitude: 171° 46' 30" W.
 or 11h.27m. 6s.W.
 Geocentric Direction
 Cosines: a=-9615, b=-1390, c=-2371.
 Altitude: 2 metres.
 Lithological Foundation: Coral sand on volcanic rock.

Instruments:

Horizontal components: Short period Wood-Anderson torsion seismograph. Wiechert 1000 kg. astatic pendulum (Bartels)
 Vertical Component: Wiechert 80 kg. vertical pendulum (Spindler and Hoyer)

Tables for computation:

H. Jeffreys and K.E. Bullen, Seismological Tables, 1940.
 H. Jeffreys, Times of Transmission for small distances and focal depth, 1939.
 G.J. Brunner and J.B. Macelwane, The Brunner focal depth-time-distance chart.

Time Service:

The Standard clock, Strasser and Rohde No. 381, is rated daily against radio time signals. A "Synchronome" clock is used to time-mark the records.

All times are entered in Greenwich Mean Time (Universal Time).

January 1949:

2nd.	iP WANEZ	00h. 12m. 05s.	5th.	i WA	09h. 00m. 49s.
	iS WANEZ	00h. 12m. 23s.	5th.	iP WA	23h. 50m. 55s.
	Distance=1.4° H=00h. 11.7m.			iS WANE	23h. 51m. 14s.
	Probably felt locally			Distance=1.4° H=23h. 50.5m.	
	M.M.II-III.		6th.	iS WA	01h. 58m. 08s.
2nd.	iS WANE	07h. 14m. 13s.		slight local shock.	
	slight local shock.		7th.	iP WA	09h. 50m. 18s.
2nd.	iP WANE	22h. 44m. 53s.		iS WA	09h. 51m. 54s.
	iS WANEZ	22h. 45m. 11s.		Distance=8.4° H=09h. 48.2m.	
	Distance=1.4° H=22h. 44.5m.		7th.	iS WANE	15h. 35m. 35s.
3rd.	iP WA	07h. 05m. 49s.		slight local shock.	
	iS WANEZ	07h. 06m. 07s.	8th.	iP WANE	12h. 27m. 51s.
	Distance=1.4° H=07h. 05.4m.			iS WANE	12h. 29m. 27s.
4th.	i WA	07h. 32m. 23s.		Distance=8.4° H=12h. 25.8m.	
4th.	eS? WANE	10h. 42m. 41s.	12th.	iS WANE	16h. 34m. 25s.
4th.	iP WA	14h. 35m. 40s.		slight local shock.	
	iS WANE	14h. 36m. 02s.c.a.	13th.	iP WANEZ	08h. 50m. 55s.
4th.	iP WANE	16h. 05m. 02s.c.a.		iS WANEZ	08h. 53m. 16s.
	iS WANE	16h. 05m. 19s.		Distance=13° H=08h. 47.9m.	
4th.	iS WANE	22h. 15m. 53s.	13th.	i WAEN	09h. 01m. 21s.
	slight local shock.		13th.	iP WANEZ	09h. 03m. 31s.
5th.	iP WANE	02h. 31m. 43s.		iS WANE	09h. 06m. 01s.
	iS WANE	02h. 32m. 26s.		Distance=13° H=09h. 00.5m.	
	Distance=3.6° H=02h. 30.8m.				



15th.	iP WA	01h. 54m. 23s.c.a.	25th.	iS WANE	06h. 05m. 47s.
	iS WANE	01h. 56m. 12s.		slight local shock.	
16th.	e WANE	04h. 22m. 14s.	25th.	iS WANE	12h. 59m. 48s.
19th.	iS WA	02h. 30m. 40s.		slight local shock.	
	slight local shock.		25th.	iP WA	13h. 02m. 44s.
19th.	iP NE	15h. 01m. 22s.		iS WANE	13h. 03m. 00s.
	iS NEZ	15h. 01m. 44s.		Distance=1.2° H=13h. 02.4m.	
	Distance=1.7° H=15h. 00.9m.		25th.	iS WANE	23h. 14m. 14s.
	WA not recording.			slight local shock.	
19th.	iP NEZ	17h. 42m. 42s.	26th.	iP WANE	04h. 23m. 03s.c.a.
	iS NEZ	17h. 43m. 04s.		iS WANE	04h. 23m. 45s.
	Distance=1.7° H=17h. 42.2m.		27th.	iS? EN	07h. 27m. 23s.
	WA not recording.			iSS? EN	07h. 31m. 24s.
20th.	iP WANE	05h. 18m. 33s.		eLr? NE	07h. 40m. c.a.
	iS WANEZ	05h. 18m. 52s.	27th.	eL NE	15h. 18m. c.a.
	Distance=1.4° H=05h. 18.1m.		29th.	iP WAEN	21h. 50m. 03s.c.a.
21st.	iP WANEZ	17h. 43m. 49s.		iS WANE	21h. 50m. 21s.
	iS WANEZ	17h. 44m. 05s.	30th.	iP WA	08h. 13m. 45s.
	Distance=1.2° H=17h. 43.5m.			iS WANE	08h. 14m. 03s.c.a.
21st.	iP WANEZ	18h. 23m. 49s.	31st.	iP WANEZ	23h. 31m. 45s.
	iS WANEZ	18h. 24m. 05s.		compression from NE?	
	Distance=1.2° H=18h. 23.5m.			iS WANEZ	23h. 32m. 05s.
21st.	iP WA	18h. 39m. 21s.		Distance=1.6° H=23h. 31.3m.	
	iS WANEZ	18h. 39m. 37s.		iS? WANEZ	23h. 32m. 30s.
	Distance=1.2° H=18h. 39.0m.			The first shock appears to have	
21st.	iP WA	19h. 24m. 37s.		been followed by another of	
	iS WA	19h. 25m. 09s.		approximately equal magnitude	
	Distance=2.6° H=19h. 23.9m.			half a minute later.	
	E and N not recording.			Felt locally M.M.III.	
22nd.	iP WANEZ	01h. 04m. 03s.			
	iS WANEZ	01h. 04m. 19s.			
	Distance=1.2° H=01h. 03.7m.				
22nd.	iP WA	01h. 12m. 23s.			
	iS WANE	01h. 12m. 40s.			
	Distance=1.3° H=01h. 12.0m.				
22nd.	iS? WANE	01h. 41m. 05s.			
	slight local shock.				
22nd.	iP WANEZ	01h. 49m. 51s.			
	iS WANEZ	01h. 50m. 32s.			
	Distance=3.4° H=01h. 49.0m.				
22nd.	iP WANE	02h. 58m. 43s.			
	iS WANEZ	02h. 58m. 59s.			
	Distance=1.2° H=02h. 58.2m.				
22nd.	i WANE	03h. 01m. 41s.			
	slight local shock.				
22nd.	i WANE	03h. 26m. 40s.			
	slight local shock.				
22nd.	iS WANEZ	05h. 18m. 23s.			
	slight local shock.				
22nd.	iS WANE	09h. 03m. 32s.			
22nd.	iP WAN	12h. 08m. 50s.			
	iS WANEZ	12h. 09m. 06s.			
	Distance=1.2° H=12h. 08.5m.				
22nd.	iS WANEZ	12h. 10m. 35s.			
	P wave lost in previous				
	shock.				
23rd.	eL NE	07h. 18m. c.a.			
24th.	iP WANEZ	09h. 17m. 57s.			
	iS WANEZ	09h. 19m. 25s.			
	Distance=7.7° H=09h. 16.0m.				
	Felt Nukualofa M.M.IV-V.				
24th.	iP WANEZ	23h. 11m. 16s.			
	iS WANEZ	23h. 11m. 31s.			
	Distance=1.2° H=23h. 10.9m.				
25th.	iP WA	01h. 53m. 52s.			
	iS WANEZ	01h. 54m. 07s.			
	Distance=1.2° H=01h. 53.5m.				
25th.	iP? WA	04h. 12m. 27s.			
	iS? WANE	04h. 13m. 27s.			

February 1949:

1st.	iP WANEZ	00h. 29m. 19s.
	compression.	
	iS WANEZ	00h. 29m. 39s.
	Distance=1.6° H=00h. 28.9m.	
	Felt locally M.M.I.	
1st.	iP WAENZ	02h. 42m. 25s.
	iS WAENZ	02h. 43m. 09s.
	Distance=3.7° H=02h. 41.5m.	
2nd.	iP WA	16h. 55m. 15s.
	iS WANE	16h. 55m. 34s.
	Distance=1.5° H=16h. 54.8m.	
2nd.	iS? WANE	17h. 52m. 03s.c.a.
2nd.	iS WANE	20h. 18m. 47s.
	slight local shock.	
3rd.	iP WA	16h. 30m. 40s.
	iS WANEZ	16h. 31m. 31s.
	Distance=4.3° H=16h. 29.6m.	
3rd.	iP WANE	18h. 48m. 09s.
	iS WANE	18h. 48m. 35s.
	Distance=2.1° H=18h. 47.5m.	
4th.	iS WANE	06h. 33m. 47s.
	slight local shock.	
4th.	iS WANE	16h. 17m. 55s.
	slight local shock.	
5th.	iP WANE	00h. 48m. 31s.
	iS WANE	00h. 49m. 58s.
	Distance=7.6° H=00h. 46.6m.	
5th.	iP WA	17h. 14m. 25s.c.a.
	iS WANE	17h. 14m. 53s.
6th.	iP WA	16h. 35m. 03s.c.a.
	iS WANE	16h. 35m. 47s.c.a.
6th.	iS WANE	18h. 56m. 13s.
	slight local shock.	
6th.	iP WA	20h. 42m. 21s.c.a.
	iS WANE	20h. 43m. 19s.
9th.	iS WANE	14h. 06m. 10s.
	slight local shock.	



10th.	iP WANE	10h. 20m. 24s.	23rd.	eS? WANE	20h. 58m. 07s.
	iS WANE	10h. 20m. 49s.		eL NEWA	20h. 59m. 45s. c.a.
	Distance=2.0° H=10h. 19.8m.		25th.	iS WANE	23h. 20m. 11s.
10th.	iP WAENZ	21h. 57m. 13s.		slight local shock.	
	compression from S.W.		26th.	iP WANE	04h. 19m. 43s.
	iS WAENZ	21h. 57m. 32s.		iS WANE	04h. 20m. 03s.
	Distance=1.4° H=21h. 56.8m.			Distance=1.5° H=04h. 19.3m.	
	Felt locally M.M.V. All com-		26th.	iP WANE	17h. 09m. 19s.
	ponents except WA thrown out			iS WANEZ	17h. 09m. 37s.
	of adjustment by S. wave.			Distance=1.4° H=17h. 08.9m.	
11th.	iS WA	03h. 15m. 31s.	26th.	iS WANE	22h. 19m. 31s.
	slight local shock.			slight local shock.	
11th.	iP WA	06h. 19m. 31s.	26th.	iP WANE	23h. 08m. 45s.
	iS WANE	06h. 19m. 53s.		iS WANE	23h. 09m. 18s. c.a.
	Distance=1.7° H=06h. 19.0m.			Distance=2.7° H=23h. 08.0m.	
13th.	iS WA	01h. 55m. 42s.	27th.	iP WANE	11h. 57m. 55s.
	slight local shock.			iS WANEZ	11h. 58m. 14s.
13th.	iP WA	06h. 19m. 31s.		Distance=1.4° H=11h. 57.5m.	
	iS WANE	06h. 19m. 53s.	28th.	iP? WAENZ	04h. 01m. 06s.
	Distance=1.7° H=06h. 19.0m.			If P, dilatation from S.W.	
13th.	iS WA	01h. 55m. 42s.		iS? WAENZ	04h. 01m. 47s.
	slight local shock.		28th.	iS WANE	08h. 31m. 47s.
13th.	iS WA	06h. 42m. 55s.		slight local shock.	
13th.	iP NEWAZ	18h. 28m. 55s.	28th.	iS WANE	23h. 12m. 26s.
	compression from S.S.W.			slight local shock.	
	iS NEWAZ	18h. 32m. 22s.			
	Distance=19° H=18h. 24.6m.			<u>March 1949:</u>	
14th.	e WANE	16h. 29m. 03s. c.a.	1st.	i WANE	02h. 57m. 13s.
15th.	eL NE	02h. 08m. 30s. c.a.	1st.	iP WANEZ	00h. 03m. 51s.
16th.	iS WANE	07h. 52m. 50s.		iS WANEZ	00h. 04m. 13s.
	slight local shock.			Distance=1.7° H=02h. 03.4m.	
16th.	eS? WAEN	11h. 41m. 51s.		Felt locally M.M.III.	
	eL NE	11h. 45m. c.a.	1st.	iS WANE	00h. 17m. 12s.
17th.	iP WANEZ	03h. 37m. 01s.		slight local shock.	
	iS WANEZ	03h. 37m. 21s.	2nd.	iP WANE	08h. 43m. 40s.
	Distance=1.5° H=03h. 36.6m.			iS WANEZ	08h. 44m. 01s.
17th.	iP WAN	13h. 31m. 42s.		Distance=1.6° H=08h. 43.2m.	
	iS WANEZ	13h. 32m. 17s.	3rd.	iP WANEZ	00h. 14m. 37s.
	Distance=2.9° H=13h. 30.9m.			iS WANEZ	00h. 14m. 53s.
17th.	iP? WA	20h. 26m. 21s.		Distance=1.2° H=00h. 14.3m.	
	eS WAN	20h. 27m. 33s.	4th.	iP WANEZ	02h. 42m. 13s.
17th.	iS WAN	21h. 10m. 10s.		iS WANEZ	02h. 42m. 32s.
	slight local shock.			Distance=1.4° H=02h. 42.8m.	
19th.	i ENWAZ	01h. 00m. 36s.	4th.	iP? WAEN	10h. 37m. 57s.
	i ENWAZ	01h. 00m. 48s.		iS? WAE	10h. 41m. 16s.
	i ENWAZ	01h. 01m. 05s.	4th.	iS NE	16h. 05m. 22s.
	eL NEWA	01h. 04m. c.a.		slight local shock.	
19th.	iP WA	02h. 28m. 19s.		WA not recording.	
	iS WANE	02h. 29m. 29s.	8th.	iP? WA	13h. 26m. 47s.
	Distance=6.0° H=02h. 26.8m.			iS? WANE	13h. 27m. 25s.
20th.	iS WANE	04h. 27m. 13s.	8th.	iS WANE	23h. 40m. 22s.
	slight local shock.			slight local shock.	
21st.	iS WANE	20h. 30m. 56s.	9th.	iS WANE	07h. 04m. 22s.
	slight local shock.			slight local shock.	
22nd.	iS WANE	02h. 57m. 18s.	9th.	iP WANEZ	14h. 56m. 19s.
	slight local shock.			compression from S.W.	
22nd.	iP WAN	10h. 17m. 53s.		iS WANEZ	14h. 56m. 54s.
	iS WANE	10h. 19m. 58s.		Distance=2.9° H=14h. 55.5m.	
	Distance=11° H=10h. 15.5m.			Felt locally M.M.III-IV.	
22nd.	iP WA	21h. 17m. 35s.	10th.	iS WANE	04h. 20m. 03s. c.a.
	iS WANE	21h. 17m. 56s.		slight local shock.	
	Distance=1.6° H=21h. 17.1m.		10th.	iP WANE	06h. 21m. 01s.
23rd.	iS WANE	04h. 22m. 15s.		iS WANEZ	06h. 21m. 33s.
	slight local shock.			Distance=2.6° H=06h. 20.3m.	
23rd.	iS WANE	08h. 27m. 51s.	11th.	iS WANE	16h. 09m. 21s.
	slight local shock.			slight local shock.	
23rd.	iP WANEZ	10h. 06m. 35s.	14th.	iS WANE	01h. 06m. 55s.
	iS WANEZ	10h. 06m. 55s.		slight local shock.	
	Distance=1.5° H=10h. 06.2m.				



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14th.	iP WANE 04h. 41m. 21s. iS WANEZ 04h. 41m. 48s. Distance=2.2° H=04h. 40.7m.	24th.	iP WAEN 00h. 18m. 38s. iS WANE 00h. 18m. 58s. Distance=1.6° H=00h. 18.2m.
14th.	iP WANEZ 18h. 54m. 33s. dilatation. iS WANEZ 18h. 54m. 53s. Distance=1.5° H=18h. 54.1m.	24th.	iP WAEN 02h. 57m. 39s. iS WAEN 02h. 57m. 58s. Distance=1.5° H=02h. 57.2m.
15th.	iP WA 16h. 13m. 30s. iS WANE 16h. 13m. 52s. Distance=1.7° H=16h. 13.0m.	24th.	eL WAN 21h. 27m. c.a.
16th.	iP WANEZ 17h. 28m. 14s. iS WANEZ 17h. 28m. 39s. Distance=2.0° H=17h. 27.7m.	25th.	iP WA 03h. 47m. 55s. iS WAEN 03h. 48m. 28s. Distance=2.8° H=03h. 47.2m.
16th.	iS WANE 21h. 39m. 14s. slight local shock.	25th.	i WAE 08h. 06m. 19s.
16th.	e WAE 22h. 22m. 30s. e E 22h. 25m. 30s.c.a. e LWAE 22h. 33m. c.a. N record not decipherable.	25th.	iS? WANE 11h. 26m. 53s.
17th.	iS WANE 08h. 09m. 53s. slight local shock.	25th.	iP WA 22h. 28m. 34s.
17th.	iS? WA 19h. 03m. 03s.c.a.	25th.	iS WANE 22h. 29m. 14s. Distance=3.4° H=22h. 27.6m.
17th.	eL NE 21h. 21m. c.a.	25th.	i WA 22h. 39m. 43s.
18th.	iS WANE 12h. 38m. 43s. slight local shock.	26th.	e WAEN 03h. 02m. 52s.
19th.	iP WANE 14h. 51m. 24s. iS WANEZ 14h. 52m. 09s. Distance=3.8° H=14h. 50.4m.	26th.	iP WANE 16h. 41m. 46s. iS WANE 16h. 42m. 18s. Distance=2.6° H=16h. 41.1m.
21st.	iS WANE 11h. 17m. 51s. slight local shock.	27th.	eP NWAE 06h. 44m. 31s. eS N 06h. 53m. 17s.
22nd.	eP? WA 12h. 26m. 46s. iS WAEN 12h. 27m. 02s.	27th.	eLq NEWA 07h. 00.5m. eLr NEWA 07h. 05.0m. Distance=6.6° H=06h. 33.8m.
22nd.	iP WAENZ 12h. 39m. 33s. iS WAEN 12h. 40m. 44s. Distance=6.2° H=12h. 38.0m.	28th.	iS? WA 16h. 18m. 48s. slight local shock.
23rd.	iP WANEZ 02h. 50m. 43s. iS WANEZ 02h. 51m. 03s. Distance=1.6° H=02h. 50.3m.	30th.	iP? WA 03h. 05m. 09s. iS? WA 03h. 06m. 16s.
23rd.	eP WAN 23h. 06m. 17s. iS WANE 23h. 06m. 57s. Distance=3.4° H=23h. 05.4m.	30th.	iS WA 12h. 17m. 35s. slight local shock.
		30th.	iP NEWA 14h. 49m. 03s. iS NEWA 14h. 50m. 15s. Distance=6.2° H=14h. 47.5m. Azimuth S.W.
		31st.	iP WAEN 00h. 24m. 36s. iS WAEN 00h. 25m. 31s. Distance=4.7° H=00h. 23.4m.
		31st.	iS WANE 03h. 35m. 02s.c.a. slight local shock.
		31st.	i WAN 09h. 43m. 22s.

Bulletins Received:

The receipt of Seismological Bulletins and other information from the following sources is acknowledged with thanks:

Beograd:	September - December, 1948.
Bogota:	March - August, 1947.
Brisbane:	November, 1948.
Budapest and Kalocsa:	October, 1948.
Cleveland:	September - December, 1948.
De Bilt:	September, October, December, 1948.
Firenze:	September, November, December, 1948.
Granada:	August - September, 1948.
Helsinki:	July - September, 1948.
Istanbul:	July - August, 1948.
Jesuit Seismological Association:	September - December, 1948.
	St. Louis: January - October, 1945.
	October (supp) 1948.
	Cape Girardeau: November, 1942 - December, 1943.
	September - December, 1948.
	January - December, 1942.
	August, 1947 - August, 1948.
Kew:	
La Plata:	
Moscow:	

Nanking: January - June, 1948.
Ottawa: July - October, 1948. The Earthquake
in Montmorency County Quebec on
January 1, 1948.
Paris: June, 1947.
Pasadena: Air letters: December, 1948 - March,
1949. Preliminary: August - December,
1948. Final: January - March, 1949.
Bulletin of the Seismograph Stations
Earthquakes in Northern California
from July to September, 1947.
Perth: July - September, 1948.
Rome: September - November, 1948.
Strasbourg: May, 1948 - January, 1949.
Stuttgart: July, 1948.
Toledo: July - October, 1948.
Trieste: July - September, 1948.
Uccle: October - December, 1948. Bulletin
Seismique De L'Observatoire Royal
De Belgique.
U.S.C.G.S.: Preliminary Epicentres, Nos.
113-48 - 18-49. United States
Earthquakes, 1946.
Wellington and Auckland: Air Letter: January, 1949.
D.S.I.R. October - December, 1948.
Seismological Reports for 1946.

Apia, Western Samoa.
7th April, 1949.

A.L. BURROWS.

Observer-in-Charge.



Apia Observatory, Western Samoa.
Preliminary Seismological Bulletin.



April - June, 1949:

No. 2, 1949:

Latitude: 13° 48' 26" S.
 Longitude: 171° 46' 30" W.
 or 11h.27m. 6s.W.
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 Altitude: 2 metres.
 Lithological Foundation: Coral sand on volcanic rock.

Instruments:

Horizontal Components: Short period Wood-Anderson torsion seismograph.
 Wiechert 1000 kg. astatic pendulum (Bartels)
 Vertical Component: Wiechert 80 kg. vertical pendulum (Spindler and Hoyer)

Tables for computation:

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 H. Jeffreys, Times of Transmission for small distances and focal depth, 1939.
 G.J. Brunner and J.B. Macelwane, The Brunner focal depth-time-distance chart.

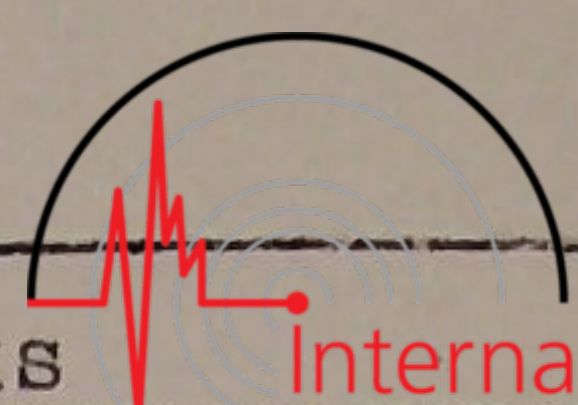
Time Service:

The Standard clock, Strasser and Rohde No. 381, is rated daily against radio time signals. A "Synchronome" clock is used to time-mark the records.

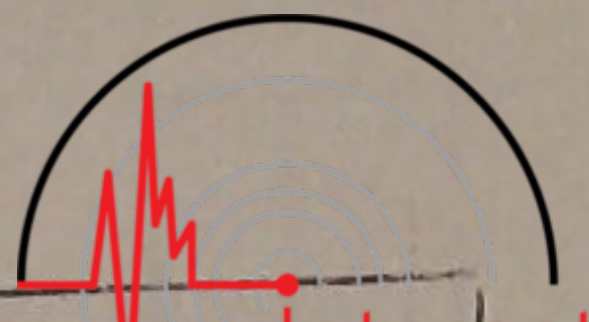
All times are entered in Greenwich Mean Time (Universal Time).

April 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	i	WA	03 53 14				
1	eP	WA	07 04 30	iS	WA	07 06 23	dist about 10°
1	i	WA	09 01 18				
1				iS	WA	15 23 53	local
1				iS	WA	15 57 25	"
2	iP	WA	07 39 14	iS	WA	07 39 31	dist=1.3° H=07h.38.8m.
2	iP	WAENZ	19 04 04	iS	WANEZ	19 04 48	dist=3.7° H=19h.03.1m.
2	iP	WA	21 03 04	iS	WAE	21 03 39	locally felt MM.II. dist=2.9° H=21h.02.1m.
3	i	WA	01 31 09				
4				iS	WANE	00 34 02	local
4				iS	WA	13 45 25	"
5	iP	WAEN	08 30 10	iS	WAEN	00 30 38	dist=2.3° H=08h.29.5m.
6	i	WA	14 19 10				
6	iP	WANE	20 05 28	iS	WANE	20 06 12	dist=3.7° H=20h.04.5m. felt locally MM.II.
7	iP	WA	10 22 41	iS	WA	10 23 12	dist=2.3° H=10h.22.1m.
7	i	WA	21 26 30				
7	iP	WAEN	22 57 38	iS	WAEN	22 58 08	dist=2.4° H=22h.57.0m.
8	iP	WANE	06 10 51	iS	WANE	06 11 11	dist=1.6° H=06h.10.4m.
8	iP	WANE	10 58 23	iS	WANE	10 58 44	dist=1.4° H=10h.58.0m.
9	i	WA	04 49 25	iS	WA	04 51 28	
9	iP	WANE	23 40 21	iS	WANE	23 40 41	dist=1.6° H=23h.39.9m.



Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
10	i	WANE	09 21 34				
10	i	NE	23 47 40	i	NE	23 53 11	
				eLr	Z	23 54.5	
11	iP	ENZ	08 07 39	iS	ENZ	08 08 03	dist=1.9° H=08h.07.1m.
12				eL	NE	09 57.3	
12				iS	WANE	13 10 39	local
12				iS	WA	22 45 54	"
13	eP	WA	09 50 36	eS	WA	09 50 59	dist=1.8° H=09h.50.1m.
13	iP	WANEZ	10 26 23	iS	WANEZ	10 26 42	dist=1.4° H=10h.26.0m.
13	iP	NEWA	20 07 20	eS	N	20 17.0	dist about 76°
	i(PKP)	NE	07 39	eL	NE	29.0	H=19h.55.7 ca.
14	a		07 33.0	iS		07 33.3	Times approximate
	b		09 06.1	iS		09 06.4	Shocks in order of
	c		12 31.5	iS		12 31.8	recorded magnitude f, e,
	d		14 27.1	iS		14 27.4	a, d, b, c. dist=1.4° ca.
	e		15 48.7	iS		15 49.0	recorded on N & Z only.
	f		17 04.1	iS		17 04.4	
14				i	WA	19 41 30	
				eL	WA	42.8	
				e	E	44 36	
				e	N	52 15	
				i	WA	54 52	
14	i	WAEN	21 05 30				
15	iP	WA	06 21 33	iS	WA	06 21 56	dist=1.8° H=06h.21.0m.
15				iS	WA	06 29 06	local
15	i	WA	22 59 26				
16	i	WA	05 28 59				
16	i	WA	06 35 22				
16	i	WA	11 26 26				
16	iP	WA	18 25 48	iS	WA	18 27 10	dist=7.2° H=18h.24.0m.
17	i	WA	17 35 23				
18	iP	WA	00 57 51	iS	WA	00 58 14	dist=1.8° H=00h.57.3m.
18	iP	WA	03 33 03	iS	WA	03 33 33	dist=2.4° ca. H=03h.32.4m.
18	iP	WANEZ	21 35 17	iS	WANEZ	21 35 38	dist=1.6° H=21h.34.6m. Compression from W. Felt locally MM.IV.
18	i	WA	21 39 53				In coda of
	i	WA	21 49 53				previous shock.
18	iP	WA	22 11 21	iS	WA	22 11 43	dist=1.7° H=22h.10.9m. probably an aftershock.
19	i	WA	10 29 08				
20	iP	WA	03 20 25	iS	WA	03 20 42	dist=1.3° H=03h.20.0m.
20				e	WANE	03 42 02	
				eLq	NE	52 46	
				eLr		04 09.5	
20	iP	WAEN	21 38 02	iS	WAEN	21 38 43	dist=3.4° H=21h.36.1m.
21	iP	NE	08 18 52	iS	NE	08 19 16	dist=1.9° H=08h.18.3m.
22	eP	WAEN	02 12 27	iS	WANE	02 12 47	dist=1.6° H=02h.12.0m.
22				eL?	NE	17 53.0	
23	iP	WA	06 24 13	iS	WA	06 24 32	dist=1.4° H=06h.24.8m.
23	iP	WA	07 13 45	iS	WA	07 14 06	dist=1.6° H=07h.13.3m.
23	iP	WA	12 34 12	iS	WA	12 34 32	dist=1.6° H=12h.33.8m.
24	i	WAEZ	03 59 44				local
24	i	WAN	06 54 16				"
24	i	WA	11 39 29				"
25	i	WA	06 05 35				"
25	i	WA	07 21 08				"
25	eP	N	14 08 19				"
	e	N	12 13				
	e	NE	16 ca.				
26				i	ENWA	10 16 26	
				i	ENWA	16 41	
				i	WA	16 55	
				eL	N	20.5	
26				iS	WANE	20 26 46	local
29				iS	WANE	02 09 22	"



Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
29	eP	WA	16 45 56	eS	WA	16 46 25	dist=2.4° H=16h.45.3m. compression deeper than normal.
30	iP	NEZWA	01 34 08	iS	NE	01 42 36	
	i(PcP)	NE	34 52	i(ScS)	N	43 50	dist=65° ca. H=01h.23.5m.
				i	NE	44 04	
				i	NE	44 31	
				i	NE	45 02	

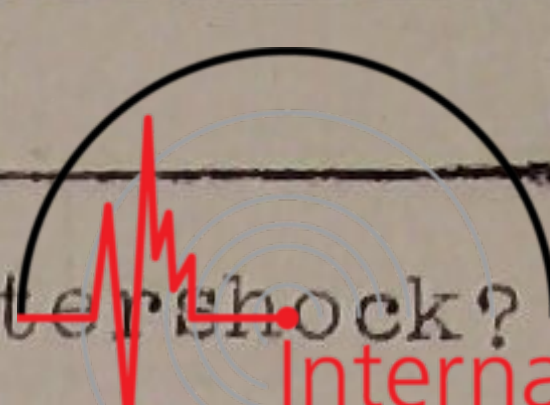
May 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	iP	WA	06 36 46	iS	WA	06 37 06	dist=1.6° H=06h.36.3m.
	iP	WA	07 03 27	iS	WA	07 03 49	dist=1.7° H=07h.03.0m.
	iP	WA	11 44 29	iS	WA	11 44 53	dist=1.9° H=11h.44.0m.
	iP	WA	11 49 41	iS	WA	11 50 02	dist=1.6° H=11h.49.2m.
	iP	WAEN	22 01 24	iS	WAEN	22 02 02	dist=1.7° H=22h.00.9m.
3	e	WAEN	06 07 38				
5				iS	WA	18 28 07	
5	e	WA	14 00 30				
6				iS	WA	09 16 40	
6	e	WA	12 50 50				
7	iP	WANE	00 23 21	iS	WANE	00 23 43	dist=1.6° H=00h.22.9m.
7	eP?	WA	12 33 17	e	EN	12 42 ca.	
8	e	EN	21 40.3	e	EN	21 48.3	
9				iS	WA	08 18 52	local
9	iP	WAEN	09 34 53	iS	WAEN	09 35 13	dist=1.6° H=09h.34.4m.
9	e	EN	13 59 ca.				
10				eS?	WAEN	10 19 30	
				i	N	20 42	
				e	N	21 27	
10	iP	WAENZ	14 13 35	iS	WAENZ	14 14 51	dist=6.6° H=14h.11.9m.
10				iS	NE	16 35 01	local
10	e	EN	18 28 20	iS	WAEN	18 28 39	
				i	NE	31 05	
				i	NE	31 17	
				i	NE	31 27	
				i	NE	31 45	
14	iP	ENZ	06 14 02	iS	ENZ	06 14 21	dist=1.4° H=06h.13.6m. felt MM.II.
14				iS	WA	20 10 15	local
14				eL	EN	23 46.0	
15				e	E	07 41.0	
17	e	NE	02 37.2				
17	e	EN	05 37.5	eL	EN	05 56.0	
17	iP	WAEN	19 20 18	iS	WAEN	19 20 38	dist=1.5° H=19h.19.7m.
17	iP	WAEN	22 41 53	iS	WAEN	22 44 26	dist=13.7° H=22h.37.6m.
17	iP	WA	23 15 31	iS	WA	23 16 30	dist=5.1° H=23h.14.2m.
18	iP	WA	18 19 47	iS	WA	18 20 00	dist=1.0° H=18h.19.5m.
18	e	NE	21 43 39				
19	eP	WA	17 18 19	eS	WA	17 19 40	dist=7.1° ca. H=17h.16.2m.
20	iP	WANEZ	08 14 06	iS	WANEZ	08 15 07	dist=5.2° H=08h.12.8m. M=6 ca.
20	iP	WA	22 30 18	iS	WA	22 30 37	dist=1.6° H=22h.29.8m.
21	iP	WA	07 45 31	iS	WAN	07 47 30	dist=10.7° H=07h.43.0m.
23	eP?	EN	04 22 18	eS?	EN	04 24 06	
24	i(P)	WA	02 31 03	i(S?)	WANE	02 32 55	dist=10° (about) H=02h. 28.6m. ca.
				eL	NE	34.0	
24	i	WA	06 55 08				
24	i	WA	14 19 43				
25	iP	WA	02 46 46	iS	WA	02 47 06	dist=1.6° H=02h.46.3m.
25	iP	WA	09 22 16	iS	WA	09 22 33	dist=1.3° H=09h.21.8m.
25	iP	WA	09 38 24	iS	WA	09 38 50	dist=2.1° H=08h.37.8m.
26	iP	WA	04 34 35	iS	WA	04 34 55	dist=1.6° H=04h.34.1m.
27	iP	WA	04 34 35	iS	WA	04 34 55	dist=1.6° H=04h.34.1m.
27	iP	WANEZ	10 59 57	iS	WANEZ	11 00 20	dist=1.8° H=10h.59.3m. Felt Apia MM.III. M=4 ca.

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
27	iP	WA	11 16 02	iS	WA	11 16 24	dist=1.8° ca. aftershock?
27	e	NE	22 06 ca.				
28	iP	WA	11 18 48	iS	WA	11 19 03	dist=1.2° H=11h.18.4m.
28	iP	WA	12 30 59	iS	WA	12 31 19	dist=1.6° H=12h.30.3m.
28	iP	WA	16 32 38	iS	WA	16 32 56	dist=1.4° H=16h.32.2m.
28	iP	WA	21 15 13	iS	WA	21 15 33	dist=1.6° H=21h.14.8m.
28				eL	EN	23 29.3	
29	iP	WA	03 07 15	iS	WA	03 07 23	dist=0.6° H=03h.07.0m.
29	i(P)	WA	03 52 02	i(S)	WA	03 52 37	dist=2.9° ca. H=03h.51.3m.
29	iP	NE	09 54 39	iS	NE	09 55 12	dist=1.8° H=09h.54.1m.
29	iP	NE	12 29 07	iS	NE	12 32 14	dist=17° H=12h.25.2m.
				i	NE	33 43	
31	e	NE	07 47.0				
31	e	NE	21 57.0	e	NE	22 01.0	
31				iS	WA	23 38.7	local

June 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	iP	WANE	02 30 59	iS	WANE	02 31 22	dist=1.8° H=02h.30.5m.
1				iS	WA	08 26 48	local
1	iP	WA	09 52 52	iS	WA	09 53 09	dist=1.5° H=09h.52.5m.
1	iP	WAEN	23 09 22	iS	WAEN	23 09 43	dist=1.6° H=23h.08.9m.
2	iP	WA	07 17 14	iS	WA	07 17 59	dist=3.8° H=07h.16.3m.
2				eL	NE	17 19.0	ca.
2	iP?	WA	23 01 07	iS?	WANE	23 03 47	dist=14.5° ?H=22h.57.7m.?
3	iP	WA	00 48 51	iS	WA	00 49 33	dist=2.6° H=00h.48.2m.
3				e	WA	10 59 50	
3	iP	WA	17 00 30	iS	WA	17 01 01	dist=2.6° H=16h.59.8m.
4	iP	WA	00 57 33	iS	WA	00 59 30	dist=10.4° H=00h.55.1m.
4				iS	WA	09 28 13	local
4	iP	WANEZ	19 34 23	iS	WANEZ	19 34 42	dist=1.4° H=19h.34.0m. felt locally MM.II.
6	iP	WANE	07 01 21	iS	WANE	07 02 51	dist=8.0° H=06h.59.6m.
	i		02 10	i	WA	03 55	
				eL	WANE	04.0	
6	iP	WAEN	20 02 37	iS	WANE	20 03 23	dist=3.9° H=20h.02.0m.
6	e	EN	20 42 ca.				
7	iP	WA	20 10 36	iS	WA	20 10 56	dist=1.6° H=20h.10.1m.
7	iP?	WA	22 46 12	iS	WA	22 48 40	dist=13.3° ?H=22h.43.1m.
8	i	WA	12 38 00				
8				iS	WA	14 06 59	local
9				iS	WA	19 07 54	"
9	iP	WANEZ	21 19 45	iS	WANEZ	21 20 23	dist=3.2° H=21h.18.9m. locally felt MM.III. M=6 ca.
10	iP	WA	14 39 40	iS	WA	14 40 25	dist=2.9° H=14h.38.7m.
10	e	WA	20 06 49				
10	eP?	WA	21 35 30	iS	WA	21 37 15	dist=9.3° ca. H=21h.33.2m.
10	eP	WA	22 02 35	iS	WA	22 03 03	dist=2.2° H=22h.02.0m.
10	i	WA	22 29 25				
11				e	NE	01 20.0	
				e	NE	01 25.0	
12	iP	WANE	05 30 22	iS	WANE	05 30 39	dist=1.3° H=05h.30.0m.
13	e	WA	09 28 38				
13	i	WA	10 27 21				
14	iP	WA	13 19 54	iS	WA	13 21 55	dist=11° H=13h.17.5m.
14				i(S)	WANE	02 05 53	
14	e	NE	15 40				+ seismic activity
15	i	WAE	03 25 39				local
15	i	WAEN	03 33 15				
16	e	EN	16 25				microseismic activity



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Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
17				e	NE	18 01 17	confused by microseisms
				e	NE	03 00	
				i	NE	16 42	
				i	NE	17 40	
18				iS	WA	19 54 07	local
20	iP	WA	18 43 15	i(S)	WAEN	18 48 30	dist about 32°
	i	WA	44 02	e	NE	48 58	
	e(PP)	NE	44 10	e	E	49 09	
	e	NE	45 12	e	E	49 16	
	e	NE	47 12	e	E	49 33	
21	iP	WA	06 20 08	iS	WA	06 20 27	dist=1.4° H=06h.19.7m.
22	eP	EN	08 59 46	e	EN	09 04 48	
				eL	NEWA	25.3	
23	iP	WA	10 16 53	iS	WANE	10 17 46	
23	iP	WA	22 31 08	iS?	WAENZ	22 32 07	Slight Dist about 6°
23	iP	WAENZ	22 31 30	eS	EN	22 35 57	Superimposed on previous shock. P doubtful,
	ipP	WAENZ	32 02	i(ss)	E	36 54	pP strong.
	i(PP)	ENZ	32 22	e(SSS)	E	37 36	dist about 27° h=170 km.
	i(PPP)	ENZ	32 35	e(ScS)	EN	42 18	H=22h. 26.1m. ca.
24	iP	WA	06 18 42	iS	WA	06 18 59	dist=1.3° H=06h.18.3m.
24	iP	WANEZ	16 03 17	iS	WANEZ	16 03 37	Felt locally MM.III.
							dist=1.6° H=16h.02.8m.
24	e	NE	22 47 16				
	e	NE	50 43				
25	iP	WANEZ	19 19 05	iS	WANEZ	19 20 20	dist=6.5° H=19h.17.5m.
				L	WA	22.0	
26	iP	WA	05 36 30	iS	WA	05 36 49	dist=1.5° H=05h.36.1m.
26				iS	WA	16 38 25	local
27	iP	WA	12 23 07	iS	WA	12 24 59	dist=10° H=12h. 20.7m.
27	i	NE	22 30				
28	iP	WA	06 22 30	iS	WA	06 26 04	dist=19.5° H=06h.17.5m.
	i	WA	23 11	L	WANE	27.0	
28	iP	WA	09 15 30	iS	WA	09 16 08	dist=3.2° ca. small local
28	i(P)	WANEZ	09 16 34	i(S)	WANEZ	09 17 43	dist about 6.0° doubtful
30	iP	WANEZ	01 25 02	iS	WANEZ	01 25 29	dist=2.2° H=01h.24.4m. M=4½. No felt reports
30	eP	WA	02 38 55	iS	WA	02 40 10	
				i	WA	40 13	
30	iP	WANEZ	17 19 14	iS	WANEZ	17 19 35	dist=1.6° H=17h.18.8m. M=4½. Felt Apia MM.IV.
30	iP	WAN	17 25 53	iS	WANE	17 26 13	dist=1.6° H=17h.25.4m. aftershock. In coda of previous shock. Felt MM.II.

Bulletins Received:

The receipt of Seismological Bulletins and other information from the following sources is acknowledged with thanks:

- | | |
|-----------------------|--|
| Beograd: | January - March, 1949. |
| Bergen: | Earthquakes in Norway 1939-41. |
| Bogota: | September - December, 1947. |
| Brisbane: | December 1948 - April, 1949. |
| Bucarest: | February - June, 1948. |
| Budapest and Kalocsa: | November, 1948 - February, 1949. |
| Cleveland: | January - April, 1949. |
| Copenhagen, Denmark: | Bulletin of the Seismological Station, Scoresby Sund January - December, 1938. |
| De Bilt: | November, 1948., January - April, 1949. |
| Firenze: | October - November, 1948., March, 1949. |





Bulletins Received (Contd.):

Granada: January - February, May, 1949.
Helsinki: October - December, 1948.
Istanbul: September - December, 1948.
Jesuit Seismological Association: November, 1948 - April 19, 1949
(supp) January, 1949.
Saint Louis: November 1945 - June 1946.
Kew: January - April, 1949.
Ksara: October, 1948., March, 1949.
La Paz: January - December, 1946., January - March, 1948.
La Plata: January - December, 1943.
Nanking: July - December, 1948.
Ottawa: November 1948 - February, 1949.
The Location of the Cornwall - Massena Earthquake September 5, 1944.
Pasadena: Air Letters: March - June 23, 1949.
Preliminary: December 10, 1948 - March 19, 1949.
Final: April - June, 1949.
Seismological Laboratory Bulletin April.
Seismological Observatory Bulletin
Pittsburgh: January - December, 1948. June, 1948.
Riverview: January - December, 1947.
Rome: December, 1948 - February, 1949.
Sofia: January - December, 1940. January - December, 1941. January - December, 1942. January - December, 1943.
January - December, 1944.
Strasbourg: October 1948, - April, 1949.
Stuttgart: August 1948 - March 1949.
Toledo: July 1948 - February, 1949.
Trieste: October - December, 1948.
Uccle: December, 1948. January, 1949.
U.S.C.G.S.: Preliminary Epicentres, Nos. 19-49-52-49. Seismological Bulletin April, May, June, 1945. MS1-122.
United States Earthquakes, 1946.
Wellington and Auckland: Air Letter: May - June, 1949.
D.S.I.R.: January - April, 1949.
Supplement: January - December, 1941.
January - December, 1943.
January - December, 1944.

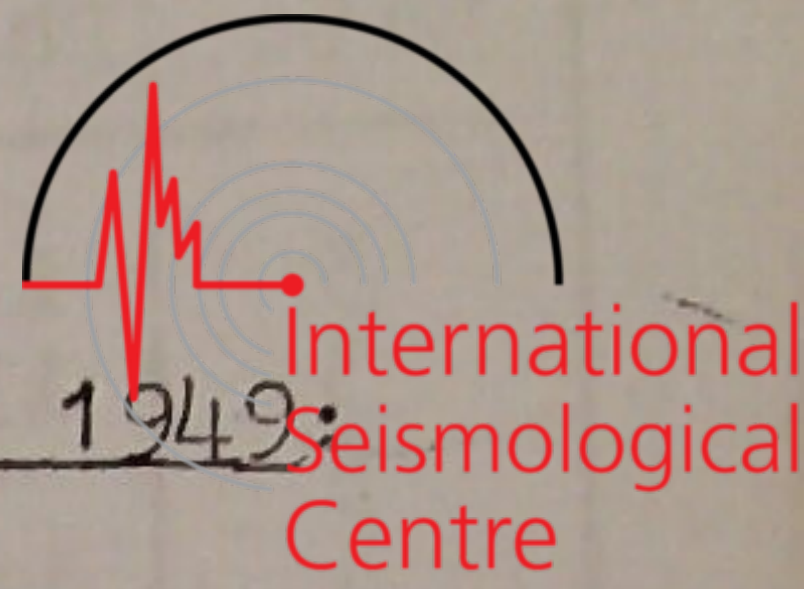
Apia, Western Samoa.
15th July, 1949.

A.L. BURROWS.

OBSERVER-IN-CHARGE.

Apia Observatory, Western Samoa,
Preliminary Seismological Bulletin.

July - September, 1949



No. 3, 1949:

Latitude: 13° 48' 26" S.
Longitude: 171° 46' 30" W.
or 11h.27m. 6s.W.
Geocentric Direction
Cosines: a=-9615, b=-1390, c=-2371.
Altitude: 2 metres.
Lithological Foundation: Coral sand on volcanic rock.

Instruments:

Horizontal Components: Short period Wood-Anderson torsion seismograph.
Wiechert 1000 kg. astatic pendulum (Bartels)
Vertical Component: Wiechert 80 kg. vertical pendulum (Spindler and Hoyer)

Tables for Computation:

H. Jeffreys and K.E. Bullen, Seismological Tables, 1940.
H. Jeffreys, Times of Transmission for small distances and focal depth, 1939.
G.J. Brunner and J.B. Macelwane, The Brunner focal depth-time-distance chart.

Time Service:

The Standard clock, Strasser and Rohde No. 381, is rated daily against radio time signals. A "Synchronome" clock is used to time-mark the records.

All times are entered in Greenwich Mean Time (Universal Time).

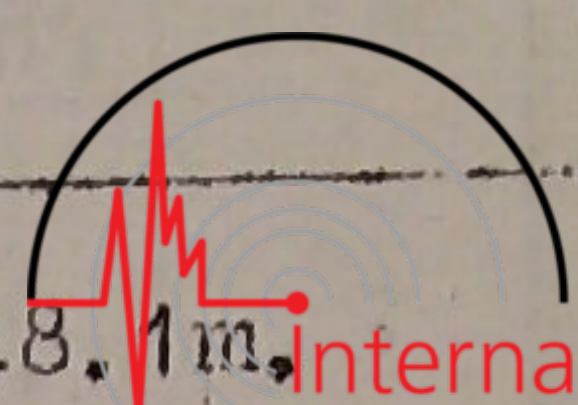
July 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	iP	WANEZ	02 05 07	iS	WANEZ	02 05 21	dist=1.1° H=02h.04.8m. dilatation M=4½
1	iP	WANEZ	03 21 37	iS	WANEZ	03 21 50	dist=1.0° H=03h.21.3m. M=4½
1	iP	WANEZ	03 28 11	iS	WANEZ	03 28 24	aftershock? dist=1.0°
1				iS	WA	05 03 46	
1	iP	WA	05 31 03	ca.iS	WA	05 31 17	dist=1.1° H=05h.30.7m.
1	iP	WANE	06 28 21	iS	WANE	06 59 04	dist=3.7° H=06h.57.4m.
				i	WAN	07 01 42	
1	iP	WA	10 01 01	ca.iS	WA	10 01 19	dist=1.4° H=10h.00.4m.
2	iP	WA	03 17 05	iS	WA	03 17 30	dist=2.1° H=03h.17.5m.
2	iP	WA	06 41 19	iS	WA	06 41 33	dist=1.1° H=06h.41.0m.
2	iP	WA	07 11 42	iS	WA	07 11 55	dist=1.0° H=07h.11.4m.
2	iP	WA	07 37 23	iS	WA	07 37 36	dist=1.0° H=07h.37.5m.
2				e	EN	11 42.0	
				eL	EN	11 48.0	
2				iS	WA	19 09 08	local
2	eP	ENWAZ	20 06 09	eS	EN	20 13 33	dist=52° ca. H=19h.57.2m.
	ePcP	N	07 21	ScS	N	15 49	
	PP	N	08 12	eLq	NEWA	18.0	
				(SSS)	N	18.45	
				eLr	NEWA	21.3	
3	i	WA	01 41 37				
3	iP	WANEZ	02 06 48	iS	WANEZ	02 07 16	dist=2.3° H=02h.06.2m. M=5 ca.



Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
3	iP	WANEZ	05 41 35	iS	WANEZ	05 41 55	dist=1.6° H=05h.41.2m.
3	iP	WANE	09 19 27	iS	WANEZ	09 19 44	dist=1.4° H=09h.19.1m.
3				iS	WA	15 32 00	local
4	iP	WA	06 28 49	iS	WA	06 29 45	dist=4.9° H=06h.27.6m.
4	iP	WA	07 33 05	iS	WA	07 33 34	dist=2.4° H=07h.32.5m.
4				e(L)	NE	13 54.5	
5	iP	WA	01 13 27	iS	WA	01 13 51	dist=2.0° H=01h.12.9m.
5	i	WA	03 42.0				
5	iP	WA	03 50 02	ca.iS	WA	03 50 17	dist=1.2° H=03h.49.7m.
5	iP	WANEZ	04 09 49	iS	WANEZ	04 10 10	dist=1.6° H=04h.09.4m.
5	eP	WA	05 46 25	iS	WA	05 46 39	locally felt MM.II. dist=1.1° H=05h.46.1m.
6	e	NE	19 58 30				
7				iS	WA	06 28 56	local
7				iS	WA	08 00 52	"
7				iS	WA	19 06 27	"
8	iP	WA	06 34 09	iS	WA	06 34 35	dist=2.2° H=06h.33.6m.
8	e(P)	N	08 11 09	e(S)	NE	08 16 21	
8				iS	WA	16 40 12	local
8	eP	WA	19 36 10	iS	WA	19 37 00	dist=3° H=19h.35.1m.
9				iS	WA	08 01 45	local
9				e(S)	NE	15 03 18	
9				e	N	06 16	
9				e	NE	10 21	
9	eP	WA	22 16 32	eS	WA	22 17 43	dist=6.2° H=22h.15.0m. weakly recorded felt Nukualofa MM.II.
10	e(PPP)	EN	04 19 20	e(PS)	E	04 26 09	
10	e	E	24 33	e	E	36 07	
11	eP	E	09 31 05	eL	EN	48.0	+ long coda.
11				e(S)	NE	09 33 00	dist=10° H=09h.28.7m.
12	iP	WAEN	23 22 43	i	EN	33 54	
15	iP	WA	04 30 26	iS	WAEN	23 22 57	dist=1.1° H=23h.22.4m.
15				iS	WA	04 30 46	dist=1.6° H=04h.30.0m.
16				iS	WA	05 32 21	
16	iP	WANEZ	12 25 46	iS	WA	02 54 05	
17	iP!	WANEZ	10 36 25	iS!	WANEZ	12 26 05	dist=1.5° H=12h.25.3m.
18	iP!	WANEZ	07 36 58	iS!	WANEZ	10 36 49	dist=2.0° H=10h.35.9m. felt locally MM.II.
18							dist=6.2° ca. H=07h.35.4m. dilatation from S.W. deep
18	iP	ENWA	08 31 43	e(S)	E	08 34 24	dist about 14°?
18	eP	WANE	23 01 03	ca.iS	WANE	08 34 24	dist=3.5° H=01h.00.2m.
20	iP	WA	20 19 55	iS	WA	23 01 44	dist=7.8° H=20h.18.0m.
21	iP	WA	01 22 17	iS	WA	20 21 23	dist=1.0° H=01h.22.0m.
21				iS	WA	01 22 30	
22	iP	WA	08 21 14	iS	WA	16 19 24	
23	iP!	WANEZ	10 30 51	iS!	WA	08 21 33	dist=1.5° H=08h. 20.6m.
23	i	Z	31 02	i	NE	34 24	h = 150 km.
23	ipp	N	31 17	iSS	N	34 33	dist=19° H=10h.26.5m.
23	ipp	WANEZ	31 29	i	NE	35 27	
23	i(SP)	E	31 45	i(ScS)	WA	36 24	
23	i	WANE	10 32 08		EN	42 19	
23	i	WA	32 42				
24	iP	WA	07 16 45	iS	WA	07 17 06	dist=1.7° H=07h.16.3m.
25	iP	WA	05 36 50	iS	WA	05 37 10	dist=1.6° H=05h.36.4m.
25				e(Lq)	NE	11 48.0	
27	iP!	WAEN	15 15 10	eLr	NE	53.0	
27	i	WA	15 12	iS!	ENWA	15 17 39	dist=13.5° H=15h.12.0m. strongly recorded M=7.7½
28				i	ENWA	17 48	
28				L	WA	18 15	
28	iP	WA	11 29 29	i(PcP)	WA	20 16	
29	iP	WA	01 55 16	iS	WA	11 29 46	dist=1.3° H=11h.29.1m.
30				iS	WA	01 55 51	dist=3.0° H=01h.54.5m.
30				iS	WA	09 56 07	

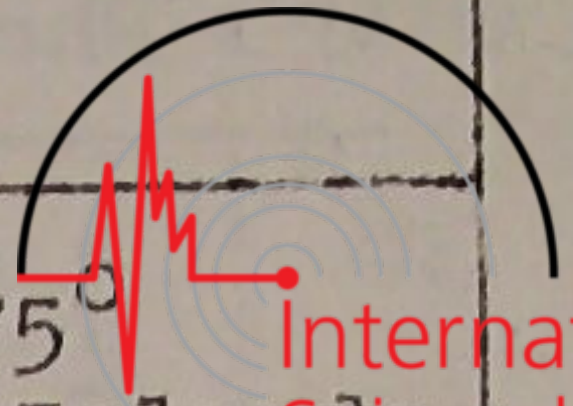
Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
30	iP	WA	18 49 30	iS	WA	18 50 58	dist=2.3° H=18h.48.1m.
	i	WA	49 43				
30	iP	WA	18 53 24	iS	WA	18 53 37	dist=1.0° H=18h.53.1m.
30				iS	WA	18 54 29	local
31				iS	WA	11 41 40	"
31	iP	WA	11 51 41	iS	WA	11 52 23	dist=3.6° H=11h.50.9m.
31	iP	WA	13 14 13	iS	WA	13 14 28	dist=1.2° H=13h.13.9m.
31	iP	WA	22 21 58	iS	WA	22 22 30	dist=2.7° H=22h.21.3m.
31				iS	WA	23 01 24	local



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August 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	iP	WA	04 47 35	iS	WA	04 47 58	dist=1.9° H=04h.47.2m.
1	eP	WANE	07 57 33	e(S)	EN	08 01 06	S uncertain
	i	WANE	58 49	e	EN	01 56	dist=19° ca.
				i	EN	02 05	
1	iP	WA	15 24 07	iS	WA	15 24 25	dist=1.4° H=15h.23.7m.
1	iP	WA	11 52 53	iS?	WA	11 53 58	dist=5.5°? H=11h.51.5m.
1	iP	WA	22 31 18	iS	WA	22 31 39	dist=1.7° H=22h.30.7m.
2				eL	NE	23 46.4	
3	iP	WA	02 41 16	iS	WA	02 41 35	dist=1.5° H=02h.41.8m.
4	iP	WA	14 28 12	iS	WA	14 28 25	dist=1.0° H=14h.27.9m.
5				e	E	19 31 39	In microseisms
				eL	E	19 53.8	
6	iP!	WANEZ	00 36 58	iS!	WANEZ	00 37 54	Felt Apia MM.III. Nukualofa. MM.V. dist=5.0° H=00h.35.8m. magnitude greater than 7.
6	iP	WANEZ	15 52 31	iS	WANEZ	15 53 12	dist=3.5° H=15h.51.6m.
7	i	NE	17 28 36				In heavy microseisms
8	iP	WA	13 13 18	iS	WA	13 14 15	dist=5.0° H=13h.12.0m.
8	iP	WA	17 14 55	iS	WA	17 15 48	dist=5.5° H=7h.13.6m.
				e	EN	19 58 ca.	
				e	EN	20 13 ca.	
9	iP	WA	17 32 24	iS	WA	17 32 42	dist=1.4° H=17h.32.0m.
11	iP!	WANEZ	15 01 17.5	iS!	WANEZ	15 01 38.5	Felt Apia MM.III. dilata- tion from S.W. dist=1.7° H=15h.00.8m.
12				iS	WA	12 33 50)	
12				iS	WA	14 06 00)	local
12				iS	WA	17 31 47)	
12	iP	WAEN	23 20 23				
	i	EN	20 30				
13	iP	WA	17 06 52	iS	WA	17 07 26	dist=3.0° H=17h.06.1m.
13	iP	WAEN	18 33 06	eS	WAEN	18 39 34	distance about 44°
	e	WAEN	36 22	Lq	EN	42.9	
				Lr	EN	47.0	
14				iS	WA	20 55 58	local
15	iP	WA	01 56 56	iS	WA	01 57 30	dist=3.0° H=01h.56.2m.
17	iP	WA	06 37 57	iS	WA	06 38 26	dist=2.4° H=06h.37.3m.
17	e	EN	08 38 45				
				iS	WAEN	09 42 23	local
				e	E	22 51 45	
				e	E	54 14	
				e	N	55 24	
18	eP	WA	11 13 06	i(S)	WA	11 13 37	possible distance 2.6°
				e	WA	15 48	
				e	WA	16 06	
				e	WA	16 54	
18	iP!	WANEZ	22 31 41	iS!	WANEZ	22 33 01	distance 7° ca. H=22h.30.0m.
19	iP!	WANEZ	00 53 27	iS!	WANEZ	00 54 04	dist=3.2° H=00h.52.6m.
19	iP!	WANEZ	08 26 55	iS!	WANEZ	08 27 46	dist=4.4° H=08h.25.8m.
20	iP	WA	02 01 15	iS	WA	02 01 35	dist=1.7° H=02h.00.7m.
21	iP	WANE	08 47 22	iS	WANEZ	08 48 17	dist=5° H=08h.46.1m.



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Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
22	iP iPcP PPP	NEZ NE N	04 13 12 13 29 18 03	iS i(SKS) i(PPS) iSS i iSSS Lq	NE N E NE E NE NE	04 22 28 23 04 23 13 27 04 29 33 30 39 32.6	distance about 75° Queen Charlotte Islands region. West coast Canada. Strongly re- corded. H=04h.01.3m.ca.
22	iP	WA	15 31 30	iS	WA	15 31 48	dist=1.5° H=15h.31.1m.
22				iS	WA	18 00 34	local
23				iS	NE	11 11 21	"
23				e	EN	20 46 27	
23				eL	EN	21 01.5	
24	iP	NE	06 27 51	iS	NE	06 29 13	dist=7.2° H=06h.26.1m. Felt Nukualofa MM.IV.
24	iP	NEZ	12 54 33	iS	NEZ	12 55 26	dist=4.6° H=12h.53.4m.
24	i(P)	NE	19 42 45	i(S)	NE	19 44 24	distance possibly 14.5°
25				iS	WA	09 06 48	local
25	iP	WANEZ	11 34 48	iS	WANEZ	11 35 05	dist=1.3° H=11h.34.6m. magnitude about 4½
25	iP	WA	23 35 39				
25				e	EN	23 43 26	
26	i(P)	NE	00 42 14	i	NE	00 48 36	
26				iS	WA	22 31 35	local
27	iP	WANE	02 34 40	iS	WANE	02 35 33	dist=4.6° H=02h.33.5m.
27				iS	WA	16 08 26	local
28	iP	WA	01 38 33	iS	WA	01 38 50	dist=1.4° H=01h.38.2m.
28	iP	WA	10 54 28	iS	WA	10 54 48	dist=1.6° H=10h.54.0m.
28	iP	WANE	17 55 57	iS	WANE	17 56 18	dist=1.7° H=17h.55.5m.
29	iP	ENWA	09 02 48	e(S)	NE	09 04 09	
29	i	N	03 16	i	E	05 23	distance possibly 7°
29				e	N	05 47	
29				i	E	06 16	
30				iS	NE	01 05 47	local

September 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	iP	WA	05 18 28	iS	WA	05 18 42	dist=1.1° H=05h.18.2m.
4	iP!	WANEZ	14 56 09	iS!	WA	14 56 28	dist=1.8° H=14h.56.7m. magnitude 5. No felt reports
5	i(P)	WANE	18 05 05	ca.			
5	i	WANE	08 39				
6	iP	WAEN	11 20 30	iS	WAEN	11 20 47	dist=1.3° H=11h.20.1m.
6	iP	WAN	12 38 25	iS	WANE	12 39 36	dist=6.2° H=12h.36.7m.
6	i	WA	38 58	i	WA	42 05 ca.	
6	iP	NE	22 33 45	iS	NE	22 34 31	dist=3.9° H=22h.32.7m.
6				i	N	35 27	
6				i	N	38 16	
7	iP	N	13 10 21	iS	N	13 11 33	dist=6.2° H=13h.08.8m.
7				e	NE	11 57	
9	iP	WAE	07 51 36	iS	WAEN	07 52 20	dist=3.8° H=07h.50.6m.
9				eL	ENWA	52.8	
9				i	WA	55 32	
9	iP!	NEWA	20 27 05	iS!	NEWA	20 27 35	local dist=2.4° H=20h.27.4m. magnitude about 5
9				i	WA	30 18	
9				i	WA	30 53	
11	iP	WA	00 17 52	iS	WA	00 18 18	dist=2.1° H=00h.17.3m.
12	iP	NEZ	09 21 18	iS	NE	09 24 58	dist=20½° H=09h.17.7m.
12	i	WA	22 28	Lq	NE	26.5	
12	i	WA	22 48				
12	i	WA	23 05				
12	iP	WAEN	10 56 57	iS	WAEN	10 59 02	dist=11° H=10h.54.4m.



Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
13	iP	WANEZ	06 54 54	iS	WANEZ	06 55 23	dist=2.4° H=06h.54.2m.
				i	WA	57 33	
				i	WA	59 30	
14				iS	WA	03 01 33	local
14				e	E	16 49 ca.	
14	iP	ENZ	20 00 52	e(S)	EN	20 09 14	possible distance 62°
				eL	EN	16.0	
16				iS	WA	12 48 42	
				eL	WA	49.7	
16				S?	NE	19 49 39	
				i	NE	50 48	
				i	NE	53 56	
17				eL	NE	23 09 ca.	
19				iS	EN	15 58 50	local
20	iP	WA	09 26 40	iS	WANE	09 27 07	dist=2.2° H=09h.26.1m.
20				iS	WA	09 41 08	local
20	iP	WANEZ	11 59 08	iS	WAENZ	12 02 08	dist=16° H=11h.55.5m.
	i	WA	59 58	i	WANE	02 34	magnitude 6 $\frac{3}{4}$
				i	WA	02 50	
				i	WA	03 00	
				L	WA	04.7	
21				eL	NE	13 17.8	
21	iP!	NE	18 20 15	iS!	NE	18 20 36	dist=1.6° H=18h.19.8m.
21	iP	WANE	22 12 44	iS	WANE	22 13 09	dist=2.0° H=22h.12.2m.
22	iP	WA	12 07 58	iS	WA	12 08 23	dist=2.0° H=12h.07.4m.
22	iP	WA	14 53 36	iS	WA	14 54 04ca.	dist=2.3° H=14h.53.0m.
				i	WA	54 37	
				i	WA	56 10	
23				iS	WA	18 29 23	local
24				eLq	WANE	04 32.0	In heavy microseisms
				e	E	34 47	
				e	E	35 48	
				e	NE	39 16	
24	iP	WA	12 04 54	iS	WANE	12 05 16	dist=1.7° H=12h.04.4m.
25				iS	WA	11 36 36	local
25				eL	EN	15 30 ca.	In microseisms
26	e(P)	E	08 13 42	eL	N	08 20	
27	iP	WA	00 28 38	iS	WA	00 28 58	dist=1.6° H=00h.28.2m.
27	iP	WA	07 02 35				
27	iP	WA	08 08 53	iS	WA	08 09 14	dist=1.6° H=08h.08.4m.
27	iP	N	15 39 45	eLq	NE	15 52.0	
	e	N	41 27	eLr	NEZ	16 05.0	+ coda L waves
	i	WA	42 36				T = 20 secs.
27	iP	WANEZ	17 56 07	iS	NE	17 57 32	dist=7.4° H=17h.54.3m.
28	iP	WANE	15 11 23	iS?	WANE	15 14 25	possible distance 16 $\frac{1}{2}$ °
28	iP	WAEN	23 17 39	iS	WAEN	23 18 05ca.	dist=2.1° H=23h.17.1m.
29				iS	WA	09 54 53	local
30	iP	WAEN	01 32 15	iS	WAEN	01 32 33	dist=1.4° H=01h.31.8m.
30	iP	WAEN	04 01 26	iS	WAEN	04 03 07	dist= 9° H=03h.59.2m.
				i	WAZ	03 16	magnitude about 6
				i	WA	03 44	
				Lq	WA	04.0	
				i	NZ	06 25	
				i	Z	17 20	
30	i(P)	WAEN	15 16 36	i(S)	WAEN	15 20 20	distance possibly 21°
30				iS	WA	17 14 19	local
30	iP	WANE	18 22 07	iS	WANE	18 24 05ca.	dist=10.1° H=18h.19.8m.
				i	WA	24 15	magnitude about 6
				L	WA	24.8	
30	iP	WA	18 27 08	iS	WA	18 27 26	dist=1.3° H=18h.26.7m.
30	iP	WAEN	22 09 27	iS	WAEN	22 11 14	In coda of previous shock
				eL	WA	12.9	dist=9.5° H=22h.07.2m.

Bulletins Received:



The receipt of Seismological Bulletins and other information from the following sources is acknowledged with thanks:

Beograd: February, April, May, 1949.
Bogota: May - December, 1948.
Brisbane: May - June, 1949.
Budapest: June, 1949.
California: Bulletin of Seismographic Stations:
January - March, 1940. April - June, 1940. July - September, 1940.
October - December, 1940.
Cleveland: May - June - July, 1949.
De Bilt: May - June, 1949.
Firenze: March - June, 1949.
Granada: March, April, June, 1949.
Helsinki: January - March, 1949.
Istanbul: January - May, 1949.
Jesuit Seismological Association: April - July, 1949. Supp: February -
March, 1949. Saint Louis: July -
September, 1946.
Kew: May - June - July, 1949.
International Seismological Summary
for 1937, January, February, March.
June, 1949.
Kalocsa: April - May - June, 1949.
Ksara: March - April, 1949.
Ottawa: Earthquakes recorded on Rockburst
Project Stations. January - June,
1949. Bibliography of Seismology.
July - December, 1948.
Pasadena: Preliminary: March - July, 1949.
Seismological Laboratory Bulletin.
July - September, 1948.
Perth: October - December, 1948. January -
March, 1949.
Reykjavik: January - March - December, 1947.
Rome: March - April - May, 1949.
Sofia: January - December, 1945.
Czechoslovakia: Bulletin Seismique des stations,
Seismologiques de Praha et de Cheb
Annees 1944 et 1945.
Toledo: January - July, 1949.
Trieste: January - April, 1941. January -
June, 1949.
U.S.C.S.S.: Preliminary epicentres Nos. 53-49 to
82-49.
Supplement List S1-49 to S13-49.
Wellington: D.S.I.R.: May - June, 1949.
Supplement: January - December, 1945.
January - December, 1946.

Apia, Western Samoa.
14th October, 1949:

A.L. BURROWS.
OBSERVER-IN-CHARGE.

* * * *

Apia Observatory, Western Samoa.

Preliminary Seismological Bulletin.

October - December, 1949:



No. 4, 1949:

Latitude: 13° 48' 26" S.
 Longitude: 171° 46' 30" W.
 or 11h.27m. 6s.W.
 Geocentric Direction
 Cosines: a=-9615, b=-1390, c=-2371.
 Altitude: 2 metres.
 Lithological Foundation: Coral sand on volcanic rock.

Instruments:

Horizontal Components: Short period Wood-Anderson torsion seismograph.
 Wiechert 1000 kg. astatic pendulum (Bartels)
 Vertical Component: Wiechert 80 kg. vertical pendulum (Spindler and Hoyer)

Tables for Computation:

H. Jeffreys and K.E. Bullen, Seismological Tables, 1940.
 H. Jeffreys, Times of Transmission for small distances and focal depth, 1939.
 G.J. Brunner and J.B. Macelwane, The Brunner focal depth-time-distance chart.

Time Service:

The Standard clock, Strasser and Rohde No. 381, is rated daily against radio time signals. A "Synchronome" clock is used to time-mark the records.

All times are entered in Greenwich Mean Time (Universal Time).

October 1949:

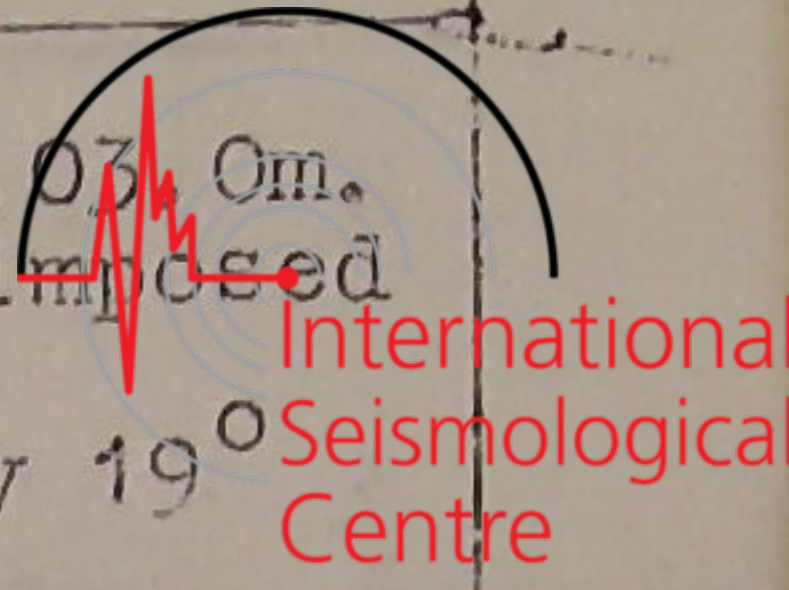
Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	iP!	WANEZ	03 41 52	iS!	WANEZ	03 42 06	dist=1.1° magnitude 4½ deeper than normal H=03h.41.4m.
1	e(P)	N	07 30 23	i	E	07 42 55	
	e	E	31 00	e	N	43.5	
1	iPn	WANEZ	21 20 27	iSn	WANEZ	21 20 47	dist=1.6° H=21h.20.0m.
	iP+	WA	20 30	iS+	WA	20 49	
2	iP	WA	01 36 12	iS	WA	01 36 32	dist=1.6° H=01h.35.8m.
2				iS	WA	07 17 44	local
2	i	WA	21 00 01				
3	iP	WA	22 36 47	iS	WA	22 37 21	dist=2.9° H=22h.36.0m.
4	iP!	WANEZ	04 29 09	iS!	WANEZ	04 29 33	dist=2.0° magnitude 5 no felt reports H=04h.28.6m.
4				iS	WA	04 34 26	aftershock ?
4	iP	WA	07 30 39	iS	WA	07 30 57	dist=1.3° H=07h.30.3m.
4	iP	WA	07 42 11	iS	WA	07 42 31	dist=1.6° H=07h.41.8m.
5	iP	WA	10 39 53	iS	WA	10 40 36	dist=3.7° H=10h.39.0m.
5	i(P)	WA	14 39 56				
	i	WA	41 45				
5	e(P)	NE	15 06 26	e(S)	NE	15 09 54	dist possibly 19°
5	i(P)	Z	19 09 55	e	NE	19 20 ca.	records being changed.
6	iP	WANE	09 01 43	iS	WANE	09 02 18	dist=3.0° H=09h.01.0m.
6				iS	N	09 06 53	aftershock ?
6	i(P)	WANE	15 18 48				



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Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
6	iP	WANE	18 12 11	iS	WANEZ	18 12 31	dist=1.6° H=18h.12.8m.
6				iS	WA	19 26 05	local
6				iS	WA	21 10 08	"
7							11.30 - 19.30 no record
8	iP	WANE	04 34 32	iS	WANE	04 34 52	dist=1.6° H=04h.34.1m.
8	iP	WA	08 22 06	iS	WA	08 23 05	dist=5.1° H=08h.20.9m.
8				iS	WA	18 54 08	local
9	iP	WA	03 53 05	iS	WA	03 54 28	dist=7.4° H=03h.51.3m.
9	iP!	WANEZ	13 44 58	iS!	WANEZ	13 45 23	dist=2.1° H=13h.44.4m. magnitude 4½
9	i(P)	WANE	15 06 27				
11				i(S)	WA	07 48 14	
				eL	EN	49.3	
				e	E	55.36	
11	i(P)	WAN	11 41 57	e	N	11 46 13	
11	iP	WA	14 49 30	iS	WA	14 50 03	ca. dist=2.8° H=14h.48.8m.
11				iS	WA	16 51 51	local
13	iP!	WANE	03 36 57	iS!	WANEZ	03 37 44	dist=4.0° H=03h.36.0m. magnitude 5+
				L	WA	38.8	
				i	WA	42 24	
13	iP	WA	09 16 34	iS	WANE	09 17 07	dist=2.8° H=09h.16.8m.
16				iS	WA	04 29 14	
				i	WA	31 29	
16	iP	WA	12 39 39	iS	WA	12 39 56	dist=1.3° H=12h.39.3m.
				i	WA	41 52	
17	eP	WA	03 45 32	eS	WA	03 46 33	dist=5.2° ca. H=03h.44.2m.
				e	WA	53 56	
17	e	N	11 10 05				
19				iS	WA	08 35 31	local
19	iP	ENWA	21 07 43	iS	EN	21 13 58	dist=38° ca. H=21h.00.3m. magnitude 7¼ strongly recorded
	i	WA	07 59	iScS	EN	17 36	
	ipP	E	08 17				
	iPP	E	09 28				
	iScP	E	13 36				
19	iP	WA	21 44 15	iS	WA	21 44 41	In coda of previous shock magnitude 4 ca. dist=2.1°
20	iP	WANE	12 48 44	iS	WA	12 49 23	dist=4.2°
20	i(P)	WANEZ	12 52 26	e(S)	E	12 58 03	Interpretation uncertain
	i(PP)	WA	54 10	i	E	12 59 13	distance possibly 38°
				Lq	N	13 01 ca.	Superimposed on previous
20	iP	WA	18 14 52	iS	WA	18 16 09	dist=6.8° H=18h.13.2m.
21	e(P)	NE	21 41 48	e(S)	NE	21 47 46	distance possibly 38°
				Lr	NE	53.0	
22	iP	NEWA	08 53 21	iS	NE	08 58 00	dist=27° H=08h.47.7m.
	i	NE	55 57	i	NE	58 27	
22	e	E	16 47 ca.				
22	iP	WA	20 29 51	iS	WA	20 30 11	dist=1.6° H=20h.29.4m.
25	i(P)	WA	05 50 27				
25	iP	WA	08 21 10	iS	WA	08 21 45	dist=3.0° H=08h.20.4m.
25	i(P)	WA	12 44 56	iS	WA	12 48 49	distance possibly 23°
26	i(P)	E	09 20 28				
27	iP	WANE	10 05 22	iS	WANE	10 06 28	dist=5.6° H=10h.03.5m. magnitude 6 ca.
27	iP	WA	23 57 39	iS	WA	23 58 08	dist=2.4° H=23h.57.0m.
28	iP	WA	18 42 12	iS	WA	18 42 26	dist=2.0° H=18h.41.7m.
28	iP	WA	18 50 09	iS	WA	18 51 48	dist=8.9° H=18h.48.1m.
29	iP	WANE	00 22 39	i(S)	WANE	00 23 15	dist=3.1° ca. H=00h.21.7m.
				i	WA	26 51	
29	iP	WA	14 15 36	iS	WA	14 17 25	dist=10° H=14h.13.3m.
29	iP	WA	14 25 11	iS	WA	14 25 51	dist=3.5° H=14h.24.3m.
				i	WA	29 06	
29	iP	WANE	16 30 05	iS	WANE	16 30 26	dist=1.7° H=16h.29.6m.
30	eP	ENWA	05 37 54				
30-31	iP	WANEZ	23 58 44	iS	WANE	00 02 19	dist=20° H=23h.54.7m.
	i(PP)	WA	58 58	Lr	WANE	05.3	

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
31	iP?	WA	00 04 24	iS?	WA	00 05 15	dist=4.1°? H=00h.03.0m. Two shocks superimposed
31	eP	N	01 50 30				
31	eP	E	18 03 24	e(S) eL	E E	18 07 50 10.3	distance possibly 19°



November 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
1	eP e	N N	07 39 55 40 19	eS	N	07 44 33	dist=27° H=07h.33.3m.
1	iP	WA	14 24 14	iS	WA	14 24 30	dist=1.3° H=14h.24.8m.
2	e(P)	N	02 38 20	e(L)	N	02 48.3	
3	iP	NE	01 23 30	e	NE	01 34 33	
5	iP	WA	15 48 44	iS	WA	15 49 09	dist=2.1° H=15h.48.1m.
7	iP! ipP	WAENZ WAZ	06 04 22 04 40	iS!	EN	06 08 21	dist=22.5° H=06h.59.4m.
7	iP!	WANEZ	14 35 11	iS!	WANEZ	14 35 29	dist=1.4° H=14h.34.8m. Felt locally MM.4.
7	iP	WA	17 06 20	iS	WA	17 06 37	aftershock. distance=1.3°
8	e(P)	NE	04 13 22	e(S)	NE	04 16 44	distance possibly 18.5°
12	iP	WANE	03 00 22	iS	WANE	03 04 12	dist=21.5° H=02h.55.6m.
13	iP	WANEZ	07 41 03	iS	WANE	07 44 56	Times uncertain dist=22°
	i	NE	41 42			45 09	
13	iP	WA	10 06 37	iS	WA	10 06 51	dist=1.1° H=10h.06.3m.
14	iP!	WANEZ	02 48 56	iS!	WANEZ	02 49 14	dist=1.4° H=02h.48.5m. Felt locally MM.II.
15	iP	WA	13 21 30	iS	WA	13 22 52	dist=7.2° H=13h.19.3m.
16	iP	WA	00 07 17	iS	WA	00 07 38	dist=1.7° H=00h.06.6m.
16				iS	WA	01 40 05	local
16	iP	WA	11 15 05	iS	WA	11 15 24	dist=1.5° H=11h.14.6m.
17	iP	WA	20 39 16	iS	WA	20 39 33	dist=1.3° H=20h.38.9m.
18	iP	WA	08 04 52	iS	WA	08 05 14	dist=1.8° H=08h.04.3m.
19	iP	WANE	07 27 10	iS	WANE	07 28 03	ca. dist=4.6° H=07h.25.8m.
20	iP!	WANEZ	00 54 18	iS!	WANEZ	00 54 37	dist=1.5° H=00h.52.8m.
20				eL	E	07 41.0	
20	iP	WA	16 15 05	iS	WA	16 15 28	dist=1.9° H=16h.14.5m.
				i	WAEN	18 08	
22	iP!	NEWAZ	00 55 28	iS!	NEWAZ	00 58 13	dist=15° H=00h.52.0m.
				i	NEWA	01 00 36	magnitude about 7½
24	iP	WA	07 02 35	iS	WA	07 03 11	dist=3.0° H=07h.01.8m.
25	iP	WA	05 46 19	iS	WA	05 47 44	dist=7.4° H=05h.44.5m.
26	iP!	WA	01 12 43	iS!	WA	01 14 13	dist=7.9° H=01h.10.8m.
27	iP!	NEW/AZ	08 43 20	iS!	NEW/AZ	08 44 02	dist=3.3° H=08h.42.4m. Felt Nukualofa MM.2. Apia MM.4. magnitude 7 local
29				iS	WA	04 42 22	local
29	iP	WA	09 20 25	iS	WA	09 21 18	dist=4.5° H=09h.19.3m.
29	iP!	WANE	09 58 14	iS!	WANE	09 58 43	dist=2.4° H=09h.57.6m.
30	iP	WA	03 59 22	iS	WA	03 59 44	dist=1.7° H=03h.58.9m.

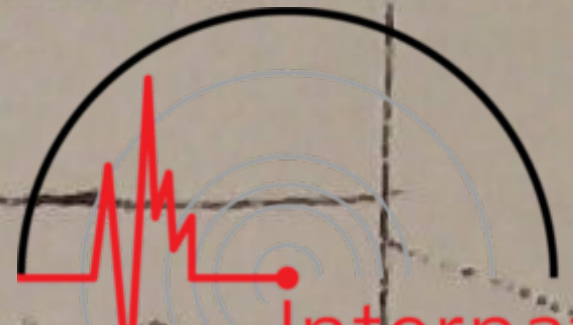
December 1949:

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
2	iP	WA	02 24 56	iS	WA	02 25 24	dist=2.1° H=02h.23.7m.
				i	WA	27 36	
2	iP	WAN	02 33 30	i(S)	WAN	02 36 13	distance possibly 14.5°
2	iP	WA	06 57 45	iS	WA	06 58 06	dist=1.6° H=06h.51.3m.
2				iS	WA	07 36 42	local
2	iP	WA	11 02 25	iS	WA	11 03 07	dist=2.6° H=11h.01.5m.



Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
2	iP! i	WANEZ WA	19 43 11 43 14	iS i i	WANEZ WA WA	19 43 42 45 54 46 29	dist=2.6° H=19h.42.5m.
3	i(P)	WA	06 10 28				
3	iP	WA	13 42 45	iS	WA	13 43 05	dist=1.6° H=13h.42.3m.
4	iP	WA	15 34 27	iS	WA	15 35 06	dist=1.6° H=15h.34.0m.
5	iP	WA	00 58 20	iS	WA	00 58 37	dist=1.3° H=00h.57.9m.
6	iP	WANEZ	14 28 39	iS i	WANEZ WA	14 29 18 32 47	dist=3.2° H=14h.27.8m.
6	iP	WA	16 55 24	iS	WA	16 55 59	dist=3.0° H=16h.54.6m.
7	iP	WA	14 57 49	iS	WA	14 58 05	dist=2.2° H=14h.57.2m.
7	e(P)	WA	21 16 15	e(L)	EN	21 33.0	
9	iP	WA	10 04 05	iS	WA	10 04 25	dist=1.6° H=10h.03.7m.
9	iP	NEWA	11 06 31	eS e(SS) eLq? eLr?	NEWA WA N N	11 11 58 12 22 00 53.0 01 02.9	distance about 34° may be artificial
10							
10	iP!	WANEZ	17 20 16	iS!	WANEZ	17 20 36	dist=1.6° H=17h.19.8m. felt MM.4 magnitude 5 $\frac{3}{4}$
10	iP	WA	17 54 42	iS	WA	17 55 02	ca. aftershock
11				iS	WA	07 29 18	local
11	iP	WA	09 39 39	iS	WA	09 39 56	dist=1.4° H=09h.39.3m.
11	iP i	WANE WAN	11 38 26 38 36				
13	iP	WA	09 35 54	iS	WA	09 36 26	dist=2.5° H=09h.35.2m.
13				i(S) i(S)	WA WA	11 32 43 11 35 14	local ?
13	iP	WA	21 07 30	iS	WA	21 07 52	dist=1.8° H=21h.07.0m.
14	iP	WA	00 38 20	iS	WA	00 38 44	dist=2.0° H=00h.37.8m.
14	iP	WA	03 00 18	iS	WA	03 00 47	dist=2.4° H=03h.59.7m.
14	iP	WA	04 13 30	iS	WA	04 13 50	dist=1.6° H=04h.13.1m.
14	iP	WA	19 18 19	iS	WA	19 18 42	dist=1.9° H=19h.17.6m.
15				e	N	03 31.5	
16	i(P)	WANE	14 09 55	i(S)	WANE	14 12 14	distance possibly 12°
16	iP!	WANEZ	21 26 14	iS!	WANEZ	21 26 22	dist=0.6° H=21h.26.0m. felt MM. II. magnitude about 4 $\frac{1}{2}$
17	eP ePP	NEWA NE	07 06 22 09 48	iS e Lq Lr	NE NE NE NEZ	07 17 05 18 27 31.7 39.6	distance about 86°
17	eP e(PP)	NEWA N	15 20 43 24 31	eS (SKS) e(SS) L	NE N NE NE	15 31 06 31 26 37 00 45.0	distance about 84° L waves larger amplitude than previous shock
18	iP i iP!	WANE WANE WANEZ	05 43 50 44 36 04 19 02	iS iS!	WANE WANEZ	05 47 26 04 20 54	dist=20 $\frac{1}{2}$ ° H=05h.39.2m In heavy microseisms dist=10° H=04h.16.6m. magnitude 6-6 $\frac{1}{2}$.
21	eP	WA	17 47 43	iS	WA	17 48 58	dist=6.5° H=17h.46.1m.
22	iP	WA	17 14 38	iS	WA	17 14 58	dist=1.6° H=17h.14.2m.
22	iP	WA	22 29 57	iS	WA	22 30 15	dist=1.4° H=22h.29.6m.
23	iP	WA	14 06 10	iS	WA	14 06 39	dist=2.4° H=14h.05.5m.
23	iP	WA	19 24 37	iS	WA	19 24 55	dist=1.3° H=19h.24.2m.
24	iP	WA	22 33 56	iS	WA	22 33 26	dist=2.5° H=22h.32.2m.
26	iP	WA	03 20 39	iS	WA	03 20 50	dist=1.4° H=03h.20.1m.
26	e(P) e	N E	05 35 33 36 34				
26	iP!	WANE	06 25 50	iS!	WANE	06 27 10	dist=7.2° H=06h.24.1m. magnitude 7
27	iP!	NEZ	21 04 32	iS!	NEZ	21 05 05	dist=2.6° H=21h.39.9m. felt MM. II. dilatation from SW
29	iP i i(PPP)	NE N N	03 15 30 16 29 19 59	eS e(SCS) eLq eLr	N NE NE NE	03 24 58 25 21 34.8 38.2	distance about 73°

Date	Phase	Comp.	Time	Phase	Comp.	Time	Remarks
29	iP	NE	16 45 51	iS	NE	16 49 44	dist=22° H=16h.41.0m.
30				e	NE	01 42 39	
				eL	NE	47.0	
30	eP	N	10 44 21	e(S)	N	10 47 42	
				e	N	59 03	
				e	N	59 25	
31	e(P)	NE	08 46 40	i	N	11 00 36	



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Seismological Bulletins Received:

The receipt of Seismological Bulletins and other information from the following sources is acknowledged with thanks:

- Batavia:** January - March, 1949.
Beograd: June - August, 1949.
Brisbane: July - September, 1949.
Bucarest: January - June, 1949.
Cleveland: August - September, 1949.
Copenhagen: Kobenhavn: January - December, 1944.
 Scoresby-Sund: Sept., 1946 - Dec., 1947.
 July - August, 1949.
De Bilt: July - September, 1949.
Firenze: August, 1949.
Granada: June, 1949.
Istanbul: June - August, 1949.
Jesuit Seismological Association: Supplement: June, 1949.
 Saint Louis: October, 1946 - May, 1947.
 August - September, 1949.
Kew: July - October, 1948.
La Paz: January - August, 1949.
Lisbon: May and June, 1949.
Ottawa: Preliminary: July 14 - October 13, 1949.
Pasadena: Seismological Laboratory Bulletin, October - December, 1948.
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Perth: April - June, 1949.
Poona: March, 1949.
Rome: Government of India: March - May, 1949.
Strasbourg: June - July, 1949.
 Union Geodesique et Geophysique Internationale: February - June, 1949.
 August, 1949. Institut de Physique du Globe de Strasbourg: 10 May - 10 October, 1949. Bulletin du Bureau Central Seismologique Francais. April - July, 1949.
Stuttgart: April - June, 1949.
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Toledo: May - September, 1949.
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 Supplement List: S14-49 to S26-49.
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 Earthquakes in New Zealand during the year, 1947.
American Geophysical Union (Reprint): Earthquake study in Southern California, 1948.
Bull. Seis. Soc. (Reprints): Unexplained Phases in Seismograms. The Walker Pass Earthquakes and structure of the Sierra Nevada.

Seismological Bulletins Received (Contd.):



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Response Characteristics of electro-
magnetic Seismographs.
Earthquakes in India and Neighbourhood.

India Meteorological Department:

Apia, Western Samoa.
16th January, 1950:
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[Faint, mirrored text from the reverse side of the page is visible through the paper, including phrases like 'Seismological Association', 'Preliminary', 'October - December', 'April - June', 'June - July', 'August', 'May - September', 'April - June', 'July - December', 'May - September', 'Preliminary', 'Supplement List', 'Seismological Bulletin', 'D. S. R. July - September', 'Seismological Reports for the year', 'Earthquakes in New Zealand during the year', 'Explained these in seismograms', 'The Wilson Pass earthquake and structure of the Sierra Nevada', 'American Geophysical Union (Geophysical Research Reports)', 'California', 'Wellington', 'E.S.C.S.I.', 'Tokyo', 'Gwal', 'Bartlett', 'Some', 'Penna', 'Perth', 'Oaxaca', 'Kew', 'International Seismological Association']