Riverview College Observatory.

SYDNEY. N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	ε : 1	$\frac{r}{T_o^2}$
A_N	1	227	8.5	3.9	0.02
	3	84	13.0	9.6	0.003
A_E	1	237	9.4	4.0	0.02
	3	75	9.6	5.0	0.009
A_Z	2	88	5.0	2.9	0.036

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
1	Jan. 5	eP	01 31 58	4	1			8890	Very small.
		iS	42 10	5	+6	+4		(80°0)	iS largest phase
		MN	58 35	13	1				on record.
		F	02 10						Osaka Δ 2428 km.
									P 01 23 57
									Koti Ep.Kamtchatka
2	" 5	e	19 04.4						
		eS	14 04	7	1				
		eL	30.4	17					Manila Δ 1670 km.
		MN	34 34	17	3				P 19 00 00
		F	19 50						
3	" 5	e	20 36.4						
		MN, ME	39 55	15	1	1			A few waves.
4	" 7	e	00 04.8	4					
		e	07 16	7	1				La Paz Δ 7060 km.
		eS?	07 36	8	1	2			P 00 00 12
		e	13 29	16	4				Melbourne
		eL	14.5	18					e 07 52
		ME_1	19 40	13		1			L 16 00
		MN_1	19 54	13	2				Fordham
		MN_2	22 36	13	2				e 15 00
		F	00 55						
5	" 14	e	06 26.2						
		eL	29.9	16?					
		ME_1	31 31	12		3			Wellington
		MN_1	32 32	12	3				L 06 31
		ME_2	34 37	13		2			Melbourne
		MN_2	36 06	13	2				L 32 23
		F	07 00						
6	" 14	eP	22 08 28					4300	0, 22 00 48
		PR_1	10 04	6		1		(38°7)	
		PR_2	10 33	6		3			Wellington Δ 34°5
		eS	14 30	14		5			0 21 59 52
		eSR_2	17 48	14	6				P 22 07 05
		eSR_3	18 10	14	12				Felt at Apia R-F 4
		eL	19.7	20					Melbourne Δ 43°0
		mN	20 33	13	17				P 22 09 20
		mE	21 08	16		12			Manila
		MN_1	22 58	10	6				e 22 13
		ME_1	23 28	16		12			Batavia
		MN_2	26 04	10	6				i 22 14 44
		ME_2	26 40	14		14			
		ME_3	30 04	12		8			
		MN_3	31 30	10	7				
		F	23 45						

(Continued on next sheet)

No.

Riverview College Observatory

SYDNEY, N.S.W.

PRELIMINARY BULLETIN. January 1930.

SEISMOLOGICAL BULLETIN

ϕ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation: Triassic sandstone.

INSTRUMENTS:

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS, EW)
2. Wiechert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. **Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)**

	V	T_o	ϵ:1	$\frac{r}{T_o^2}$
A_N				
A_E				
A_Z				

No.	Date.	Phase.	Time (*Greenwich*) h. m. s.	Per. s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
	Jan. 5	e	1 32.0						
		i	42 11						
		M	58 35						
	" 5	e	19 04.4						
		e	14.1						
		M	34 23						
	" 7	eL	0 12.0						
		L	16						
		M	19 54						
		M	22 24						
	" 14	e	6 26.2						
		eL	29.9						
		M_1	32 28						
		M_2	35 58						
		M_3	41 28						
	" 14	eP	22 08 28						
		eL	17.5						
		M_1	19 55						
		M_2	22 58						
	" 16	e	11 58.7						
		M	12 31 29						Galitzin Z.
	" 18	iP	7 10 01						
		iS	14 49						
		i	17 31						
		M	19 55						
	" 20	iP	7 17 19						
		iS	21 55						
		iSR_1	23 37						
		M	26 54						
	" 21	P	18 29 34						
		S	34 08						
		L	36.8						
		M	39 34						
	" 24	e	1 42.6						
	" 25	e	1 46.8						
	26	i	16 54 10						
		L	58.0						
	" 28	e	6 25.1						
		S?	29 30						
		eL	32.6						
		M	39 05						
	" 29	e	0 25.1						
		eL	42.6						

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
11	Jan.24	e	01 40 51	4	1	1			
		e	42 47	4		½			
		i	44 23	6		6			Melbourne
		e(L)	44.6	12?					i 01 43 12
		m	44 55	8	2	3			L 44 35
		m	45 15	8	2	4			
		m	45 55	6	2	4			
		MN	47 47	9	3				
		ME	47 55	8		3			
		F	01 55						
12	" 24	eL?	02 30.9	18					A few long waves.
		M	33.1	15					
			21 30 to 21 37 and						
			23 22 to 23 40		Small waves on Galitzin Vertical.				
13	" 25	eP_Z	01 46 48						eP from Galitz.Z
		S	53 47	8	2				
		SR_1	57 02	12		7			Manila Δ 730 km.
		eL?	02 03.0						0 01 38 47
		MN_1	06 39	14	7				P 40 25
		ME	08 44	14		2			Hong Kong
		MN_2	11 58	14	2				P 42 48
		F	02 30						Melbourne
14	" 26	i	16 54 09	2	1	2			i 54 45
		i	57 56	4	4	1			
		m	58 05	5	6	3			Largest wave.
		F	17 03						Following very
15	" 28	e	06 24.8	4	1½				small.
		e	25.5	5	2	2			Manila Δ 5800 km
		eS	29 39	6		2			0 06 19 25
		m	30 05	8	3	2			P 28 44
		eL	31.6	20					Hong Kong
		MN_1	34 15	12	3				P? 29 29
		MN2	39 07	12	2				Batavia
		MN_3	44 45	12	3				i 29 29
		F	07 10						
16	" 29	e	00 35.1						
		eL	42.5	20					
		ME	44 10	10		1			
		MN	49 52	10	1				
		F	01 00						

WM. O'LEARY S.J.

1930, February.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. **Foundation : Triassic sandstone.**

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	ε : 1	$\frac{r}{T_o^2}$
A_N	(1P	217	9.0	4.8	0.01
	(3	83	13.3	7.3	0.005
A_E	(1	226	9.3	3.6	0.01
	(3	74	10.0	4.5	0.012
A_Z	(2	96	5.2	3.4	0.033

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
17	Feb. 1	eP	17 38 28	2	½	½			Small rapid vibrations, well marked. Origin near?
		i	38 48	4	2	3			
		i	39 04	4	4	3			
		eL?	41 42	10					
		F	17 52						
18	" 2	eP	15 08 49	2	2			9280	0, 14 56 22
		i	09 05	3	3			(83°5)	J.S.A. Ep. 49°N.
		iS	19 17	6	4				177°E.
		i	19 35	5		-4			Hong Kong
		ScPcPcS	19 37	7		4			P 15 05 51
		PS	20 03	8		4			Manila Δ 6678 km.
		eL	38.2	26					0 14 55 51
		MN_1	41 09	20	6				P 15 06 01
		ME_1	43 00	20		7			St. Louis
		MN_2	48 05	16	8				P 06 17
		ME_2	49 35	18		3			Copenhagen Δ 8150
		ME_3	53 45	20		4			P 07 25
		MN_3	56 21	20	3				Strasbourg Δ 8840?
		MN_4	16 05 45	20	4				P 08 12
		F	16 55						Batavia Δ 9120
									P 08 39
19	" 3	e?	02 46.3						
		e	48.3	4					Melbourne
		eL	54.8	20					i 02 50 20
		xME	03 00 06	10		3			L 56 35
		MN	01 05	10	3				Manila
		F	03 30						e 50 48
20	" 7	e	06 28.6						
		e	33.2	?					Wellington
		eL	35.6	20					e 06 32 40
		MN_1	40 06	12	4				Melbourne
		ME_1	42 00	14		4			e 34 22
		MN_2	42 39	14	4				L 42 10
		ME_2	44 06	15		4			
		F	07 20						
21	" 7	e	12 04.5						Wellington Δ 14°
		eL	12.8	20					0 11 58 10
		MN	15 38	12	3				Ep. apppox. 30°S.,
		ME	16 19	14		2			175°E.
		F	12 50						
22	" 7	e	16 52.1						Batavia Δ 1030 km.,
		eL	17 05.5	20					Sumatra.
		ME	08 10	17		4			P 16 35 53
		MN	09 18	15	3				Hong Kong
		F	17 45						P 40 13

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
23	Feb.12	iP	06 26 19	4	+1½	-4½		2560	0, 06 25 06
		iPR_1	26 37	6	+4	-12		(23°0)	Felt in Hawkes
		iPR_2	26 49	4	+4	-9			Bay District, New
		iPR_3	27 03	6	+5	-11			Zealand,
		iS_N	30 22	8	-6				Wellington Ep.:
		iS_E	30 25	6		-15			41°S., 177°E.
		i	30 34	6		+17			0 06 21 35
		i	30 37	6	+13				P 21 58
		i	30 41	8		-16			Δ 1°4
		i	30 53	7	11	10			Melbourne Δ 24°7
		i	31 52	6	-7				P 26 50
		eL	32.2	19					Perth
		MN_1	32 53	12	40				P 30 30
		ME_1	33 16	13		25			
		MN_2	34 11	12	51				
		ME_2	34 31	13		48			
		MN_3	35 39	12	38				
		ME_3	36 57	12		45			
		MN_4	37 25	11	28				
		ME_4	39 53	12		44			
		MN_5	42 11	11	25				
		F	08 30						
24	" 14	e	19 00.1						Small. On Galit-
		M	20 17						zin Vertical only.
25	" 14	iP	20 47 37	4		1½		3610	
		i	48 50	4		1½		(32°5)	
		eS	52 50	5	1	1			Melbourne
		eL	55.3	18					i 20 48 25
		MN_1	58 26	13	16				M 21 05.6
		MN_2, ME	59 46	14	53	16			
		F	22 30						
26	" 18	e	02 11.7	4					La Plata Δ 3470 km
		e	15.9	4					0 01 52.77
		eS?	21.4	15					P 59.42
		eL	39.5	24					La Paz Δ 3950 km.
		MN_1	42 55	18	5				Ep. 60°S.,25°W.
		MN_2	47 26	17	3				P 02 02 12
		ME	50 28	18		3			
		MN_3	51 43	16	2				
		F	03 40						
27	" 18	eP	06 12 53	4	1	½		2990	0, 06 06 57
		eS	17 27	8	7	2		(26°9)	
			18 09	8	5	2			U.R.S.S. Ep.;
		eL	19.9	16					6°S.,149°E.
		MN_1	21 25	14	9				
		ME_1	21 41	14		4			Melbourne
		ME_2	25 09	12		2			e 06 19 08
		MN_2	25 59	11	5				L 23 32
		F	07 15						

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
28	Feb, 24	iP	20 58 27	3	+4	-4		5330?	Manila Δ 1330 km.
		e(S?)	21 05 22	5	2	3			Ep. 3°N., 118°E.
		iE	07 52	5		-5			O 20 51 14
			08 35	9	3	3			P 54 07
			09 08	7	3	3			Amboina Δ 620 km.
		mNE	12 30	6	8	4			P 54 14
		F	21 45						Phases small after mNE.
29	" 25	e	10 27 09	6					
		eL?	28 30	16					
		L	32 30	17					Small.
		M	38 35	12	1				
		F	10 50						
30	" 25	e	17 53 00	6					
		e	53 40	10?					Small.
		e	56 49	12					
		M	18 00 15	12	1				
		F	18 15						
31	" 28	e	02 24.6						
		e	26.6	12					
		eL	27.4	16					
		MN	28 49	12	1				
		ME	29 57	14		1			
		F	02 55						
32	" 28	eP?	18 08 07	3	1	1			Preliminary phases small and very indefinite.
		e	08 20	4		2			
		e(S?)	11 28	6	1				
		$e(SR_1)$	12.6	7?					
		eL	14.1	16					
		MN_1	16 30	14	7				
		ME_1	17 28	16		8			
		MN_2	17 41	12	10				
		ME_2	18 53	14		5			
		MN_3	19 36	11	6				
		ME_3	22 25	13		2			
		F	19 15						

WM. C'LEARY S.J.
Director.

No. 3 1930, March.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	s : 1	$\frac{r}{T_o^2}$
A_N	(1	203	8,9	4.2	0.02
	(3	76	14.0	6.4	0,003
A_E	(1	231	9.5	3,9	0.01
	(3	82	9.5	4.5	0.01
A_Z	(2	91	5.0	3.5	0.03

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
33	Mar. 1	e?	01 27 27						
		e	32 03	4	1				Harvard
		eL	34.6	16					eL 01 29 0
		MN	36 30	12	2				Ottawa
		F	02 00						L 32
34	" 6	P	15 40.6					3300?	P in minute mark.
		i	40 43	2		1			
			40 50	5		2			Small waves of
		PR_1?	41 00	9		4			about 2 sec. per-
		PR_2?	41 17	9	1	4			iod superposed
		m	41 39	9	2	4			on PR waves of
		e(S?)	45 08	6	2	2			9 sec.
		iS	45 26	6	7	10			Wellington
		m	45 40	6	6	6			P 15 38 06
		m	46 39	10	11				i 39.20
		eL	47.6	16					Suva Δ 21°2
		MN_1	49 05	16	59				0 33.6
		ME_1	49 25	18		26			P 38.6
		ME_2	50 36	15		38			Melbourne Δ 29°1
		MN_2	51 09	12	12				P 41 22
		ME_3	51 27	16		32			Adelaide Δ 3450km
		MN_3	55 38	12	20				P 42 34
		ME_4	56 29	13		9			Manila Δ 8100 km.
		MN_4	57 29	12	15				0 35 24
		F	17 50						P 46 51
35	" 10	i	03 54 11	3	2	2			Small and obs-
		eL?	56.0	14?					cured by micros.
36	" 10	e	04 52.6	?					Obscured by micros
		e	55.5	5?					
		L?	57.0	12					
37	" 10	e	05 27.0	3					" " "
		eL	34.6	14					
38	" 10	e	16 48 23	4	2				" " "
		e	48 42	5		3			U.R.S.S. Ep.,
		e	51 36	11					55°N., 138½°E.
		eL	52.6	14?					Manila Ep.,
39	" 10	i(P?)	20 22 29	4		+4		2000?	44°N., 147°E.
		i(S?)	26 21	5		+4			
		SR_1?	27 11	5		3			Subsequent waves
									small and indef-
									inite.

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
40	Mar. 12	eE	05 34.7						
		e_N	36.4						Adelaide Δ 3000 km
		e_N	37.3	6?					P 05 38 14
		eS?	38.6	6					
		eL	41.6	24					
		ME_1	43 47	10		1			Melbourne
		MN_1	44 15	10	1				e 39 50
		ME_2	45 37	10		3			
		MN_2	46 41	10	2				Wellington
		ME_3	47 09	10		4			e 40
		MN_3	48 40	10	2				
		F	06 25						
41	" 12	e?	19 35.8						
		e	36 39						Osaka
		e	42 09	12					P 19 30 21
		eL	44 00	13					L 31 04
		MN	46 05	12	1				Wellington
		F	20 00						e 40
42	" 15	e	07 08 22						Obscured by micros
		e	15 07						Batavia Δ 310 km.
		eL	20.6	15					P 06 55 41
		MN_1	25 35	12	7				Manila Δ 4190 km
		ME	26 05	12		2			0 06 53 05
		MN_2	27 15	10	3				P 07 00 37
		F	08 20						U.R.S.S. Ep.;
43	" 18	e	01 07.4						9°S., 104°E.
		M	09.5 to 11	9					A few waves mask-
44	" 20	e?	12 48.1						ed by heavy micros
		e	54.6						
		eL	55.9	16					Early phases obs-
		MN_1	59 11	14	4				cured by heavy
		ME_1	13 00 09	14		3			microseisms.
		ME_2	01 30	13		4			U.R.S.S. Ep.;
		MN_2	02 05	11	5				22½°S., 176°W.
		F	13 35						Wellington Δ 10°?
45	" 25	e	11 01,7	4					e 12 49 20
		eL	04.6	12					Melbourne
		F	11 15						e 53 48
46	" 25	e	11 41.9	2					Very small.
		e	43 15	8					Wellington
		eL	43x17	20					L 11 05 0
		MN_1	44 09	14	3				
		MN_2	45 45	12	1				Osaka
		F	12 05						P 11 29 06
									L 31 09

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
47	Mar.26	eP_N	07 18 57	2	2			4260 (38°3)	0. 07 11 20
		iP	18 58	2	+2	$-2\frac{1}{2}$			
		i	18 59	2	-4	+5			
		i	19 01	5	+10	-10	-3		Dilatation.
		m	19 08	5	17	20	18		
		PR_1	20 10	5	4	6			
		PR_2	20 34	5	8	11			
		PR_3	20 43	5	7	8			
		P_cP?	21 13	4	7	7			
		i(S?)	24 34	6	+13	+15			
		i	24 40	5	+24	-13			
		iS	24 46	7	+32	29			
		m	24 57	7	32	20			
		m	25 06	24	250	170			Large wave of 24 s period with waves of 4 & 5s. periods superposed.
		i_E	25 59	6	13	+37			
		SR_1	27 06	6	14	20			
		SR_2	27 44	7	24	19			
		SR_3	28 06	8	30	21			
		m	28 46	8	32	29			Irregular waves.
		m	29 28	8	34	35			
		eL	29 35	36					Large irregular waves with 4 sec. waves superposed.
		MZ_1	30 25	7			38		
		ME_1	30 38	20		410			
		MN_1	30 48	20	540				
		MZ_2	30 54	6			44		Max.phases very irregular till M_4
		ME_2	31 40	16		540			
		MN_2	31 44	16	490				
		MN_3	33 22	12	265				Batavia Δ 3480 km. P 07 16 32
		ME_3	33 28	12		230±			
		MN_4	34 24	12	280				Manila Δ 2665 km.
		MZ_3	34 36	11			260		P 17 21
		ME_4	34 48	12		260			Perth
		MN_5	35 46	12	265				P 17 42
		ME_5, MZ_4	36 01	11		260	170		Adelaide Δ 3000 km
		MZ_5	37 25	10			160		P 18 13
		MN_6	37 36	11	205±				Hong Kong
		MN_7	39 04	9	130				P 18 34
		MZ_6	39 40	11			110		Melbourne
		ME_6	39 48	10		115			P 18 56
		MN_8	40 46	8	86				Wellington Δ 59°4
		ME_7	41 29	9		81			O 11 24
		ME_8	43 30	10		106			P 21 32
		MN_9	44 28	10	110				U.S.C.& G.S. Ep.;
		ME_9	46 36	8		61			8°S.,125°E.
		MN_{10}	47 52	8	63				O 07 12 07
		ME_{10}	49 18	9		60			J.S.A. Ep.;
		MN_{11}	56 06	10	78				7.6°S.,124.8°E.
		ME_{11}	57 54	10		51			O 07 12 05
		CE_1	08 23 40	12		10			Manila Ep.;
		CN_1	28 24	10	9				8.5°S.,127.5°E.
		CN_2	28 24	12	14				O 07 11 48
		CE_2	32 14	12		10			U.R.S.S. Ep.;
		F	10 30.						8°S., 125°E.

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY. N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
48	Mar.26	eP	11 38 59					4010	0, 11 31 40
		iP	39 01	4	4	4		(36°1)	Amboina Δ 340 km.
		iS	44 34	8	6	8			P 11 34 07
		eL	48.6	12					Batavia
		ME_1	50 43	4		6			i 36 35
		MN_1	51 32	4	18				Manila Δ 2665 km.
		MN_2	52 55	5	18				O 31 47
		ME_2	53 14	6		10			P 37 11
		ME_3	56 06	8		12			U.R.S.S. Ep.;
		MN_3	56 32	8	11				7½°S.,214°E.
		F	13 25						
49	" 26	P?	20 22 35	5		2			Amboina Δ 730 km.
		S?	28.2	6		1			P 20 17 50
		eL?	32.4	12					Batavia i 20 10
		ME_1	34 00	5		2			Manila Δ 2665 km.
		MN_1	35 06	4	5				O 15c22
		MN_2	38 40	10	3				P 20 46
		ME_2	40 04	10		2			U.R.S.S. Ep.,
		F	21 10						8½°S.,126½°E.
50	" 30	e	00 45 13	8					
		eL	47.8	20					
		ME	50 53	17		2			
		MN	53 13	16	4				
		F	01 20						
51	" 30	e?	08 39 05						U.R.S.S. Ep., 55°S.
		e	49 54	8	2				27½°W.
		eL	09 17.6	16					Adelaide
		ME	18 44	16		1			P 08 39 10
		MN	19 44	16	2				Manila Δ 2733 km.
		F	Lost in No.52.						O 08 39 59
52	" 30	eP	09 22 42	4				3290	
		i	23 38	6	3			(29°6)	
		S	27 34	6	2	2			
		i	28 37	8		6			
		eL	32.0	20					
		M_1	32 48	18	31	31			
		ME_2	35 00	10		6			
		MN_2	35 36	10	8				
		F	10 20						
53	" 30	iP	15 26 16	5	4	3	1	3660	
		S	31 31	5	2	3		(32.9)	
		m	31 53	6	4	4			
		m	35 50	5	10				
		m	36 35	5		8			
		eL	37.1	20			)		Waves of 4s. per.
		MN_1	38 37	16	108		)		superposed.
		ME_1	38 44	16		66	)		Manila Δ 2655 Km.
		MN_2	40 06	5	23				O 15 19 10
		ME_2	40 53	8		18			P 24 32
		MZ_1	41 00	9			8		Adelaide Δ 3050
		MN_3	42 21	10	28				P 25 28
		MZ_2	42 25	12			27		St Louis Ep.;
		ME_3	42 35	10		26			8°S., 128°E.
		F	17 02						U.R.S.S. Ep.1
54	" 30	e	17 05.6	3					8½°S.,123½°E.
		e	07.7	4					A few small waves.
		F	17 22						

WM. O'LEARY S.J.
Director.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

ϕ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	s : 1	$\frac{r}{T_o^2}$
A_N	(1)	210	8.9	3.8	0.020
	(3)	85	13.0	8.2	0.004
A_E	(1)	222	9.5	3.8	0.010
	(3)	75	9.5	3.9	0.005
A_Z	(2)	103	5.0	3.0	0.040

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
55	April 2	e	20 10.1						Manila Δ 1220 km.
		e	12.7	8	2				0 19 54 58
		eL	20.7	20					P 57 38
		ME	23 22	16		4			Ep.8°N.,130°E.
		MN_1	24 16	18	3				Batavia Δ 2600 km
		MN_2	26 10	17	3				P 59 53
		F	20 50						U.S.S.R.Ep.5°N,127
56	" 4	iP_E	02 15 50	4		+3		2256	Disturbed by vis-
		iS_E	19 31	5		+5½		(20.3°)	if from 2 16 15 to
		i	19 37	5	+8	+16			2 17 00
		eL	22.2	11					0, 02 11 09
		ME	24 16	8		1			Wellington says
		MN	24 45	10	2				felt strongly in
		F	02 50						both Islands N.Z.
57	" 4	iP_N	09 30 20	2	1½			3090	0, 09 24 15
		eP_E	30 23	4				(27.8°)	Amboina Δ 3610?
		PR_1	31 03	5	5	2			P 09 31 33
		iS	34 58	5	5	1½			Manila Δ 2620 km.
		m	35 14	8	2	2			Ep. Solomons.
		mE	35 48	6		6			0 09 28 04
		mN	36 04	6	6				P 33 24
		SR_1	36 22	7	3	6			Osaka Δ 5490 km.
		SR_2	36 53	5	5	5			P 33 59
		eL	37.0	16					Batavia Δ 5740 km
		ME_1	39 58	13		8			P 34 13
		MN	40 45	12	6				
		F	10 25						
58	" 13	e	04 52.0	3					Very small.
		eL	54.2	16					
		MN	56 05	13	1½				
		ME	58 10	13		1			
		F	05 15						
59	" 15	e(P?)	10 44 15	6	2	2			Manila Δ 1060 km.
		e	49 09	12?					0 10 34 18
		e	51 35	11?					P 36 37
			53 00	11		4			Irkutsk Δ 6790 km
		MN_1	54 03	12	3				P 42 01
		ME_1	55 01	16		8			U.S.S.R.Ep. 4°5S.,
		ME_2	57 29	14		6			132°E.
		F	11 35						
60	" 15	e?	22 11.9						Amboina Δ 810 km.
		e	14 41	4					P 22 02 58
		eL	22.7	18					Manila P 06 50
		ME	25 17	13		2			Adelaide P 13 00
		MN	26 33	13	2		F 22½	45m.	

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
61	April 16	e	15 11.?						J.S.A.Ep.50°N.132°W
		M	29 41	16					0 14 30 12
									U.S.S.R.Ep.47°N.,
62	" 20	iP_Z	01 48 26	3			¾	2440	130°W.
		iP_E	48 28	3		1½		(22.0)	
		iS_N	52 15	6	2				Manila e 01 54
		iS_E	52 21	6		8			
		m	52 25	8	4				
		eL	55.0	?					
		ME	57 06	10		1			
		F	02 05						
63	" 20	iP	16 27 21	3	2	1	4	2720	0, 16 21 51
		iS_N	31 34	4	5			(24°5)	Manila Δ 2910 km.
		S	31 42	6	5	2			0 16 25 51
		SR_1	32 24	8	6				P 31 36
		SR_2	32 34	8	4	7			Batavia
		mN	33 00	8	5				i 32 16
		eL	34.0	16					ZiKaWei Δ 6900 km.
		ME	36 08	14		2			P 32 36
		MN	37 48	14	4				Medan P 35 26
		F	17 10						
64	" 21	eP?	12 04 00	4					La Plata Δ 3290 km
		e	13.9	9					P 11 57 09
		i(S_CP_CS)	14 39	8		1			La Paz Δ 5645 km.
		e_N	16.4	15					P 59 58
		e_E	17.5	14					Ep.62°S.,38°W.
		e_N	26.5	12					Wellington Δ 81°
		e_E	27.3	12					0 11 50 42
		eL	36.1	20					P 12 03 07
		ME_1	41 10	20		5			St.Lois Ep.55°S.28°W.
		MN_1	41 30	18	9				ePR_1 09 45
		ME_2	43 06	20		11			Pulkovo
		MN_2	43 56	18	17				PR_1 09 58
		MN_3	48 58	16	10				U.S.S.R.Ep.41°S.51°W
		ME_3	51 08	14	~~10~~	2			
		MN_4	52 44	14	5				
		F	14 30						
65	" 23	eP	22 01 03					8530	U.S.S.R.Ep.40°N.145°E
		iS	10 58	4	1	4		(76°8)	Vladivostock
		eSR_1	16 19	24					P 21 52 15
		eL	22.3	32					Osaka Δ 1611 Km.
		MN_1	28 10	24	6				Kanasiri Is.
		ME_1	29 37	18		3			P 52 40
		MN_2	30 55	22	5				Irkutsk Δ 3850 km.
		ME_2	32 37	20		4			P 55 13
		MN_3	36 44	20	6				Hong Kong P 56 11
		ME_3	39 00	20		4			Manila Δ 6400 km.
		MN_4	42 54	18	3				0 46 35
		ME_4	48 14	18		3			P 56 30
		F	00 20						
66	" 25	iP N	11 36 41	4	2½			2530	Adelaide Δ 2200 km
		iS_E	40 41	8		5			P 11 36 13
		eL	42.6	12					Wellington Δ 5°
		MN_1, ME_1	43 48	9	6	11			P 42 00
		MN_2, ME_2	44 36	8	7	7			Manila Δ 2010? km
		F	12 35						P 47 55?

(Continued on next sheet.)

No. 5 1930, May.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

ϕ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	$\epsilon : 1$	$\frac{V}{T_o^2}$
A_N	1	200	9.1	4.4	0.019
	3	89	12.8	8.8	0.005
A_E	1	222	9.6	4.4	0.018
	3	72	9.3	5.7	0.010
A_Z	2	92	5.0	3.2	0.04

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
72	May 1	i	01 18 12	5		1½			Osaka Δ 513 Km.
		m	18 20	6		2½			P 00 59 03
		eL	30.3	16					Hong Kong P 03 30
		F	02 00						Manila Δ 4080 km
73	" 1	eP	10 23 34	3	1	½		2910	P 01 03 36
		eS	27 56	6		2		(26°2)	
		iS	28 03	7	5	2			
		eL	31.0	16					
		MN	32 42	12	2				
		ME	33 12	10		1			
		F	11 30						
74	" 1	e	10 36 28	4					A few small waves.
		F	10 45						
75	" 2	P	01 46 52					2810	P in minute mark.
		PR_1	47 35	5	3	4		(25°3)	0 01 41 13
		iS_N	51 13	9	4				Adelaide Δ 3350 km
		iSE	51 15	5		4			P 48 09
		m	51 23	11	10				Melbourne Δ 3000
		eL	53.1	18					P 48 20
		MN_1	54 23	15	16				Manila Δ 5980 km.
		ME_1	54 52	13		10			0 41 18
		MN_2	56 25	12	6				P 50 48
		ME_2	59 52	10		7			U.S.S.R. Ep.,
		MN_3	02 01 52	9	7				13°S.,170°E.
		F	03 00						
76	" 2	iP	06 07 07	4	+6	+6	-3½	2810	0 06 01 28
		PR_1	07 38	8	7	4		(25°3)	
		PR_2	07 46	8	6	4			L hard to identify
		m	08 12	6	5	5			Wellington Δ 26°
		m	10 42	6	4				0 01 38
		iS	11 28	6	7	5			P 07 26
		m	12 08	6	22	19			Ep.15°S.171°E.appr.
		SR_1	12 44	8	8	24			Adeliade P 08 00
		m	12 53	10	11	23			Melbourne P 08 05
		m	13 04	9	10	15			Manila Δ 6200 km
		m	13 13	9	9				0 01 32
		MN_1, ME_1	15 04	10	10	8			P 11 15
		ME_2	15 17	8		11			Batavia P 12 11
		MN_2	16 21	10	12				Vladivostock Δ7420
		ME_3	17 54	8		8			P 13 32
		MN_3	18 15	11	10				Sverdlovsk Δ12400
		MN_4	20 17	9	9				P 16 17
		MN_5	23 00	9	12				U.S.S.R. Ep.,
		ME_4	23 52	8		10			13°S.,172°E.
		ME_5	25 54	8		9			
		F	07 40						

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A^z μ	Δ km.	Remarks.
	1930								
77	May 3	eP_Z	12 28 57	3			1	2890 (26°0)	Wellington says vicinity of Solomon Is. Δ 38°
		i_N	29 36	4	4				0 12 22 03
		iS	33 24	5	3				P 29 41
		m	33 29	8	5	5			
		eL	35.5	18?					Manila Δ 5422?
		ME	36 32	12		2			P 33 00
		MN	37 04	12	3				
		F	13 05						
78	" 3	iP	15 28 32	3	2			2940 (26°5)	0 15 22 40
		iS	33 02	6	12	7			
		eL	35.3	18					Adelaide iS 35 06
		MN_1	37 04	13	3				
		ME_1	37 14	12		3			
		MN_2	40 22	12	2				
		ME_2	41 28	10		2			
		F	16 25						
79	" 5	eP	13 57 29	4	1	2	1	8440 (76°0)	0 13 45 44
		P_cP	57 56	5		3			
		iS	14 07 06	6	12	7			Manila Δ 2600 km.
		m	17 12	6	13	12			Ep.18°5 N.,97°E.
		PS	07 37	8	7	4			0 13 45 51
		S_cS	08 00	8		8			P 51 08
		mNE	09 28	9	7	7			Zi-Ka-Wei Δ 3067
		eSR_1	12 12	24					P 51 26
		mE	13 28	10		12			Batavia Δ 3430
		mN	13 54	14	20				P 51 44
		mE	14 15	12		16			Irkutsk Δ 3780
		L_N	20.1	36					Ep.18°N.,95°E.
		m	20 12	24	170	120			P 52 47
		L_E	21.9	42					Osaka Δ 4206
		MN_1	23 52	20	245				P 53 25
		MN_2	25 26	28	650				Helwan P 56 04
		MZ_1	26 30	25			135		Adelaide Δ 7500
		ME_1	27 22	24		390			P 56 40
		MN_3	27 54	24	1280				Strasbourg Δ 8350
		MZ_2	28 23	25			320		P 57 43
		MN_4	28 38	20	390				Kew Δ 8870
		MZ_3	30 11	25			400		P 58 11
		ME_2	30 53	22		490			
		MZ_4	32 22	22			205		J.S.A.Ep.19°N,96°5E.
		MN_5	32 34	18	790				
		ME_3	32 42	20		490			U.S.C.& G.S.Ep.,
		MN_6	33 32	12	235				17°N.,95°E.
		MZ_5	34 47	17			240		0 13 45 32
		ME_4	34 56	18		490			
		ME_5	35 56	18		385			
		MN_7	36 36	16	235				
		MZ_6	37 04	16			145		
		MZ_7	39 35	17			210		
		ME_6	40 06	16		230			
		MZ_8	42 16	15			150		
		ME_7	42 56	14		205			
		MN_8	44 40	15	100				
		ME_8	47 12	16		190			
		MZ_9	47 16	15			110		
		F	17 55						

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RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A^Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
80	May 6	ePR_1	22 54 57	6					Strasbourg ∠ 3300 k
		PS	23 04 53	8	2	3			Ep. 38°N., 45°E.
		PPS?	06 43	20	4	5			0 22 34 10
		m	07 11	20	4	7			P 40 19
		eL_N	24.3	28					Baku P 35 34
		L_N	30 00	40	80				Helwan P 37 41
		L_N	33 52	40	100				Kucino P 38 36
		L_E	36 00	36		43			∠ 1950
		L_E	39 00	26		66			Kew ∠ 3750
		MN_1	41 21	28	52				Ep. 40°N., 45°E.
		ME_1	43 05	20		32			P 41 09
		MN_2	45 19	16	17				Reykjavik ∠ 47°5
		ME_2	46 20	18		27			P 42 58
		MZ_1	46 26	18			14		Zi-Ka-Wei ∠ 6933
		MN_3	49 21	23	42				P 44 38
		MZ_2	50 55	18			20		Manila ∠ 77°5
		ME_3	51 09	20		72			0 34 32
		ME_4	53 57	18		35			P 45 39
		MZ_3	54 03	18			20		U.S.S.R. Ep., 38°N.,
		MN_4	57 55	18	19				45°E.
		F	01 55						
81	" 8	e	13 01 11						Malabar ∠ 8°2
		e	04 13	14					P 12 49 30
		eL	09.9	16					Batavia P 49 49
		MN_1	13 45	12	2				Manila ∠ 2330 km.
		ME_1	15 07	13		3			P 52 19
		MN_2, ME_2	17 00	13	2	3			Ep., 5°S., 116°E.
		F	Lost in No. 82.						
82	" 8	ePN	13 39 54					2820	
		iP	40 03	3	-2	+4	+1½	(25°4)	Melbourne-
			40 11	4	4	8			P 13 31 08
		iPR_1	40 29	4	-2	-9			Wellington ∠ 21°
		iPR_2	40 43	4	5	-8			P 39 30
		mE	41 45	7		5			Ep. 22°S., 167°/E.
		mN	42 16	6	5				Manila ∠ 6844 km.
		iS	44 23	7	-5	-10			P 45 23
		m	44 35	5	6	15			Zi-Ka-Wei e 46 42
		m	44 55	8	16	19			
		eL	45.9	16					
		MN_1, ME_1	47 00	14	21	21			
		ME_2	48 27	14		20			
		MN_2	48 33	12	15				
		MN_3	50 55	11	13				
		MN_4	52 37	10	14				
		ME_3	54 00	12		7			
		F	15 05						
83	" 8	e	16 40.0	8					
		eL	44.0	20					A few long waves.
		ME_1	47 16	18		2			
		MN, ME_2	59 09	18	2	1			
		F	17 15						
84	" 10	e	12 35.4						A few small waves.
		i	36 03	4	2	½			
		F	12 45						
85	" 12	iP_N	02 41 57	4	4			2460	
		iP_{EZ}	41 58	1		½	3	(22°1)	Wellington i 42 00
		m	42 01	4		4			Manila ∠ 6500
		iS	45 53	6	8	13			P 47 18
		m	46 33	7	7				

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	Amplitude. A_E μ	Amplitude. A^z μ	Δ km.	Remarks.
	1930								
85	May 12	eL	02 47.9	14					
Cont.		L	48.9	16	12				
		ME	49 29	12		2			
		MN	50 30	12	3				
		F	03 30						
86	" 18	ePz	00 07 46	3				3170	
		i_N	08 06	4	4			(28°5)	
		iS	12 30	6	5	3			
		SR?	13 50	8		10			
		eL	16.4	16					
		ME_1	17 12	16		33			
		MN_1	18 52	12	13				
		ME_2	19 04	14		21			
		ME_3	20 46	10		10			
		MN_2	22 16	10	13				
		F	01 15						
87	" 19	e(L)	03 57.9	20					La Plata Δ 33 40 km
		MN_1	04 04 16	16	3				P 3 18.13
		MN_2	07 22	16	4				La Paz Δ 5670
		F	05 45						P 21 00
									Ep.57°6 S.,27°W.
88	" 19	i	15 13 59	4	2				Manila Δ 650 km.
		S?	21 57	8					Ep.20°25'N,120°5E.
		i	22 12	6		2			P 15 05 34
		eL	34.0	20					Hong Kong P 05 38
		ME	35 20	20		3			Zi-Ka-Wei Δ 940 km
		MN	38 36	20	2				P 06 15
		F	~~09 00~~ 16 20						Osaka Δ 2043 km.
89	" 20	e_N	07 53.2	4					P 08 01
		e_E	57 10	8					U.S.S.R.Ep.25°N.,
		e_E	58 00	8					124°E.
		e_N	59 07	11					Manila Δ 3420 km.
		eL	08 00.9	26					P 07 49 15
		ME_1	04 28	12		5			Adelaide Δ 3650
		MN_1	05 28	12	13				P 49 28
		ME_2	06 25	12		6			Osaka Δ 4271
		MN_2	07 14	12	6				P 50 23
		F	09 00						
90	" 20	e_N	11 38 18	4					J.S.A.Ep.51°N,180°W.
		i_E	38 38	4		3			0 11 14 56
		e	43 58	8					U.S.C.& G.S.Ep.51°N.
		e	44 27	16					180°W. 0 11 14 59
		e(L)	55.0	20?					Zi-Ka-Wei Δ 5522
		L	12 01 00	30					P 11 23 22
		ME_1	02 14	22		6			Manila Δ 6578
		MN_1	07 05	20	10				P 25 00
		ME_2	07 16	20		4			St.Louis P 25 11
		MN_2	13 26	20	4				Ottawa Δ 7080
		F	12 35						P 25 29
91	" 28	eL	01 44.9	13					
		M	46 41	11	2				A few small waves
92	" 31	i	18 18 42	6	2				U.S.S.R.Ep.37°N,
		eL	36.4	20					140°E.
		M	40 34	20?					Osaka Δ 498 km.
		F	19 00						P 17 59 32
									Zi-Ka-Wei Δ 2056
									e 18 02 13
									Irkutsk Δ 3180
									P 04 25

WM. O'LEARY S.J.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

ϕ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	ε : 1	$\frac{r}{T_o^2}$
A_N	1	220	8.8	3.6	0.020
	3	86	11.9	7.2	0.005
A_E	1	241	9.2	3.6	0.020
	3	70	9.6	4.0	0.010
A_Z	2	86	5.0	3.4	.0.040

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
93	June 1	e?	13 14.4						Obscured by huge microseisms of 6 s. period and max.amp. 4mm.
		e	17.4						
		e(L)	20.2	22					
		ME_1	21 30	17					
		MN_1	21 35	13					
		ME_2	26 37	17					
		MZ_1	30 15	17					
		ME_3	30 48	24					
		ME_4	32 09	15					
		MN_3	32 39	12					
		MZ_2	34 41	17					
		MN_4	37 09	13					
		MZ_3	39 26	14					
		F	14 00						
94	" 4	$ePz_?$	09 56 26					3780?	
		iP	56 49	4	-6	+8	+8		
		iPR_1	57 58	4	-4	+3	+5		L waves absent.
		iPR_2	58 15	4	+3	-5	-8		
		PR_3	58 21	4	3	3	5		Malabar Δ 1980 km.
		iS	10 01 48	5	+7	-5			P 09 54 44
		m	01 57	4	9				Manila Δ 1380 km.
		iSR_1E	04 33	6		+19			P 54 55
		iSR_1N	04 36	6	+22				Batavia Ep.Moluccas
		iSR_2	05 08	7	+11	-7			P 55 03
		SR_3	05 19	7	9	7			Adelaide Δ 4900 km.
		MZ_1	09 56	4			8		P 56 05
		MN_1, ME_1	10 16	6	15	13			Hong Kong
		MZ_2	10 49	3			9		P 56 20
		MZ_3	11 33	3			6		Vladivostock Δ4910
		ME_2	11 49	7		9			P 58 47
		MN_2	12 14	6	11				Sverdlovsk Δ 8310
		ME_3	13 17	7		12			P 10 02 15
		MN_3	14 31	6	14				U.S.S.R.1°S,125°E.
		F	11 00						
95	" 5	iP	11 48 24	3		2		3110	0 11 42 15
		PR_1	49 07	3		3		(28°0)	
		mE	50 04	8		3			Apia Δ 14°5
		m	50 52	5	3	5			0 11 42 28
		m	51 26	8	3	3			P 46 0?
		iS	53 05	7	9	6			Wellington Δ 24°0
		m	53 23	8	6	11			0 11 42 32
		m	53 29	8	6	12			P 48 00
		mE	54 26	9		9			Melbourne e 49 18
		mN	54c53	8	14				Manila Δ 7000 km.

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. Az	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	Manila-
95	June 5	mN	11 55 19	8	13				0 11 42 26
		mE	55 46	9		13			P 52 54
		eL	56.0	20					Batavia
		L	56 57	15	42	26			e 53 53
		MN_1	59 11	12	15				Hong Kong
		ME_1	59 29	10		10			P 54 00
		MN_2	12 00 29	9	27				Vladivostock Δ8210
		MN_3	02 24	10	8				P 54 08
		ME_2	03 06	10		8			Irkutsk Δ 10,700
		ME_3	04 43	13		16			P 55 53
		MN_4	06 31	12	6				U.S.S.R.Ep. 20°S.,
		ME_4	07 09	10		9			180°E.
		F	13 35						
96	" 8	e?	17 49.1	3					
		eP?	50 30	3				3000?	Adelaide Δ 5500 km
		eS	55 01	8					P 17 51 25
		S	55 11	8	3	1			Manila Δ 4660 km
		eL	58.6	14					0 17 44 29
		ME	18 01 02	10		2			P 52 34
		MN	02 39	9	1				
		F	18 35						
97	" 10	e?	15 26.8						
		e	32.7	14?					
		eL	36,8	20					
		MN	38 21	17	1				
		ME	39 09	13		½			
		F	16 10						
98	" 11	iP	00 55 31	5	2	1		3000	0 00 49 34
		i_{NZ}	55 47	3	~15		7	(27°0)	Preliminary phases
		mN	56 24	5	7				small.
		mN	56 37	5	8				
		mN	57 11	4	9				
		mE	58 15	4		6			
		mN	58 55	5	8				
		iS_N	01 00 06	14	17				S phases large on N
		m	00 20	22	230	69			with waves 4s. per.
		m	00 42	22	290				superposed. Very
		SR_1E	01 24	16		34			indefinite on E.
		SR_2E	01 46	16		40			SR phases indefin-
		SR_3E	02 04	12		21			ite on N. On E 4s.
		L	02 57	27		390			waves superposed.
			03 35	30		440			Group of complex
			04 02	23		270			large waves on EW
			04 28	23		265			with waves of 4 &
		MZ_1	06 11	19			120		5s.per.superposed.
		MN_1	06 28	17	150				Adelaide Δ 3000 km
		ME_1	06 49	13		55			P 00 55 59
		ME_2	08 07	12		86			Melbourne P? 56 24
		MZ_2	08 53	15			93		Manila Δ 3833 km.
		MN_2	08 58	13	67				P 56 26
		ME_3	09 12	11		84			Apia Δ 40°
		zMZ_3	10 04	12			105		O 49 17
		MN_3	10 18	14	140				P 57 12
		ME_4	10 32	10		63			Wellington Δ 41°5
		MZ_4	13 15	9			46		Ep. 6°S., 144°E.
		MN_4	13 22	10	75				O 49 20
		ME_5	13 31	10		43			P 57 22
		MN_5	15 14	10	40				Hong Kong P 57 50
		ME_6	15 44	10		24			Batavia i 57 51
		CE_1	28 07	13		10			

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY. N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
98	June 11	CN_1	01 28 28	13	24				Vladivostock Δ 6080
		CN_2, CE_2	31 25	10	5	4			P 00 58 38
		CN_3	37 33	10	5				Irkutsk Δ 8130
		CE_3	39 28	9		4			P 01 00 33
		eW_2	03 40.4	24					Sverdlovsk Δ10,800
		F	04 12						P 03 04
99	" 11	e?	08 50.2						
		e	42.5	7					A few small waves.
		eL	47.8	17					Manila Δ 1122 km.
		ME	49 57	10		1			P 08 13 10
		F	09 00						
100	" 12	e?	15 04.4						A few small shallow
		e	08.9						waves.
101	" 13	e_Z	20 27.4						e from Galitzin Z.
		e(L)	28.4	17?					
		ME	30 40	13		1			Shallow waves.
		MN	31 30	8	½				
102	" 15	e_Z	07 41.5						e from Galitzin Z.
		e(L)	52.4	15					
		MN	56 00	10	1				Apia $\overline{P}$ 07 35 08
		ME	57 37	13		2			$\overline{S}$ 36 47
		F	08 20						
103	" 15	e	11 46.9	6					
		eL	51.7	20					
		MN_1	53 55	13	2				
		ME	54 30	11		1			
		MN_2	56 38	11	1				
		F	12 10						
104	" 15	e	21 17.2	4					Sucre Δ 5560 km.
		e	28.5	13					P 21 16 58
		eL	39.4	24					La Paz Δ 5610 km.
		MN_1, ME_1	42 19	19	6	10			P 17 04
		MN_2	44 37	19	6				St. Louis e 21 00
		ME_2	44 54	19		5			Wellington Δ 46°?
		MN_3, ME_3	47 42	19	4	3			e(S) 23 40
		F	22 50						
105	" 19	eP	13 16 25						eP from Galitzin Z.
		eL	34.4	23					Two shocks.
		MN_1	37 08	17	8				Batavia.- 140
		ME_1	37 50	13		1			P 13 08 09 Δ 41θ km
		MN_2	39 12	13	3				P 27 55 Δ 230
		ME_2	40 34	13		2			Manila-
		L	53.4	21					P 13 12 53 Δ 2910
		MN_3	54 25	23	14				P 32 53 Δ,2960
		MN_4	57 15	17	6				Hong Kong P 13 27
		ME_3	58 24	20		9			Zi-Ka-Wei,-
		MN_5	14 02 00	17	4				e 13 07 24 Δ 3728
		ME_4	04 20	17		6			e 14 57 Δ 8522
		F	14 30						Sverdlovsk Δ 8030
106	" 21	eL	20 40.4	20					P 18 44
		MN_1	42 43	11	2				U.S.S.R.Ep. 7°S,
		ME_1	43 17	10		1			105°E.
		MN_2	45 48	12	1				
		ME_2	46 34	11		1			
		F	21 10						

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RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
107	June 23	eP	19 40 18	3	1	q		2880?	
		eS	44 49	7	1½				Adelaide Δ 3350 km
		e	45 07	7	4				P 19 40 37
		m	45 27	8	2	2			Manila Δ 3610 km.
		m	46 31	8	1	2			O 19 34 28
		m	47 28	8	2	6			P 41 17
		mE	47 56	8		6			Irkutsk Δ 7800
		m	48 26	7	3	6			P 45 26
		eL	48.7	31					Tachkent Δ 9500
		MN_1, ME_1	50 16	17	17	22			P 47 04
		MN_2	51 28	15	15				Uccle
		ME_2	51 39	15		9			P 55 18
		ME_3	57 24	12		5			U.S.S.R.Ep. 8°S.,
		MN_3	58 27	12	6				147.5°E.
		F	20 50						
108	" 25	eP?	10 31 29	3					La Paz Δ 890 km.
		e	32 27						Ep.14.2°S.,76.5°W.
		e	46 58	7					P 10 19 27
		eL	11 16.5	24					Sucre Δ 1200 km.
		MN	23 40	17	1				P 20 12
		ME	24 15	16		1			Ottawa Δ 6750 km
		F	12 40						O 17 39
109	" 25	e	21 47.9						P 27 53
		e	50.9	21					J.S.A.Ep.14°S,74°5W
		e	57.4	21					U.S.C.&G.S.Ep.,
		m	57 42	21	6	6			16°S.,75°W.
		m	58 01	21	6	8			O 10 17 38
		e	22 01.7	17					U.S.S.R.Ep. 15°S.,
		eL	10.1	17					75°W.
		ME_1	19 16	17		4			La Paz Δ 820 km.
		MN_1	24 16	14	2				Ep.14.4°S,75.5°W.
		ME_2	24 37	17		2			P 21 23 39.5
		MN_2	27 42	15	2				Sucre Δ 1100 km
		ME_3	29 26	16		2			P 24 19
		MN_3	37 03	15	1				Georgetown Δ 55°
		F	23 10						P 31.02
110	" 30	e	13 04.4						Ottawa Δ 6700
		eL	10.9	14					O 21 34
		MN	11 55	14	2				P 31 45
		ME	13 58	14		1			Strasbourg Δ 11,000
		F	13 30						P 35 14
									J.S.A.Ep.14°S,78°W
									U.S.C&G.S.Ep.16°S,
									79°W
									U.S.S.R.Ep. 15°S,
									80°W.

WM. O'LEARY S.J.

No. 7. 1930, July.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. **Foundation : Triassic sandstone.**

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	∗ : 1	$\frac{r}{T_o^2}$
A_N	(1)	213	8.6	3.3	0.028
	(3)	80	11.8	6.4	0.006
A_E	(1)	218	9.6	3.5	0.020
	(3)	83	9.3	6.7	0.014
A_Z	(2)	95	5.0	3.3	0.048

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
111	July 2	eP	21 16 06	4	2	1	2	9100	0, 21 03 46
		i	16 22	6	4	7		(81°9)	
		PR_2	21 23	5		3			Phu Lien Δ 1700 km
		eS	26 22	8		2			P 21 07 34
		mE	26 40	9		6			Bombay Δ 1900 km
		mN	26 58	9	6				P 07 43
		eL_N	40.0	47					Hong Kong Δ 2400
		L_N	42 57	47	190				P 08 25
		L_E	44 06	32		66			Zi-Ka-Wei Δ 3667
		MN_1	49 22	25	25				P 09 29
		ME_1	54 08	25		32			Manila Δ 3680
		MN_2	54 58	18	14				P 09 46
		ME_2	58 20	18		16			Strasbourg Epi.- 27°5 N.,90°E.
		MN_3	59 37	15	9				
		ME_3	22 03 32	116		7			0 21 03 34
		F	00 40						U.R.S.S.Ep.,28°N., 94°E.
112	" 3	e	09 29.5						
		M	35 22	14	2				Very small.
									Wellington e 09 28
113	" 3	e	17 52.5						Very small.
		eL	56 09	14					Wellington e 17 57
		M	18 00 02	12	1				
114	" 5	ePZ	18 02 39					3200	eP from Galitz.Z.
		PR_1	03 24	5	4			(28°8)	Heavy micros. on
		S	07 24	?					Weichert.
		i	07 40	5	5	7			0, 17 56 22
		m	09 18	6		6			Manila Ep.approx., 1°0 S.,163°E.
		eL	10.7	21					
		ME_1	12 51	16		15			U.R.S.S.Ep., 6°5 S 147°5 E.m s
		MN_1	13 58	16	7				Melbourne e 08 12
		ME_2	15 41	14		6			Wellington e 04 20
		MN_2	17 25	12	8				Osaka P 04 20
		MN_3	20 23	10	3				Batavia e 05 19
		ME_3	21 28	9		4			Irkutsk Δ 7580 km
		F	19 05						
115	" 13	e	01 35.0	8					Felt in Montana,
		eL	51.5	20					Three Forks Distr.
		M_1	56 00	17	2				St.Louis P 1 03 27
		M_2	02 05 11	14	1				Georgetown P 09.5
		M_3	14 33	17	2				Sucre P 19 03
		F	02 35						Δ 4200 km.

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RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
116	July 13	e	08 43.0						Very small.
		M	49 20	9	1				
		F	09 00						
117	" 14	e_{NE}	23 01.0						J.S.A.Ep.13°N,90°W.
		e_N	22 15	11					U.S.C.& G.S.Ep.,
		e_N	27 50	18?					13°N., 90°W.
		e_N	32 29	24					U.R.S.S.Ep.,12°5 N
		e_E	34 ' ' 02	18					90°W.
		eL	37.0	30					St.Louis P 22 45 56
		ME_1	45 10	17		4			Georgetown Δ 3450
		MN_1	46 00	18	5				P 22 46 37
		ME_2	49 35	15		3			La Paz Δ 4050
		MN_2	51 48	15	2				P 47 50
		ME_3	59 25	15		3			Scoresby Sund 7760
		MN_3	00 04 20	15	3				P 51 46
		eW_2	42.6	27					Strasbourg Δ 9140
		MN	51 20	18	3				P 53 13
		F	01 30						
118	" 22	ePZ	19 37 41	2			2	8160	0, 19 26 11
		iP_cPNZ	38 09	5	3		2	(73°4)	J.S.A.Ep.,46°5 N
		S	47 17	8					152°5 E
		m	47 33	8	2				0 19 ' ' ' 25 59
		m	47 56	9	1				U.R.S.S.Ep.,45°N.
		m	48 13	11	3				147°5 E.
		m	48 27	11	3				U.S.C.& G.S.Ep.,
		eL	20 02.3	21?					46°5N.,151°E.
		ME	07 10	16		2			0 19 26 05
		MN_1	07 42	18	3				Osaka Δ 1704 km.
		MN_2	13 42	16	3				P 19 28 56
		F	20 35						Zi-Ka-Wei Δ 2733
									P 31 00
119	" 25	eP	09 31 47	3	½	½		2160	Felt in Wellington
		i	13 57	4	½	1		(19°4)	R-F.3.
		eS	17 19	10?					Pg 09 10 09
		i	17 44	4		2			Melbourne i 18 29
		eL	18.2	16					
		MN	20 20	10	1				
		ME	20 27	10		1			
		F	09 45						
119a	" 25	e	16 23.0						From Galitzin Z.
		M	25.5						Very small.
120	" 26	e	13 06 12						" " Felt in
		M	11						Wellington R-F.2.
121	" 26	e	17 11.6						Very small.
		eL_Z	16.2						
		MZ	17 48						
122	" 27	e	02 21.3						" "
		M	22 20						
123	" 28	e_N	18 09.5						Heavy microseisms.
		e_N	11 25	6	2				Wellington e 18 06
		i_E	14 58	4		4			Melbourne i 18 13 25

WM. O'LEARY S.J.

No. 8 1930, August.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	ε : 1	$\frac{r}{T_o^2}$
A_N	(1	203	8.7	3.8	0.020
	(3	118	9.8	6.2	0.009
A_E	(1	226	9.0	4.4	0.026
	(3	79	9.3	5.0	0.018
A_Z	(2	93	5.0	3.4	0.050

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
2	1930		h. m. s.	s.	μ	μ	μ	km.	
1~~3~~4a	Aug. 1	e	21 22.6						From Galitzin Z.
		M	27						
124b	" 2	eP_Z	16 15 27	4				6390	P from Gzlitz.Z.
		i_Z	15 41	7				(57°5)	
		eS	23 23	9	1	3			Wellington Δ 35°
		i	23 41	9	4	5			La Plata Δ 6020
		eL_{NE}	30.3	20					0 16 06.0
		L_{NE}	31 15	16	11	8			La Paz Δ 6980
		iL_Z	31 51	18					P 16 39
		L_{NE}	32 22	23	9	8			Adelaide Δ 4150
		ME_1, MZ	35 30	15		5			P 18 48
		MN	36 55	14	4				Manila Δ 4265
		ME_2	39 00	14		4			0 16 49
		F	17 25						P 24 26
125	" 2	i_Z	22 00 34						i from Galitz.Z.
		eL	07.2	19?					Very small.
		ME	09 25	17		3			
		MN	10 20	16	3				
		F	22,25						
126	" 18	eP	10 06 42	2	2	½	2	9510	La Plata Δ 3060
		PR_1	10 18	7	1			(85°6)	0 09 53.72
		m	10 31	7	1				La Paz Δ 5390
		eS	17 20	13	3				P 10 02 40
		$\overline{S_cP_cP_cS}$	17 38	13	3	2			Ep., 52°S, 27°W.
			19 22	11	5				Tananarive Δ9300
		e_E	31 16	14					0 09 53 44
		eL	37.4	27					P 10 04 30
		MZ_1	43 24	23			22		Wellington Δ 83°
		MN_1, ME_1	43 48	23	21	12			0 09 53 18
		MN_2, MZ_2	46 20	18	25		20		P 10 05 55
		MN_2, E_2	48 04	16		11			Strasbourg Δ 11,744
		MN_3	50 07	15	16				P 10 05 01
		ME_3	51 04	16		6			Ep., 52°S, 25°W.
		F	12 20						St.Louis Δ 110°
									P 08 16
									Ep., 57°S., 26°W.
									U.S.C.& G.S.Ep., 54°S., 31°W.
									0 09 53.6
									U.R.S.S.Ep., 53°S, 26°W.

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
127	Aug. 20	$eP?_N$	21 04 36					7270?	Hong Kong Δ 1050
		eS	13 24	5	3	2			P 20 55 22
		PS	13 56	15	4				Zi-Ka-Wei
		eSR_2	20 38	15					P 55.35
		eL	25.7	24					Manila Δ 1120
		ME	30 05	17		6			P 56 29
		MN_1	31 20	17	8				Ep., 24°20'N,
		MN_2	34 09	17	10				122°30'E. app.
		F	22 35						Osaka Δ 2500
									P 57 23
									Phu Lien Δ 1940
									P 57 30
									U.R.S.S. Ep., 24°5N
									121°E.
128	" 24	ePN	09 14 09	7	1			3080	
		iP_GS_N	17 07	4	-5			(27°7)	Manila Ep., 5°S.,
		eS_E	18 46	7					163°E. approx.
		i_{NE}	19 04	9	-16	8			P 09 16 34
		mNE	20 02	7	8	6			Batavia e 9 17 48
		i_E	20 17	7		9			Adelaide S 20 00
		eL_E	22.7	14					Melbourne S 20 15
		eMN	23 45	10					Irkutsk Δ 8290
		ME_1	24 10	12		18			P 20 04
		MZ_1	24 13	12			5		Tachkent Δ 10500
		MN_1	24 23	12	28				P 22 02
		ME_2	25 46	9		10			U.R.S.S. Ep., 5°S.
		MN_2	26 39 [illegible]	10	15				161°E.
		MN_3	28 13	9	10				
		ME_3	29 23	9		8			
		F	10 35						
129	" 27	eP_{EZ}	14 50 53	3		1	1	2760?	Suva Δ 12°
		iS_N	55 09	3	5				P 14 46.5
		i_N	55 30	6	6				Wellington Δ 32°
		m_N	56 14	10	3				O 14 42 54
		eL_N	57.1	17					Adelaide Δ 2600?
		MN_1	58 07	17	16				i(P) 56 29
		MN_2	15 00 47	13	7				Manila P 14 56 37
		F	15 40						
130	" 29	eN	00 58 15						Very small. No
		iN	58 59	5	4				definite phases.
131	" 29	eL_N	11 47.1	?					
		MN	50 28	8	1				Melbourne i 44 38
		F	12 00						

WM. O'LEARY S.J.
Director

No. 9

1930, September.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	s : 1	$\frac{r}{T_o^2}$
A_N	1	203	8.7	4.0	0.030
	3	80	11.9	5.7	0.005
A_E	1	212	9.4	4.7	0.020
	3	86	9.5	4.8	0.014
A_Z	2	93	5.6	3.3	0.040

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
132	Sept. 1	e_Z	17 00 08						
		e_N	08 00	3	2				Melbourne
		eL	13.8	16					e 17 13 45
		MN	15 10	13	4				Wellington
		F	17 30						e 15
133	" 6	e_E	06 48 31	6		1			
		e_N	48 40	6	1				Melbourne
		e(L)	55.9	15					e 06 53 35
		MN	55 48	10	6				
		F	07 10						
134	" 6	e_{NZ}	17 19 24	3	2		1		No definite phase
		e_{NE}	22 25	3	2	2			Manila Δ 3265 km
		e_E	24 12	3		2			0 17 15 18
		F	17 40						Sverdlovsk Δ 6580
									P 27 04
135	" 13	eP?E	23 21 49	3				2440	0 23 17 03
		iP_{NE}	22 04	3	+4	+4½		(22°0)	Suva Δ 10°
		$iNEZ$	22 08	3	-4	-5	+3		Wellington Δ 18°6
		$iNEZ$	22 18	4	-4	-12	+4		Ep., 23°S, 170°E.
		iS_{NE}	25 58	5	+8	+8			P 23 21 58
		i_E	26 28	6		+11			Melbourne Δ 27°
		eL_{NE}	27.8	21					P 23 23 02
		MN_1	29 09	14	20				Adelaide Δ 2800
		ME_1	29 20 XX XX	15		18			P 26 35?
		MN_2	32 46	12	20				Manila Δ 3030
		ME_2	36 23	11		5			0 23 21 46
		F	00 20						P 27 46
136	" 14	eP_N	03 06 36	3	3			3020	0 03 00 37
		iP_{NZ}	06 39	3	+13		-5	(27°2)	Adelaide Δ 2900
		iPR_{1N}	06 11	3	+16				iP 03 06 36
		iPR_{1Z}	07 13	3			-5		iP 07 08
		iS_N	11 13	5	16				Wellington Δ 21°5
		mN	11 25	6	9				Ep., 58°S, 158°E.
		eL_N	12.7	24					0 03 01 44
		L_E	14 20	12		22			P 06 43
		ME_1	15 29	10		24			Melbourne Δ 22°
		MN_1	16 50	12	19				P 06 57
		MZ	17 14	13			10		Batavia Δ 6170
		ME_2	18 03	9		22			P 12 15
		MN_2	18 32	11	24				Manila Δ 8445
		ME_3	19 20	9		23			0 03 01 07
		MN_3	20 40	7	12				U.R.S.S.Ep.,
		F	04 45						37°5S, 172°5W.

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
137	Sept. 14	eP_{NZ}	17 18 14	3				2690?	P may be 1 or 2s earlier in hour mark.
		i_Z	18 18	2			4		
		i_{NEZ}	18 19	3	+7	+7	-11		
		i_{NZ}	19 07	3	+10		-8		Melbourne Δ 25°5
		m_N	19 14	4	6				P 17 19 19
		m_E	19 28	5		5			Adelaide Δ 3400?
		m_{NE}	19 36	5	4	6			P 19 32
		iS_N	22 27	5	-11				Manila Δ 5530
		i_E	22 32	5		-10			0 17 13 24
		m_N	22 41	6	11				Batavia P 23 05
		i_E	22 46	5		+14			Irkutsk Δ 9300
		m_{NE}	23 16	6	16	11			P 25 32
		m_{NE}	24 11	6	12	11			U.R.S.S.Ep.,13°N. 165°E.
		m_E	25 14	7		10			
		MNE	26 56	8	4	6			Wellington says felt at Cheviot R-F.4, Δ 1°1
		F	18 10						Pg 17 17 44
138	" 15	e	22 50.3						m s
		MN_1	54 23	16	3				Melbourne i 54 29
		ME	55 19	13		1			
		MN_2	58 19	13	2				
		F	23 20						
139	" 15	e	23 46 28	6					
		eL_E	48.0	16					
		ME_1	50 49	15		3			
		MN_1	51 29	13	3				
		MN_2	53 07	11	3				
		ME_2	55 00	11		2			
		F	00 25						
140	" 16	e?	10 06 10						
		e	14 55						Melbourne i 20 41
		eL	20.2	19					Adeliade L 24 30?
		ME	23 30	10		1			
		MN	25 00	10	1				
		F	10 45						
141	" 21	iP_E	08 39 30	3		2		2590	Wellington Δ 4°6
		eP_N	39 33	3	1			(23°3)	Felt R-F.4 in East
		eS	43 36	5	1	1			Cape District,N.Z.
		eL_N	45.1	18					P 08 35 57
		eL_E	46.2	18					Melbourne Δ 28°5
		MN	46 31	15	6				P 40 05
		ME	47 14	13		2			
		F	09 25						
142	" 21	eP	23 16 11					8790	eP from Mainka.
		iS	26 06	9	4			(79°1)	0 23 04 09
		eL_N	42.3	21					Manila Ep.26°N,
		L_N	45 16	35	31				98°5E. 0,23 04 11
		L_N	46 27	30	50				Strasbourg Ep.27°N
		L_N	48 27	24	27				98°E. 0, 23 04 01
		MN_1	52 00	18	18				U.R.S.S.Ep.,26°N, 99°E.
		ME_1	52 18	18		8			
		MN_2	55 44	15	8				Phu Lien Δ 1140
		ME_2	56 27	21		10			P 23 06 21
		ME_3	00 12 00	15		7			Zi-Ka-Wei Δ 2456
		F	Lost in No.143.						e 05 55
143	" 22	e	00 41 49						Manila Δ 2950
		iE	42 17	5		4			P 09 55
		L_E	42 42	13		5			Tachkent Δ 3100
		L_E	43 36	13		9			P 10 09
		ME	46 11	9		2			Adelaide S
		F	Lost in No.144						00 40 14

(Continued on next sheet.)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
144	Sept. 22	iP_E	01 36 36	5		-8		2670	0 01 31 12
		iP_{NEZ}	36 38	5	-4	+22	-7	(24°0)	Wellington Δ10°
		PR_1	37 09	7	4	14	9		0 01 30 37
		PR_2	37 18	7		12	9		P 33 05.Ep.,
		i_E	37 35	7		+25			33°S, 179°W. Felt
		iS_E	40 46	11		21			in East Cape R-F4
		m_{NEZ}	41 03	9	6	21	11		U.R.S.S.Ep., 40°S,
		m_{NE}	41 21	9	10	29			180°E.
		SR_1	41 51	11		14			Adelaide Δ 3450
		SR_2	42 03	12		20			P 01 38 17
		SR_3	42 17	15		45			Amboina i 41 09
		MZ_1	44 46	18			40		Batavia i 42 52
		MN_1, ME_1	45 08	16	63	49			Manila e 43 16
		MN_2, ME_2	46 02	15	150	120			Medan P 44 12
		MZ_2	46 18	16			92		La Plata Δ 10,000
		ME_3	46 58	15		140			0 01 31.0
		MN_3	47 30	13	84				P 44.3
		MN_4	48 51	11	37				La Paz Δ 9810
		ME_4	48 59	12		45			P 44 58
		MZ_3	49 08	12			32		Tachkent Δ 14,000
		MN_5	53 12	12	36				P' 50 19
		MZ_4	53 56	13			33		Sverdlovsk Δ13000
		ME_5	55 06	12		57			P 50 39
		MZ_5	58 12	12			16		
		ME_6	58 55	12		51			
		MZ_6	02 01 05	13			20		
		F	Lost in No.145.						
145	" 22	iP_{EZ}	03 03 08	3		4	1		Wellington Δ 9°3
		e_E	10 38	11					P 03 01 22
		L	11 58	17					
		ME_1	12 35	15		5			
		MN_1	14 11	15	7				
		ME_2	17 33	11		2			
		MN_2	20 11	11	2				
		F	04 00						
146	" 22	eP?	11 39 31	3		1			Wellington Δ 9°2
		eS?	43 39	7		1			P 11 36 02
		eL	47.5	15					
		MN_1, ME_1	49 33	12	2	2			
		ME_2	56 36	9		2			
		F	12 25						
147	" 22	e_E	13 06.1	4					Wellington Δ 9°1
		e_E	07 33	4					P 12 58 27
		eL_N	09.6	16					
		MN	12 00	12	5				
		ME	12 33	12		1			
		F	13 40						

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich)	Per	Amplitude.			Δ	Remarks.
					A_N	A_E	A_Z		
	1930		h. m. s.	s.	μ	μ	μ	km.	
148	Sept. 22	e_E	14 02.1						
		eL_N	04.6	15					
		ME	05 38	12		1			
		MN	08 36	9	1				
		F	14 25						
149	" 22	eL?	14 57.6						A few shallow long waves.
		L	15 03 45						
		F	15 15						
150	" 22	e	21 01.5						
		i	04 00	5	-3				
		i_{NE}	04 12	5	-4	-6			
		i_{NE}	04 31	5	-8	-7			
		eL	07.0	15					
		MN	08 00	10	4				
		F	21 25						
151	" 23	e	05 40.6						
		eL	42.0	18?					Wellington e 5 31 37 Local.
		MN	43 15	15	7				Melbourne e 40 42
		ME	43 38	15		4			
		F	16 10						
152	" 24	e_N	12 23.2						Manila Δ 870 km. P 12 05 46
		e_{NE}	26.2	9					
		e(L)	35.0	15					Zi-Ka-Wei Δ 2600 e 11 57
		MN_1	37 55	12	3				
		ME	44 40	14		5			Koti P 12 12 17
		MN_2	47 00	12	3				Batavia Δ 2980 P 12 22
		F	13 15						U.R.S.S.Ep., 11°N, 128°E.
153	" 25	e_N	18 11 26	4					
		iP_E	11 38	5		2		2830	Wellington Δ 6°7
		P_Z	11 39	4		2	2	(25°4)	Ep. 35°S, 179°E.
			12 32	13		4			0 18 06 32
		iS_E	16 00	8		7			P 08 14
		SR_1N	17 14	12	5				Melbourne Δ 27°7
		eL	19.0	15?					P 12 15
		eMN	20 24	16					Adelaide Δ 2400
		MZ	20 38	16			10		P 18 25
		MN_1, ME_1	21 01	15	42	17			Sverdlovsk
		ME_2	21 58	15		23			P 25 41
		MN_2	22 03	12	20				
		MN_3	23 50	11	16				
		ME_3	25 11	15		17			
		F	19 40						
154	" 26	e	19 54 06						Wellington P 46 - Small nearby shock.
		eL	56.1	16					
		ME	59 40	10		1			
		MN	20 00 36	10	1				
		F	20 30						

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
155	Sept. 26	e(S)	21, 33 28	10					
		eL	36.5	20					
		ME_1	38 09	11		2			
		MN_1, ME_2	39 00	11	2	8			
		F	22 10						
156	" 27	MN	18 01 45	9	1				Very small.
		F	18 15						Melbourne i 17 53 35
157	" 30	eP_{NZ}	21 26 59	3	2		1	3340	
		eS_E	31 55	6		8		(40°1)	0 21 20 44
		eS_N	31 57	6	3				Wellington Ep.,
		iS_N	32 10	6	8				3°S., 144°E.
		m_N	32 30	8	.5				Manila Ep., 2°5 S,
		iSR_1	33 51	10	16				148°E. apppox.
		m_{NE}	34 59	8	6	17			U.R.S.S.Ep., 5°5S,
		m_E	35 24	9		20			144°E.
		m_N	35 26	7	13				Adelaide Δ 4900
		m_N	35 44	7	10				P 21 35 55
		m_N	35 51	7	9				Manila Δ 3530
		L_E	35 51	16					P 27 07
		L_{NE}	37 24	17	104	190			Kobe Δ 42 45
		ME	38 04	16					P 28 28
		MN_1, ME_1	38 34	16	330	410			Ki-Ka-Wei Δ 4056
		MZ_1	39 04	16			185		P 28 42
		MN_2	40 00	13	175				Vladivostock
		MZ_2	41 09	13			190		Δ 5400
		ME_2	41 18	13		280			P 29 34
		MN_3	41 33	13	230				Batavia
		ME_3	42 38	13		280			i 31 34
		MZ_3	44 14	10			54		Irkutsk Δ 7450
		F	23 55						P 31 37

WM. O'LEARY S.J.

No. 10 1930, October.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	ε : 1	$\frac{r}{T_o^2}$
A_N	1	211	8.6	4.0	0.02
	3	84	12.0	6.4	0.007
A_E	1	235	9.2	4.4	0.02
	3	77	9.6	4.0	0.01
A_Z	2	89	5.0	3.6	0.04

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
158	Oct. 2	e	01 01.9						Felt in Guam.
		eL	07.9	18					Manila Δ 24°.8
		ME	10 39	11		1			P 00 45 16
		MN	13 06	14	2				Melbourne
		F	01 45						L 57 47
159	" 2	ez	07 00 12	2			2		
		e	01 27	4	2				
		i	06 08	7	4				Melbourne
		e	06 38	12					e 07 07 23
		eL	08.1	12					
		ME	11 06	12		3			
		MN	13 57	11	3				
		F	07 55						
160	" 3	e	18 30 approx.						Time service failed.
161	" 5	e	02 31.7 ca						Time service failed at 02 28. S,L & M distinguishable. S-P about same as No.162.
162	" 5	iP NEZ	18 ca						S-P about 4m.22s.
		iS							iP very sharp.
		eL							
		M							
163	" 8	iP	10 24 48	4	+6	+6	-5	3030	0 10 18 48
		i	24 53	4	-16	-16	+19	(27°.3)	Azimuth from iP:
		iPR_1	25 23	4	+19				N. 45° E.
		iPR_2	25 37	4	+27	+30			hence,
		mE	26 34	8		8			φ, 13° S.
		mN	27 03	7	11				λ, 171° E.
		iS	29 22	9	+44	+25			
		mE	29 31	9		47			J.S.A. ep. 10°S.
		mN	29 41	9	39				169°E.
		iSR_1	30 36	9	+92				U.S.C.& G.S. ep.
		iSR_2	30 59	9	-66				12°S.,169°E.
		iSR_3	31 11	9	+45				0 10 19 30
		eLZ	31.6	30					Wellington ep.,
		iE	31 40	9		-50			16°S.,171°E.
		LE	32.2	15					0 10 19 54
		LN	32.8	15					
		ME_1	34 53	12		62			Medan
		MN_1	35 07	12	98				P 10 24 36
		ME_1, MZ_1	36 12	11		62	38		Wellington Δ 24°.4
		MN_2	37 07	11	93				P 25 26

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h.	m.	s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930										
.63	Oct. 8	MN_3	10	39	05	10	67				Adelaide Δ 3600 km
Cont.		MZ_2		39	17	11			33		P 10 26 08
		ME_3		40	46	9		49			Melbourne Δ 31°7
		MN_4		41	44	10	58				P 26 43
		MZ_3		42	02	9			20		Osaka Δ 6844 km.
		ME_4		42	19	9		46			P 27 05
		MN_5		44	24	10	31				Amboina
		MZ_4		44	38	9			23		P 27 05
		ME_5		45	27	8		44			Manila Δ 6270
		ME_6		48	26	10		41			P 28 51
		MN_6		48	48	9	36				Kobe Δ 6380
		MZ_5		49	00	11			37		P 29 10
		MZ_6		52	05	9			17		Batavia
c		CE_1	11	03	17	9					P 29 37
		CN_1		04	11	11	15				Zi-Ka-Wei Δ 6933
		CE_2		08	06	8		13			P 29 52
		CN_2		08	47	10	7				
		CE_3		16	44	11		6			
		eW_2	13	14.2		18					
		MN		20	00	14	1				
		F	13	40							
164	" 8	e	19	17	50						
		eL		20.4		15					
		MN_1		24	23	10	½				
		ME		25	36	10		1			
		MN_2		26	08	10	1				
		F	19	55							
165	" 14	e	15	08.3		3					
		e(S)		12,36		5					Melbourne
		eL		18.0		15					L 15 17 04
		MNE		20	20	11	1	1			
		F	15	30							
166	" 16	e	20	49	37	3		1			Wellington Δ 26°2
		e		53	20	7					Ep. 15°S, 172E.
		MNE		56.8		9	2	2			P 20 51 51
		F	21	20							
167	" 17	e	09	07	44						U.S.C.& G.S.Ep.,
		e		11	07	3					33°S.,72°W.
		iS_cP_cS		11	33	6	-5	+2			0 08 46 32
		e_E		13	48	5					La Plata Δ 1100
		e_N		15	16	6					P 49 33
		eL_N		34.2		30					Georgetown Δ 69°
		MN		39	30	18	2				O 46.07
		ME		39	50	16		1			St.Louis Δ 70°3
		F	10	00							P 56 03
168	" 17	e	12	41.9							
		eL		47.2		18					Wellington Δ 41°
		ME		48	30	11		1			P 12 38 44
		MN		50	00	9	½				Melbourne L 47 05
		F	13	00							
169	" 22	eP	18	12	02	3	½			3100?	Amboina Δ 2600 km.
		e(S)		16	33	6	2	3			Ep. 4°S.,147°E.
		e		16	51	10	4				P 18 11 03
		i		18	58	6		5			Manila Δ 3530?
		m		19	12	7	2	5			P 13 08
		eL_E		20.2		15					Wellington Δ 45°
		eL_N		21.0		20					P 13 48
		MN_1		23	40	14	6				Batavia i 14 10
		ME_1		24	00	11		3			
		MN_2		29	12	12	6				
		ME_2		29	22	11		4			
		F	19	10							

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
170	Oct.23	eP_Z	09 02 24	3			2	3400?	
		eP_E	02 33	3		1			Wellington Δ 34°
		iS_N	07 36	8	3				P 09 01 50
		iSR_1N	09 16	6	7				Melbourne
		SR_3N	10 06	12	5				P 04 35
		eL	11.4	16					Manila Δ 3825 km.
		MN_1	13 28	13	21				0 08 59 41
		ME_1	13 48	14		11			P 09 06 46
		MN_2	14 15	12	30				
		ME_2	15 20	12		20			
		MN_3	16 15	11	17				
		ME_3	16 54	14		15			
		F	10 40						
171	" 24	eP_N	20 24 20	4	2			5740	0 20 15 05
		iP_{NZ}	24 23	4	-6		+6	(51°7)	
		$iPcP_N$	25 40	4	-8				Osaka Δ 2324 km.
		PR_1NE	26 35	5	6	3			P 20 19 11
		PR_2N	27 23	5	6				Kobe 2120 Near N.
		PR_3N	27 36	6	9				part of Marianne
		mN	28 16	7	9				Deep. P 20 19 33
		iS_{NE}	31 41	8	-10	-22			Amboina Δ 4920
		PS_{NE}	31 57	7	30	18			P 20 07
		iS_cS_E	34 13	6		+91			Manila Δ 3220
		S_cS_N	34 16	6	24				0 15 00
		SR_3E	37 39	12		33			P 20 35
		eL_E	38.3	24					Ep.19°26'N,146°5E.
		L_E	40 07	19		250			Zi-Ka-Wei Δ 2878
		L_E	40 36	19		350			P 20 46
		ME_1	42 31	12		73			Batavia Δ 5170
		ME_2	43 32	15		97			P 23 36
		MZ_1	44 03	15			29		Adelaide Δ 5800
		ME_3	45 39	12		48			Wellington Δ 65°
		MN_1	46 30	14	49				P 25 46
		MZ_2	46 25	14			40		Bombay Δ 7600
		ME_4	47 15	12		44			P 26 17
		MN_2	47 47	11	34				Saskatoon Δ 9160
		MZ_3	48 37	15			29		0 15 20
		MN_3	48 50	13	50				P 27 50
		MN_4	50 00	12	33				U.S.C.& G.S.Ep.,
		CE_1	21 09 26	12		6			24°N, 146°30'E.
		CN_1	11 13	12	7				
		CE_2	12 26	11		5			
		CN_2	15 21	15	14				
		eW_2	22 55.5	21					
		MN_1	23 00 00	21	3				
		MN_2	03 38	20	2				
		MN_3	11 33	18	2				
		F	23 40						
2	" 27	iP	02 04 32	0.3	m/m	0.05m/m.		272	Felt extensively
		i	04 39	0.3	0.25	1.1			over N.S.W., at
		iS	05 02	0.3	4.8	3.0			Riverview and
		M	05 08	0.3	3.3	5.8	1.0		suburbs of Syd-
		F	03 08						ney. Also more
									strongly at Goul-
									burn, Crookwell, Canberra, Boorowa,
									Marengo, Bathurst, Grenfell, Cowram
									Yass and Canowindra.

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
173	Oct. 27	iP_Z	12 35 35	2			3	3780?	
		iP_E	35 36	2		1			Suva P 12 33.0
		iP_N	35 38	2	2				Wellington
		$e(S)_{NE}$	40 58	5	4	3			e 12 36
		eL	42.7	12					Manila Δ 2600?
		MN	47 48	9	1				P? 12 39 07
		F	13 00						
174	" 27	e	14 18 57						
		eL	24.6	14					Wellington
		ME	26 51	12		1			e 14 15 40
		F	14 40						
175	" 27	e	21 43.9						
		eL	51.4	12					Melbourne
		ME	52 17	12		2			E 21 49 23
		MN	54 15	9	1				
		F	22 30						
176	" 28	iP_{NZ}	21 19 30	3	-2		1	5840	0 21 10 08
		iN	19 40	4	-2			(52°6)	
		iS_E	26 54	6		+5			Osaka Δ 2000 km
		$iScS_E$	29 23	7		+11			P 21 14 40
		$SR1?_N$	31 40	12	2				Ep. 15°N, 150°E.
		eL_E	34.6	20					Kobe Δ 2135
		eL_N	36.1	25					P 14 45
		ME_1	38 41	15		6			Manila Δ 3120
		ME_2	40 02	17		12			0 21 09 37
		ME_3	43 00	14		6			P 15 45
		MZ_1	43 20	13			7		Zi-Ka-Wei Δ 4622
		MN_1	43 40	15	12				P 15 46
		MN_2	45 21	15	10				Phu Lien Δ 4050
		ME_4	45 48	14		4			P 17 38
		MN_3	46 48	14	18				Batavia
		ME_5	48 53	14		4			e 18 50
		MN_4	50 18	15	6				Medan Δ 5120
		MN_5	58 19	14	6				P 23 32
		F	23 05						
177	" 29	e(P)	05 58 23						Wellington Δ 3°8
		iS	06 01 30	5	-3	+6			P 05 54 33
		ME	04 15	8		1			Felt over most of
		F	06 15						North Is. N.Z.
178	" 31	iP_Z	10 29 29	2			+5	2830	0 10 25 09
		eP_{NE}	29 29	3	1	1		(25°5)	
		iN_E	29 33	4	-4	+3			Melbourne
		iS_N	33 52	8	-6				P 10 30 28
		i_{NE}	34 05	8	-31	-16			Wellington Δ 31°0
		i_N	36 47	8	+22				P 30 31
		eL	36.9	18					Ep. 11°S, 166°E.
		MN_1, ME_1	38 58	12	41	29			Adelaide Δ 3000
		MN_2	39 44	11	36				P 30 32
		ME_2	40 27	10		21			Manila Δ 4160
		MN_3	40 51	10	24				0 25 12
		MZ_1	41 33	12			11		P 32 43
		ME_3	42 11	10		29			
		MN_4, MZ_2	42 40	12	41		22		
		MZ_3	44 27	10			8		
		ME_4	44 44	10		29			
		MZ_4	45 55	11			14		
		MN_5	47 01	11	19				
		ME_5	49 02	10		24			
		MZ_5	50 20	11			19		
		F	12 10						

(Continued on next sheet.)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
179	Oct. 31	eP	16 07 32	2	1			2500	
		eS	11 31	6	2			(22°5)	Melbourne
		m	11 48	8	3	2			e 16 08 38?
		e(SR2	12 50	12?					Manila
		eL	15 00	15					P 10 27
		MN_1	17 17	11	4				Adelaide
		ME_1	18 23	9		5			e 13 20
		ME_2	19 44	9		4			Wellington
		MN_2	20 18	11	5				S 17 30
		F	17 00						
180	" 31	e	18 17.6	7					Shallow waves.
		eL	21.5	15					
181	" 31	e(P) E	18 34 52	3					
		e(P) N	35 00	3					
		e(S)	39 41	8	1				Adealide
		m	39 59	8	3				S 18 45 39
		eL	43.5	15					
		ME_1	44 28	12		3			
		MN_1	45 27	11	6				
		ME_2	46 26	11		5			
		MN_2	48 20	11	8				
		F	19 30						
182	" 31	e	22 07.3						A few shallow waves

ERRATA

119	July 25	eP	09 31 47	should read	
		eP	09 13 47		

WM. O'LEARY S.J.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	ϵ : 1	$\frac{r}{T_o^2}$
A_N	1	200	9.0	3.9	0.02
	3	85	11.8	7.3	0.007
A_E	1	254	9.3	4.7	0.02
	3	74	9.4	6.2	0.01
A_Z	2	86	5.2	3.3	0.04

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
183	Nov. 1	e	01 57.8						
		e(S)	02 02 11	9					Manila P 02 00
		eL	07.2	12					
		ME	09.07	9		1			Melbourne
		MN	10 24	12	3				i 02 08 30
		F	02 35						
184	" 1	iP	12 37 39	3	-3	-2	+3	2940	
		S	42 10	6	3	3		(26°5	Perth
		m	42 21	8	5	2			P? 12 38 10
		eL	45.1	18					Manila Δ 1815?
		MN_1, ME_1	47 06	12	5	2			P 40 53
		ME_2	50 21	11		4			Adelaide
		MN_2	50 42	12	5				S 44 00
		F	13 50						Melbourne i 45 17
185	" 1	e	17 19.7	4					
		e	24.0	5					
		eL	30.5	12					
		MN	36 47	11	½				
		ME	38 39	9		½			
		F	17 55						
186	" 3	e	18 43 58	6	2				Early phases ob-
		e(S)	47 54	9	2				scured by very
		eL	53.0	24					heavy micros.
		MN_1	57 36	12	8				Manila Δ 2790
		ME_1	58 35	9		9			P 18 44 12
		MN_2	19 01 07	11	9				Wellington Δ 42°
		ME_2	03 52	11		7			Hong Kong
		MN_3	04 28	10	7				P 44 54
		F	19 40						
187	" 8	iP_{NE}	03 30 14	3	-3	+3		4560	0 03 22 16
		iP_Z	30 15	3			+6	(41°0)	S max. phase then
		$i(P_cP)_Z$	32 07	3			-3		amplitudes small
		iS	36 21	5	-8	+7			till M.
		m	39 50	6	5	3			Amboina Δ 1020?
		eL	46.6	18					P 03 24 49
		MN	51 00	13	5				Manila Δ 1145
		F	04 30						P 25 12
									Ep. 10°S, 121½°E.
									Batavia Δ 1710
									0 22 41
									P 26 17
									Ep. 10°S, 121½°E.

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich)	Per	Amplitude.			Δ	Remarks.
					A_N	A_E	Az		
	1930		h. m. s.	s.	μ	μ	μ	km.	
188	Nov. 9	iP_Z	19 15 51	2			+5	4280	0 19 08 12
		eP_{NE}	15 51	3				(38°5)	From 19 21 43 to
		$iNEZ$	15 56	3	-5	+4	+9		19 23 30 train of
		PR_1N	17 40	10	7				complex long
		PR_2N	17 55	12	8				waves, general
		iS_N	21 41	9	-6				period 30s. with
		PS_N	21 49	11	15				waves of 6-7 sec.
		iNE	24 01	12	-25	+54			per. superposed.
		mNE	24 31	11	27	39			Amboina Δ 570 km.
		iE	26 43	10		+70			P 19 10 01
		L	27.5	32					Manila Δ 2255
		ME_1	30 40	12		170			P 12 56
		MN_1	30 49	12	130				Ep. 1°S.,134°E.
		MZ_1	32 59	11			120		Batavia Δ 3390
		ME_2	33 10	12		190			P 14 10
		MN_2	33c43	12	220				Malabar Δ 3130
		MZ_2	33 47	12			180		P 14 19
		ME_3	34 20	12		135			Hong Kong Δ 3625
		MN_3	36 21	11	150				P 14 34
		MZ_3	36 39	10			72		Zi-Ka-Wei Δ 3722
		ME_4	36 40	9		110			P 15 18
		ME_5	38 22	9		82			Adelaide Δ 3600
		MZ_4	39 00	10			47		P 15 29
		MN_4	39 43	10	78				Malbourne Δ 38°2
		ME_6	40 16	9		91			P 16 07
		ME_7	42 00	12		113			Wellington Δ 57°0
		MN_5	44 15	12	86				0 19 08 18
		CN_1	20 02 22	12	9				P 18 10
		CE_1	02 35	12		12			Bombay Δ 6700
		CN_2	05 15	11	8				P 18 53
		CE_2	05 30	12		12			Strasbourg
		CE_3	10 00	12		8			Ep. 1°S.,129°E.
		CN_3	12 43	12	9				
		F	Lost in No.189						
189	" 9	e	21 33 06	4					
		eL	36.0	15					
		MN,ME	41 00	10	1	3			
190	" 10	e?	08 46.4						
		i(S)	51 26	5		7			
		eL	54,6	14					
		MN	55 40	9	2				
		ME	58 00	9		2			
		F	09 10						
191	" 10	ePN_Z	13 50 46	3	1		2	3890	0 13 43 36
		iPN_Z	50 51	4	+4		+7	(35°0)	
		iP_E	50 52	4		+2			Amboina
		iPR_1N	51 55	5	-5				P 13 46 44
		iS_N	56 15	6	-8				Manila Δ /o3000
		mNE	56 31	6	13	5			Ep.2°N.,145°E.
		SR_2E	58 55	8		7			P 49 22
		SR_3E	59 07	7	9				Adelaide Δ3600
		L	Very indefinite						P 50 32
		iME	15 01 46	7		+50			Hong Kong
		MZ_1	01 55	7			15		P 50 52
		MN_1,ME_1	02 24	8	65	130			Koti
		MN_2	03 15	10	99				P 51.1
		ME_2	03 35	13		295			Malbourne Δ 33°2
		MN_3	04 30	11	135				P 51 14
		MN_4,MZ_2	05 30	10	250		150		Wellington Δ 50°0
									Ep.1°S.,138°E.
			(Continued on next sheet)						0 13 44 03
									P 53 09

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich)	Per	Amplitude.			Δ	Remarks.
					A_N	A_E	A_Z		
	1930		h. m. s.	s.	μ	μ	μ	km.	
191	Nov.10	ME_3	14 05 40	9		215			
		MN_5	05 58	10	170				
		ME_4	06 25	10		180			
		MN_6	06 38	9	106				
		ME_5	07 16	12		145			
		MZ_3	07 42	8			52		
		MN_7	08 26	10	125				
		ME_6	08 50	9		91			
		ME_7	10 00	11		71			
		MN_8, MZ_4	11 18	12	100		70		
		CE_1	22 08	11		18			
		CN_1	26 00	9	11				
		CE_2	27 30	11		17			
		CN_2	29 16	10	12				
		CE_3	33 00	9		7			
		CN_3	33 33	9	8				
		CE_4	36 40	12		10			
		F	16 00						
192	" 11	iP_E	20 03 00	3		-1½		3280	
		iP_Z	03 01	2			-5	(29°5)	
		iS	07 50	9	3	-5			Adelaide Δ 3700
		eL	10.0	15					P 20 04 15?
		MN	13 42	13	1				Wellington P 20 05
		ME	16 44	10		1			Melbourne e 20 09 16
		F	20 45						
193	" 13	e_Z	23 17 01	3					
		eZ	20 07	11					Wellington Δ 61°
		i_E	20 29	7		5			P 23 15 31
		i_E	22 07	5		5			Melbourne e 23 18 21
		i_N	25 20	7	7				S 21 16
		eL	28.7	16					Adeliade S 24 34
		MN_1	29 09	12	16				
		ME_1	29 21	12		22			
		ME_2	31 18	10		6			
		MN_2	31 42	10	7				
		F	23 50						
194	" 17	e?	12 09.9						Masked by very
		e	13.7	15					heavy microseisms.
		e	14.0	23	----------	----------	----------		Long period waves.
		eL	17.6	26					Manila P 12 10 26
		ME_1	21 45	13		12			Suva e 12 10.5
		MN_1	22 48	14	4				Wellington Δ 33°
		MN_2	26 07	12	7				0 12 04 31
		ME_2	26 41	9		6			P 11 27
		F	12 55						
195a	" 17	M	17 16 00						A few long waves.
195	" 21	e?	03 10.1						15
		s?	14 45	10					Sydney S 13 ~~00~~ 50
		eL	18 18	21					Melbourne e 16 22
		ME_1	19 06	16		5			Perth e 17 40
		MN_1	20 10	13	4				
		MN_2	21 41	15	4				
		F	03 55						

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
	1930								
196	Nov.22	e	14 02 42						Early phases obcured by micros.
		e(S)	07 16	7					
		i	08 05	7		4			Wellington Δ 9°.4
		eL	0918	20					Ep.34°S.,176°W.
		MN_1	11 33	13	13				P 14 02 25
		MZ	12 06	14			11		
		ME_1	12 18	15		25			Melbourne
		ME_2	13 43	13		19			eP 14 03 25
		MN_2	14 30	12	10				
		MN_3	20 16	12	11				
		ME_3	20 54	15		21			
		F	15 30						
197	" 22	e	21 58.9						Shallow waves.
		M	22 05 14						
198	" 23	e	01 37.6						
		eL	40.3	23					
		ME_1	42 02	16		4			
		MN	43 55	13	2				
		ME_2	47 12	14		2			
		F	03 06						
199	" 24	e?	02 44.4						
		eL	59.0	17					Suva M 02 34
		MN	03 02 40	15	6				Wellington e 02 38
		ME_1	04 08	16		8			Melbourne e 2 48 16
		ME_2	07 40	15		10			
		F	03 50						
200	" 25	eP_Z	19 13 57					7670 (69°.0)	0 19 02 54
		eP_N	14 02						
		iS	23 09	7	4				Kobe Δ 358 km.
		eL_N	33.6	45					P 19 03 37
		L_E	3Ø416	33		82			Koti Δ 520 km.
		LE	36 16	22		54			Ep.35°N.,139°E.
		ME	38 35	15		19			P 03 59
		MN_1	38 53	25	46				Zi-Ka-Wei Δ 1922
		MN_2	40 39	22	65				P 06 20
		ME_1	40 40	15		17			Hong Kong Δ 2950
		MN_3	42 54	13	23				P 08 11
		ME_2	42 57	17		26			Manila Δ 2880
		ME_3	44 40	17		25			Ep. Idu Penin.
		MN_4	44 57	13	20				O 02 40
		ME_4	47 27	17		9			P 08 26
		MN_5	48 40	15	20				Batavia Δ 5800
		ME_5	51 38	15		8			P 11 55
		MN_6	54 58	12	10				J.S.A.Ep.35°N,138E
		F	21 45						O 02 40
201	" 26	e	05 05.9						
		eL	10.9	15					Adeliade P 5 04 45
		M	12 30	12		2			Melbourne e 07 10
		F	05 35						
202	" 28	e	08 24.1						J.S.A.Ep.18°.12 N
		eL	24.9	23					108°.4 W
		M	30 51	18		4			U.S.C.& G.S. Ep.,
		F	08 45						18°N.,105°W.
203	" 30	e	21 09.1						O 07 52.5
		eL	13.6	22					Manila P 21 05 49
		MN	15 58	15	3				Melbourne e 12 40?
		ME	17 08	15		3			Adeliade S 14 43
		F	21h45m						
204	" 30	eL	22 27.6	18					Shallow long waves
		F	22 53						U.S.C.& G.S.Ep., 18°N.,106°W.

WM. O'LEARY S.J.

Riverview College Observatory.

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN

Φ = 33° 49′ 49″ S. λ = 151° 9′ 30″ E. h = 41·9 m. Foundation : Triassic sandstone.

INSTRUMENTS :

1. Wiechert Astatic Pendulum Seismometer (1000 kilo.) (NS. EW.)
2. Weichert Vertical Seismometer (80 kilo.)
3. Mainka Conical Pendulum Seismometer (450 kilo.) (NS, EW)
4. Galitzin Aperiodic Seismometer, with galvanometer registration (NS, EW, Vert.)

		V	T_o	ϵ : 1	$\frac{r}{T_o^2}$
A_N	1	221	8.6	3.9	0.02
	3	82	12.0	6.6	0.006
A_E	1	237	9.2	4.3	0.018
	3	74	9.6	4.8	0.009
A_Z	2	85	5.2	3.3	0.05

No.	Date	Phase	Time (Greenwich)	Per.	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
205	Dec. 2	e	07 23.4	3					Very small amplitudes.
		eL$_N$	43.0	30					
		MN	52 00	18	3				Manila Ep.27°N,97E
		zF	08 10						0 07 00 59
206	" 2	e	21 00.4						
		MN$_1$	04 00	11	1				
		MN$_2$,ME	10 10	11	1	1			
		MN$_3$	17 00	11	1				
		F	21 35						
207	" 3	eP$_N$	19 03 07					8210 (73°9)	0 18 51 35
		P$_E$	03 17						
		i$_Z$	03 22	2			-3		Strasbourg Ep.
		iPR$_2$	07 44	6	1	2			18°N.,96°E.
		S$_E$	12 46	5		2			0 18 51 32
		i	12 54	5	7	10			U.S.C.&.G.S.Ep.
		m	13 11	7	6	12			19°N.,96°E
		SR$_1$?	18 12	10		7			La Paz Ep.
		SR$_2$?	22 23	11		9			18°N.,96°5 E.
		e(L)$_N$	24.0	32					Phu Lien Δ 1150 km
		eL$_E$	27.4	30					P 18 54 07
		xMN$_1$	32 46	23	105				Medan Δ 2100
		MN$_2$	35 01	18	60				P 55 09
		ME$_1$	35 15	18		62			Bombay Δ 2550
		ME$_2$	37 32	16		36			P 56 41
		MN$_3$	38 32	16	40				Manila Δ 2890
		MZ$_1$	39 14	20			34		P 57 00
		ME$_3$	39 52	18		71			Batavia Δ 3320
		MN$_4$	40 00	13	35				P 57 12
		MZ$_2$	40 22	17			36		Zi-Ka-Wei Δ 3000
		MN$_5$,MZ$_3$	42 00	17	38		24		e 57 22
		ME$_4$	42 10	19		40			Kobe Δ 3945
		MZ$_4$	43 04	14			15		P 58 54
		MZ$_5$	45 54	14			15		Helwan
		ME$_5$	46 23	16		36			P 19 01 58
		ME$_6$	53 42	17		29			Melbourne
		eW$_2$	21 17.1	26					P 03 12
		ME$_1$	23 27	19		2			Strasbourg Δ 8500
		MN$_1$	27 13	21	2				P 03 32
		ME$_2$	36 27	19		2			
		ME$_3$	45 44	19		2			
		MN$_2$	46 16	15	2				
		MN$_3$	58 27	19	3				
		MN$_4$	22 05 32	18	2				
		F	22 25						

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RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date. 1930	Phase	Time (Greenwich) h. m. s.	Per s.	Amplitude. A_N μ	A_E μ	A_Z μ	Δ km.	Remarks.
208	Dec. 8	iP_Z	17 26 22	1			3	3400?	
		i_E	28 04	6		6			Wellington Δ 14°.7
		i_E	28 21	5		7			Prob.Ep.5°S,158°E.
		i_E	28 40	6		4			0 17 22 20
		i_E	29 18	6		5			P 25 55
		S?$_E$	32 00	4					Melbourne Δ 31°.4
		S?$_N$	32 07	7					P 28 07
		mN	32 32	9	3				Manila Δ 2990 km
		mN	32 42	9	3				0 27 18
		eL	35.0	18					P 33 14
		MN_1	37 41	13	17				La Paz Δ 9900
		ME_1	38 00	15		40			P 35 14
		MN_2	38 34	11	16				
		ME_2	39 00	13		31			
		MN_3	39 15	11	18				
		ME_3	40 00	13		24			
		MN_4	40 45	11	16				
		ME_4	41 26	13		18			
		F	19 05						
209	" 9	e	00 37 22						
		e	39 26						
		L	40.2	15					
		M	41 52	8	1				
		F	00 50						
210	" 12	e	09 12.2						
		eL	19.3	22					Wellington
		M	22.2	16	1	1			P 09 11
		F	09 30						S 13
211	" 12	e	20 19.4						
		eL	22.0	18					
		MN	25 00	12	1				
		ME	26 00	16		1			
		F	20 55						
212	" 13	iP_{NZ}	02 41 08	4	2		1	3000	
		iPR_L	41 41	4	2			(27°.0)	
		iS	45 42	4	2				Melbourne
		eL	47.7	17					e 02 40 [illegible]
		ME_1	50 06	10		5			Wellington Δ 25°?
		MN_1	50 15	9	2				P 02 40 48
		MN_2	52 04	9	3				
		ME_2	53 11	9		6			
		F	03 40						
213	" 14	e	17 45.4						
		eL	49.1	19					Suva P 17 36.5
		MN	52 00	11	2				S 39
		ME	53 16	16		2			
		F	18 20						
214	" 16	eL	10 38.0	22					Suva P 10 29
		MN	40 00	15	4				S
		ME	41 00	18		3			Wellington L 10 34
		F	11 00						
215	" 17	eP_Z	11 27 26	2				2300	
		eP_N	27 30	4				(20°.7)	Perhaps two shocks.
		i_E	28 04	4		+3			Wellington Δ 2°.9
		i_E	28 21	4		-8			Ep. 37°S,173°E.
		i_{NZ}	28 22	4	+2		+3		P 11 23 43
		iS_N	31 10	4	+2				Widely felt in
		i_{NE}	32 25	5	-6	-5			New Zealand.
		MN	36 07	10	½				
		F	12 50						

(Continued on next sheet)

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY, N.S.W.

SEISMOLOGICAL BULLETIN.

No.	Date.	Phase	Time (Greenwich)	Per	Amplitude. A_N	Amplitude. A_E	Amplitude. A_Z	Δ	Remarks.
	1930		h. m. s.	s.	μ	μ	μ	km.	
216	Dec.21	eP	15 01 21	2	2	1		6490	Manila Δ 660? km.
		iS	09 23	5	3	2		(58°4)	Ep.20°25'N,122°15'E
		i_N	10 37	7	2				P 14 52 57
		m_E	10 40	10		2			Zi-Ka-Wei Δ 1111
		eL	21.0	18					e 54 00
		M_E	23 00	10		2			Koti P 14 55 12
		MN_1	24 13	10	1				Osaka Δ 171 km.
		MN_2	28 50	11	1				P 55 35
		F	16 10						Amboina Δ 2560
									P 56 30
217	" 22	eN	00 27.5						Batavia Δ 2340
		e_E	28.9						P 57 09
		eL	44.4	23					Zi-Ka-Wei Δ 1267
		ME	48 00	18		3			e 23 53 41
		MN	52 30	18	3				Manila Ep.23°35'N
		F	01 10						120°10'E.P 0 10 35
218	" 23	e(P)Z	21 43 09						
		e	50 27	7		2			Manila P 21 41 17
		i	50 59	4	+5				Kobe P 21 42 37
		eL	54.0	21					Wellington Δ 52°
		MN_1	56 49	14	17				P 21 45 16
		ME_1,MZ	57 22	11		13	9		Melbourne
		ME_2	58 42	11		10			PR_2? 48 04
		MN_2	59 48	7	9				
		ME_3	22 01 10	0		9			
		F	23 05						
219	" 25	e	13 28.5						
		eL	31.0	18					
		MN	35 21	9	2				
		ME	35 27	8		1			
		F							
220	" 25	i?N	13 54 23	2	4				i Perhaps only a
		eP_N	56 35	3				2900?	large microseism.
		iN	56 40	4	3				Melbourne
		iS_N	14 01 03	7	3				e 13 56 15
		i_E	01 38	6		7			Wellington Δ 24°
		eL	03.0	18					Prob.Ep. 10°S,
		i_E	03 10	7		6			164°E.
		MN_1	07 28	9	5				
		ME_1	07 39	9		5			
		MN_2	09 23	7	5				
		ME_2	10 04	7		8			
		F	15 00						
221	" 31	eP?	20 25 07	4					Manila Δ 3220?
		e	28 06						P? 20 21 04
		e(S)	29 44	9					Melbourne e 20 26 25
		eL	33.4	12					
		MN_1	35 42	11	8				
		ME	37 05	9		10			
		MZ	37 09	10			4		
		MN_2	39 17	11	8				
		F	21 05						

WM. O'LEARY S.J.
Diredtor.

RIVERVIEW COLLEGE OBSERVATORY,

SYDNEY. N.S.W.

SEISMOLOGICAL BULLETIN.

ADDITION to 1927 December, Bulletin.

No.	Date	Phase	Time (Greenwich) h. m. s.	Per. s.	Amplitude. A_N μ	A_E μ	A_Z μ	△ km.	Remarks.
No. 101. 1927	Dec.31	iP	23 17 57	6	6			2370	
		eS	21 46	8		11		(21.3°)	
			22 04	8	16				
		eL	23.1	26?					
		MN_1, ME_1	25 00	10	26	42			
		MN_2	26 26	10	35				
		ME_2	27 11	9		27			
		ME_3	29 12	8		22			
		MN_3	29 44	8	18				
1928	Jan.1	F	00 40						

WM. O'LEARY S J.