

HERMANUS1960 complete

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453

SEISMOLOGICAL BULLETIN

JANUARY 1960.

MAGNETIC OBSERVATORY, HERMANUS.LOCATIONLat. $34^{\circ} 25.5' S.$; Long. $19^{\circ} 13.5' E.$

85 feet above mean sea-level, 700 yards from coast.

INSTRUMENTS

Two Milne-Shaw seismographs, recording N-S and E-W horizontal ground movements. Nominal magnification 250; damping ratio 20:1; recording speed 8mm/min. Free periods: E-W, 12 secs; N-S, 10 secs.

The time is recorded in the form of a 2-3 sec. break in the record every minute excepting on the hour and half-hour. The clock correction is determined daily to an accuracy of 0.2 sec.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ meas	Remarks.
Jan. 1	e ? F	05 25.7 06 28			Weak
Jan. 2	i P i S e PPP i F	12 27 29 31 58 28 26 29 07 14 00	USCGS: West of Bouvet Island. (South Atlantic Ocean) H = 12:21:51.	26.0°	Δ deduced from times of P and S
Jan. 4	e P e F	06 35.2 43.7 07 30 ca.	USCGS: $4\frac{1}{2}^{\circ} S.$, $153\frac{1}{2}^{\circ} E$ (New Britain) H = 06:19:49	$121\frac{1}{2}^{\circ}$	Confused by microseisms
Jan. 7	e P e i S e(L) F	13 35(36) 36(07) 41 30 44 23 15 46	Sandwich Islands H = 13:28:16. (USCGS)	38.0°	Δ deduced from times of P and S
Jan. 7	e F	23 54 01 00			Traces
Jan. 8	i PcS F	11 42 42 12 42	USCGS: $55^{\circ} S.$, $27\frac{1}{2}^{\circ} W$ (Sandwich Islands) H = 11:29:18.	$37\frac{1}{2}^{\circ}$	Weak
Jan. 8	e PcP e PcS e (L) F	14 55 29 59 14 15 02.0 16 48	USCGS: $55\frac{1}{2}^{\circ} S.$, $27\frac{1}{2}^{\circ} W$ (Sandwich Islands) H = 14:45:53.	$37\frac{1}{2}^{\circ}$	
Jan. 8	e e F	21 53.9 55.1 22 30			
Jan. 9	e F	04 38 04 49			Traces

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Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ meas	Remarks.
Jan. 12	e PcS e e F	03 22 32 22 53 23 18 04 12	USCGS: 55 $\frac{1}{2}$ S., 27 W (Sandwich Island region) H = 03:09:10.	37 $\frac{1}{2}$ $^{\circ}$	
Jan. 13	i(P) e e(PP) i(S) e e(SS) F	15 52 46 53 15 56(08) 16 02 57 03 28 08 30 19 11	USCGS: 16 S., 72 W (Southern Peru) H = 15:40:34. h about 200 km.	82 $^{\circ}$	$\Delta = 84\frac{1}{2}$ $^{\circ}$? See note at end of bulletin.
Jan. 14	e F	21 47.7 22 45			Very weak
Jan. 15	i P i i(PP) i(S) e e F	09 42 51 46 06 46 19 53 17 53 36 59 15 12 51	USCGS: 15 S., 75 W (Near coast of southern Peru) H = 09:30:24. h about 150 km.	85 $^{\circ}$	Better agreement with $\Delta = 86\frac{1}{2}$ $^{\circ}$
Jan. 21	e F	11 52 12 08			Traces
Jan. 23	e F	05 30 06 02			Traces
Jan. 23	e F	07 56 08 47			Confused by microseisms.
Jan. 24	e F	05 05 06 49			Traces
Jan. 29	i e F	07 50 49 54 27 08 40			
Jan. 31	e F	06 14 07 00			Traces

Note:

Earthquake 1960 Jan. 13d 15h 40m 34s
Discrepancies between observed and expected arrival times:

Phase	$\Delta = 82^{\circ}$	$\Delta = 84\frac{1}{2}^{\circ}$
P	+ 12 secs.	0 secs.
PP	+ 22 "	+ 3 "
S	+ 28 "	+ 3 "
SS	+ 34 "	- 3 "

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Data	Obserw.	Faza	G. M. T.	Okres T sek.	Amplituda			U w a g i	
					A_N	A_E	A_Z		
					μ	μ	μ		
30	Rac.	•Z	15 ^h 39 ^m 11. ^s 5						SK-58
		•N	15						
		•E	18.5						
		•Z	22.5						
		F	43						
31	Rac.	e _Z	03 14 09						SK-58; ślady
		F	15						
31	War.	eL _N	20 45						
		eL _{EZ}	47						
		F	21 21						
	Kra.	eL _{NE}	20 45.5						
		M _N	49 13	16	2.0				
		M _{NE}	55 05	16	1.8 1.5				

Z.Gryglewicz

H.Skoczek

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Date 1960	Phase	G.M.T. h m s	Epicentre and time of Shock.	Δ meas.	Remarks.
Mar. 19	e F	16 51 16 58			Traces.
Mar. 20	i PP i PKS e(SKSP) e SS e(PKPPKS) e F	17 29 30 30 30 39(38) 47(30) 48(26) 53(00) 21 03	USCGS: 40 N., 143 $\frac{1}{2}$ E. (Off northeast coast of Honshu, Japan) H = 17 : 07 : 30 h about 60 km.	135 $\frac{1}{2}$ ^o	
Mar. 21	e F e F	00 06 00 13 01 52 02 24			Traces.
Mar. 21	e F	23 39 42 00 01			Very weak.
Mar. 22	e	02 53 36 03 30			Very weak.
Mar. 23	e F	00 45 03 18			Earthquake recorded, but time- marks uncer- tain.
Mar. 23/24	e F	23 30 00 37			Traces.
Mar. 27	e F	09 37(49) 10 27	USCGS: 13 $\frac{1}{2}$ S., 166 $\frac{1}{2}$ E. (New Hebrides Is.) H = 08 : 57 : 53	123 ^o	
Mar. 28	e PS F	00 41 09 01 41	USCGS: 7 $\frac{1}{2}$ N., 82 W. (Off south coast of Panama) H = 00 : 13 : 38	103 $\frac{1}{2}$ ^o	
Mar. 29	e e L F	07 07(57) 21(26) 09 24	USCGS: 17 S., 167 E. (New Hebrides Islands) H = 06 : 30 : 54	120 $\frac{1}{2}$ ^o	Records changed 0657-0704
Mar. 30	e F	11 51 12 16			Traces.

Magnetic Observatory, Hermanus, South Africa.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ mean	Remarks.
Mar. 3	i F	11 42 15 11 47			Weak. $\Delta < 30^\circ?$
Mar. 4	e F	21 56 22 10			Traces.
Mar. 5	e? e PPP e SKS ₁ i SKS ₂ i e PKKP i F	14 09 47 10 32 14 25 15 01 16 32 18 57 19 38 16 57	USCGS: 1 N., 129 E (Halmahera I.) H = 13 : 49 : 16	$107\frac{1}{2}^\circ$	E-W record only
Mar. 8	e? i SKS i i e e e SS F	16 54(48) 58 44 17 00 12 00 26 01 11 03(00) 04 37 09 50 18 33	USCGS: $16\frac{1}{2}$ S., $168\frac{1}{2}$ E. (New Hebrides Islands) H = 16 : 33 : 38 h about 250 km.	$121\frac{1}{2}^\circ$	
Mar. 9/10	i SoS e i Ps e SS F	00 16 47 17 21 17 31 22(01) 01 48	USCGS: 165., 72 W. (Southern Peru) H = 23 : 54 : 20 h about 150 km.	$81\frac{1}{2}^\circ$	
Mar. 12	e F	12 35 12 57			Traces.
Mar. 12	e F	20 51 22 58			Traces.
Mar. 14	e F	10 13 10 50			Traces.
Mar. 15	e F	20 12 42 20 28			$\Delta < 30^\circ?$
Mar. 16	e F	18 46 ?			Traces.
Mar. 17	e F	12 18 12 25			Traces.
Mar. 17	e F	21 55 22 01			$\Delta < 30^\circ?$
Mar. 18	e F	11 19 11 37			Traces.

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Date 1960	Phase	G.M.T. h m s	Epicentre and time of Shock.	Δ meas.	Remarks.
Mar. 19	e F	16 51 16 58			Traces.
Mar. 20	i PP i PKS e(SKSP) e SS e(PKPPKS) e F	17 29 30 30 30 39(38) 47(30) 48(26) 53(00) 21 03	USCGS: 40 N., 143 $\frac{1}{2}$ E. (Off northeast coast of Honshu, Japan) H = 17 : 07 : 30 h about 60 km.	135 $\frac{1}{2}$ ^o	
Mar. 21	e F e F	00 06 00 13 01 52 02 24			Traces:
Mar. 21	e F	23 39 42 00 01			Very weak.
Mar. 22	e	02 53 36 03 30			Very weak.
Mar. 23	e F	00 45 03 18			Earthquake recorded, but time- marks uncer- tain.
Mar. 23/24	e F	23 30 00 37			Traces.
Mar. 27	e F	09 37(49) 10 27	USCGS: 13 $\frac{1}{2}$ S., 166 $\frac{1}{2}$ E. (New Hebrides Is.) H = 08 : 57 : 53	123 ^o	
Mar. 28	e PS F	00 41 09 01 41	USCGS: 7 $\frac{1}{2}$ N., 82 W. (Off south coast of Panama) H = 00 : 13 : 38	103 $\frac{1}{2}$ ^o	
Mar. 29	e e L F	07 07(57) 21(26) 09 24	USCGS: 17 S., 167 E. (New Hebrides Islands) H = 06 : 30 : 54	120 $\frac{1}{2}$ ^o	Records changed 0657-0704
Mar. 30	e F	11 51 12 16			Traces.

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SEISMOLOGICAL BULLETIN

APRIL - MAY 1960.

MAGNETIC OBSERVATORY, HERMANUS

LOCATION

Lat. $34^{\circ} 25'.5$ S., Long. $19^{\circ} 13'.5$ E.
85 feet above mean sea-level, 700 yards from coast.

INSTRUMENTS

Two Milne-Shaw seismographs, recording N-S and E-W horizontal ground movements. Nominal magnification 250; damping ratio 20.1; recording speed 8mm/min. Free periods: E-W, 12 secs; N-S, 10 secs. The time is recorded in the form of a 2-3 sec. break in the record every minute excepting on the hour and half-hour. The clock correction is determined daily to an accuracy of 0.2 sec.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ_{meas}	Remarks.
Apr. 5	e S e (PcS) e (SS) F	07 31 (08) 31 20 34 08	USCGS: 61 S., 26 W. (Sandwich Islands) H = 07 : 17 : 45	39°	Weak
Apr. 5	e F	12 53 13 05			Traces
Apr. 13	e F	13 39 13 48			Traces
Apr. 13	e F	14 55 11 15 02			$\Delta \leq 30^{\circ}$
Apr. 15	e F	22 36 23 54			Weak
Apr. 24	i SKS i S e e F	03 44 02 44 34 45 (39) 48 (34) 04 07	USCGS: 6 S., $113\frac{1}{2}$ E. (Java Sea) H = 03 : 22 : 23 h about 600 Km.	$90\frac{1}{2}^{\circ}$	
Apr. 24	e S e (SKKKS) F	12 34.8 57.9 13 47	USCGS: 28 N., $54\frac{1}{2}$ E. (Southern Iran) H = 12 : 14 : 26	$70\frac{1}{2}^{\circ}$	
Apr. 29	e F	02 31 02 36			Traces
May 11	e SKS ₁ e i SKS ₂ i (SKKS) F	19 01.0 01 (15) 01 36 01 46 19 55	USCGS: 3 S., 131 E. (Ceram Sea) H = 18 : 36 : 0	106°	Weak

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ meas	Remarks
May 12	e SKS F	22 57(15) 24 02	USCGS: $7\frac{1}{2}$ N., 81 W. (Panama) H = 22 : 32 : 32	$10^{\circ}\frac{1}{2}$	Weak
May 13	e F	17 36 18 00			Traces
May 15	e F	06 36 ?			Traces
May 18	e F	07 35 08 27			Traces
May 18	e F	09 19 09 25			Traces Near earth- quake?
May 19	ePP(PeP) i PPP i eS(or PS) i PPS e e SS F	10 21(45) 22 31 22 46 26(35) 26 59 28 15 29 50 12 17	USCGS: 17 S., 66 E. (Mascarene Isl region) H = 10 : 11 : 51	$44\frac{1}{2}^{\circ}$	At 10h $36\frac{1}{3}$ m. $T_G = 14$ Sec. $A_N = 130 \mu$. $A_E = 101 \mu$.
May 20	e e F	11 41.2 11 47.2 13 23			Weak
May 21	i P e S F	10 14 17 23 40 14 50	USCGS: $37\frac{1}{2}$ S., $73\frac{1}{2}$ W. (Near coast of Chile) H = 10 : 02 : 50	72°	At 10h 38m, $T_G = 26$ Sec. $A_N = 578 \mu$. $A_E = 414 \mu$.
May 22	i P i S F	10 42 06 10 51 27 ?	USCGS: 38 S., $73\frac{1}{2}$ W. (Near coast of Chile) H = 10 : 30 : 39	72°	
May 22	i P i S F	10 44 06 53 28 14 30 ca	USCGS: $37\frac{1}{2}$ S., 73 W. (Chile) H = 10 : 32 : 43	$71\frac{1}{2}^{\circ}$	At 11h $08\frac{1}{2}$ m. $T_G = 21$ Sec. $A_N = 89 \mu$. $A_E = 95 \mu$.
May 22	i P i PP i S F	19 07 22 09 59 16 40 ?	USCGS: 38 S., $73\frac{1}{2}$ W. (Near coast of Chile) H = 18 : 55 : 57	72°	At 20h 01m, $T_G = 15$ Sec. $A_N \approx 700 \mu$. $A_E > 2000 \mu$.
May 23	e P i S F	05 24(59) 34 18 ?	USCGS 38 S., $73\frac{1}{2}$ W. (Near coast of Chile) H = 05 : 13 : 35	72°	Weak
May 23	e F	10 08 12 17			Traces.

Date 1960	Phase	G.M.T. h m s	Epicentre and time of Shock.	Δ_{meas}	Remarks
May 24	e F	15 12 16 30			Weak
May 25	e i	08 46 .. 08 55 07	USCGS: 45 S., 76 W. (off coast of Chile) H = 08 : 34 : 33	70°	
May 26	e F	05 47 .. 07 20	USCGS: 40 N., 20 E. (Albania - Greece border) H = 05 : 10 : 05	74½°	
May 27/28	e F	23 30 00 30			Traces.
May 28	e F	03 44 04 01			Traces.
May 28 ✓	e S e F	11 26(28) 27 54 12 42	USCGS: 38 S., 73 W. (Chile) H = 11 : 05 : 40	71½°	Weak
May 29 ✓	i PP i S F	07 53 31 08 00 22 09 36	USCGS: 38 S., 72½ W. (Chile) H = 07 : 39 : 29	71½°	Weak
May 31 ✓	i S F	03 00 57 04 35	USCGS: 39½ S., 75 W (Chile) H = 02 : 40 : 00	67°	Very weak.
May 31 ✓	i SKS F	11 26 02 12 55	USCGS: 18 N., 62 W (Leeward Islands) H = 11 : 02 : 20	92½°	

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MAGNETIC OBSERVATORY, HERMANUS

LOCATION

Lat. 34° 25.'5 S., Long. 19° 13.'5 E.

85 feet above mean sea-level, 700 yards from coast.

INSTRUMENTS

Two Milne-Shaw seismographs, recording N-S and E-W horizontal ground movements. Nominal magnification 250; damping ratio 20.1; recording speed 8 mm/min. Free periods: E-W, 12 secs; N-S, 10 secs.

The time is recorded in the form of a 2-3 sec. break in the record every minute excepting on the hour and half-hour. The clock correction is determined daily to an accuracy of 0.2 sec.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of shock	Δ meas	Remarks.
June 1	e P e S F	05 14 25 23 43 06 35	USCGS: 38 S., 73 W (Chile) H = 05 : 02 : 56	71½°	Weak.
June 2	e(P) e S F	06 09(11) 18 08 07 33	USCGS: 46½ S., 74 W. (southern Chile) H = 05 : 58 : 03	68°	Weak.
June 2	e SKS e ScSP F	08 13(05) 17 10 10 20	USCGS: 5½ S., 151½ E. (New Britain) H = 07 : 47 : 11	120°	Weak.
June 4	e F	03 35 04 08			Traces.
June 6	i PoP i PP i S F	06 07 12 09 23 06 25 49 09 40 ca.	USCGS: 45½ S. 73½ W (Near coast of Chile) H = 05 : 55 : 44	68°	Confused by micro- seisms.
June 9	e F	12 22 12 53			Traces.
June 10	e F	22 20 22 36			Traces.
June 11	i PP e PPP e(SKKS) e SKSP or ScSP e(SSP) e F	15 34 15 36(50) 41(20) 44 06 50.9 54.9 ?	USCGS: 9 s., 152½ E. (D'Entrecasteaux Is) H = 15 : 14 : 07	118°	
June 11	e ScSP or SKSP F	17 07 44 ?	USCGS: 9½ S., 152½ E (D'Entrecasteaux Is) H = 16 : 37 : 40	118°	Overlapping with record of previous earthquake.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ meas	Remarks
June 11	e F	? 19 08	USCGS: $9\frac{1}{2}$ S., $152\frac{1}{2}$ E. (D'Entrecasteaux Is) H = 17 : 07 : 52	118°	ditto
June 15/16	e F	23 50 00 12			Traces.
June 16	e F	00 30 01 07			Traces.
June 16	e F	03 26 03 33			Traces.
June 16	e F	10 48 11 07			Traces.
June 17	e F	18 01 18 28			Traces.
June 20	i P e PP e S F	02 12 32 02 15 19 02 21 54 ✓ 04 55	USCOS: 38 S., $73\frac{1}{2}$ W. (Near coast of Chile) H = 02 : 01 : 08.	71 $\frac{1}{2}$ °	
June 20	i P i S F	13 11 02 13 20 19 ✓ 15 30	USCOS: $39\frac{1}{2}$ S., 73 W. (Chile) H = 12 : 59 : 40.	71°	
June 21	e S e(SS) F	21 46 44 49(24) ✓ 22 15	USCGS: 61 S., 21 W. (Sandwich Islands region) H = 21 : 33 : 45	36 $\frac{1}{2}$ °	Weak.
June 25	e F	15 38 16 12			Traces.
June 28	e F	15 44 15 54			Traces.
June 29	e F	02 33 02 49			Traces.
June 29	e F	05 33 05 41			Traces.

SEISMOLOGICAL BULLETIN

MAGNETIC OBSERVATORY, HERMANUS

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of shock.	Δ_{meas}	Remarks
Jul.13	e e i i(?)SS	08 02 .. 05.1 05 22 05 56	USCGS: 53 $\frac{1}{2}$ S., 1 $\frac{1}{2}$ E (Bouvet Island region) H = 07 : 55 : 54	23°	
Jul.14	e i e F	19 03 .. 05 23 06(43) 19 18			Weak
Jul.15		01 19 35			Isolated phase
Jul.15	e F	05 14.0 05 30			
Jul.20	e F	22 08 23 05			Traces
Jul.25	e e i i F	04 01(15) 04(43) 20 14 34 18 06 12	USCGS: 55 N., 163 E (Near coast of Kamchatka) H = 03 : 41 : 05	148°	Measured phases very weak.
Jul.25	iPKP e(PP) eSKKS e(SS) F	11 31 34 34 41 41 32 54 45 13 30	USCGS: 54 N., 159 E. (Kamchatka) H = 11 : 12 : 00 h about 100 km.	146°	Suspected SS at least 1 minute late.
Jul.27	i(!)S e PS e _E ScS e _N F	10 25 23 25 37 26 05 26(15) 13 30	USCGS: 44.7 S., 75.1 W (Near coast of southern Chili) H = 10 : 04 : 53.0 h about 25 km.	69 $\frac{1}{2}$ °	
Jul.29	ePS(or ScSP) eSS(or SKKS) F	00 54 11 01.0 03 00	USCGS: 19 $\frac{1}{2}$ S., 170 $\frac{1}{2}$ E (Loyalty Islands) H = 00 : 24 : 06	119 $\frac{1}{2}$ °	Very weak

SEISMOLOGICAL BULLETIN

JULY 1960.

MAGNETIC OBSERVATORY HERMANUS

Date 1960	Phase	G.M.T. h m s	Epicentre and time of shock	Δ α ω ω	Remarks
Jul. 29	e F	15 16 15 53			Traces
Jul. 29	e F	16 05 16 10			Traces
Jul. 29	ePP 1PKS eSS F	17 53 29 54 30 18 11 34 20 05	USCGS: 40.1 N., 142.3 E (Honsku, Japan) H = 17 : 31 : 39.5 h about 50 km.	135°	
Jul. 31	ePP 1SKS eSKKS ePS e(SS) F	03 16 02 21 39 22 51 25 34 32.5 05 40	USCGS: 5.6 S., 150.0 E (New Britain) H = 02 : 55 : 46.2 h about 25 km.	119°	
Jul. 31	e(PS) F	15 15 34 16 03	USCGS: 43.6 S., 74.3 W (Near coast of Chili) H = 14 : 55 : 03.3 h about 97 km.	69½°	Very weak.

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SEISMOLOGICAL BULLETIN

AUGUST 1960.

MAGNETIC OBSERVATORY, FERMANUS

LOCATION
 Lat. $34^{\circ} 25.5$ S., Long. $19^{\circ} 13.5$ E.
 85 feet above mean sea-level, 700 yards from coast.

INSTRUMENTS

Two Milne-Shaw seismographs, recording N-S and E-W horizontal ground movements. Nominal magnification 250; damping ratio 20:1; recording speed 8mm/min. Free periods: E-W, 12 secs; N-S, 10 secs.

The time is recorded in the form of a 2-3 sec. break in the record every minute excepting on the hour and half-hour. The clock correction is determined daily to an accuracy of 0.2 sec.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ meas	Remarks
Aug. 1	e F	02 59(00) 03 11	USCGS: 27.9 N., 54.2 E. (Southern Iran) H = 02 : 20 : 52.4 h about 110 km.	70°	
Aug. 4	e PKP e PP e i e SS F	07 55 22 58 56 04 20 12 38 19.0 09 56	USCGS: 51.4 N., 179.1 E. (Aleutian Islands) H = 07 : 34 : 53.8 h about 83 km.	151½°	
Aug. 8	e e i i F	12 55.0 55 57 56 11 58 02 13 10	USCGS: 12.0 N., 44.4 E. (Gulf of Aden) H = 12 : 28 : 10.2 h about 24 km	52°	Phases suggest source nearer than that assumed here.
Aug. 9	e(SS) e F	08 27(20) 28(56) 09 50	USCGS: 40.0 N., 126.6 W. (Off coast of northern California). H = 07 : 39 : 22.6 h about 25 km.	152½°	Very weak.
Aug. 9	e F	17 49 .. 18 16	USCGS: 24.5 S., 177.1 W. (Tonga Islands region) H = 16 : 46 : 37.7 h about 186 km.	119½°	Very weak.
Aug. 12	e F	10 18 12 10 34			Records very similar.
Aug. 13	e F	04 33(13) 04 50			Records very similar.

Date 1960	Phase	G.M.T. h m s	Epicentre and time of shock.	Δ meas.	Remarks.
Aug. 13	e P i PP i S i (PPS) F	14 26 16 29 01 35 38 36 42 16 41	USCGS: 39.7 S., 74.8 W. (Near coast of southern Chile) H = 14 : 14 : 57.7 h about 61 km.	72°	
Aug. 15	i F	07 20 14 07 30	USCGS: 13.4 S., 65.8 E. (Indian Ocean) H = 06 : 58 : 56.4 h about 15 km.	46½°	
Aug. 15	e F	14 56 .. 15 05			Traces.
Aug. 17	i (PPP) F	09 41 13 10 03	USCGS: 20.1 S., 11.4 W. (South Atlantic Ocean) H = 09 : 33 : 49.1 h about 87 km.	30½°	Very weak
Aug. 17	e S F	11 35 42 12 09	USCGS: 19.8 S., 12.2 W (South Atlantic Ocean) H = 11 : 24 : 07.2 h about 25 km.	31°	
Aug. 20	e e F	20 14 .. 19.5 23 30 ca.	USCGS: 35.6 S., 15.4 W. (Tristan da Cunha region) H = 20 : 08 : 39.0 h about 37 km.	28½°	
Aug. 20	e F	21 30 22 45	Tristan region ?		Very similar to previous record.
Aug. 23	e	23 23 .. 01 04			Traces.
Aug. 24	e F	03 05 03 30			Traces.
Aug. 25	e F	19 16 19 46			Traces.
Aug. 25	e F	23 38 01 42			Traces.
Aug. 27	e F	10 51 11 04			Traces.
Aug. 28	e F	07 01 07 17			Traces.
Aug. 29	i ? eL?	05 35 19 35 41	Earth tremor; felt at Hermanus, Cape Town, Langebaan, Cape Columbine.		

MAGNETIC OBSERVATORY, HERMANUSN^o 453LOCATION

Lat. 34° 25.5 S., Long. 19° 13.5 E.

85 feet above mean sea-level, 700 yards from coast.

INSTRUMENTS

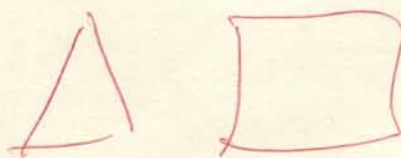
Two Milne-Shaw seismographs, recording N-S and E-W horizontal ground movements. Nominal magnification 250; damping ratio 20:1; recording speed 8mm/min. Free periods: E-W, 12 secs; N-S, 10 secs.

The time is recorded in the form of a 2-3 sec. break in the record every minute excepting on the hour and half-hour. The clock correction is determined daily to an accuracy of 0.2 sec.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ meas	Remarks
Sept.1	e F	08 38 08 55			Traces
Sept.1	e F	10 30 10 54			Traces
Sept.1	e F	16 22 18 01			Very weak
Sept.2	e F	14 41 14 57			Traces
Sept.2/3	e F	22 39 00 14			Very weak
Sept.3	e SKS F	13 06 07 10 28 14 11	USCGS: 6.1 S., 154.5 E (Solomon Islands) H = 12 : 41 : 34.9 h about 457 km.	121 ¹ / ₂ ^o	Traces
Sept.4	e F	01 00 01 30			Traces
Sept.7	i SS i(SSS) F	01 29 34 29 52 02 20	USCGS: 37.2 S., 16.1 W (Tristan da Cunha Region) H = 01 : 17 39.1 h about 25 km.	28 ¹ / ₂ ^o	
Sept.10	e F	00 55 01 08			Traces
Sept.17	e F	21 08 21 17			Traces
Sept.19	e F	04 38 04 45			Traces
Sept.19	e e e SS F	19 25 56 28 24 23 33 20 53	USCGS: 6.9 N., 77.5 W. (Colombia-Panama border) H = 19 : 01 : 25.4 h about 66 km.	99 ^o	Phases suggest source further than that assumed here.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ_{meas}	Remarks
Sept. 22	e F	05 54 .. 06 25	USCGS: 3.4 S., 29.1E. (Congo) H = 05 : 38 : 14.4 h about 29 km.	32°	Disturb- ed by Micro- seisms.
Sept. 22	i S e SS F	09 17 15 09 19(10) 11 20	USCGS: 3.3S., 29.3E. (Congo) H = 09 : 05 : 36.8 h about 28 km.	32°	
Sept. 22	e F	22 37.6 22 41			Near and very weak; no clear phases.
Sept. 29	e e F	11 40.7 42.6 12 00		129°	Barely disting- uishable from micro- seisms.
Oct. 1	e F	17 39 18 10			Traces
Oct. 2	e F	04 51(14) 05 00			Very weak
Oct. 2	e F	12 17(06) 12 50			Very weak
Oct. 6	e SS e(PKPPKS) F	20 28(12) 37(47) 21 07	USCGS: 58.2 N, 31.6W (North Atlantic Ocean) H = 19 : 55 : 42.2 h about 63 km.	101 ¹ / ₂ °	Very weak
Oct. 7	e P e PP i S i SKKS i i SS F	15 32 38 15 36 56 15 43 10 15 43 50 15 44 29 15 51 40 17 55	USCGS: 7.4 S, 130.7E (Banda Sea.) H = 15 : 18 : 30.8 h about 45 km.	103 ¹ / ₂ °	
Oct. 7	e F	20 35(39) 21 30	USCGS: 20.4S, 113.7W (Easter Isl. region) H = 20 : 01 : 32.6 h about 203 km.	109 ¹ / ₂ °	Very weak
Oct. 8	i PP i i e e SS e F	06 13 02 13 17 22 09 23(37) 29 15 31 48 07 40	USCGS: 40.0 N, 129.7E (Sea of Japan) H = 05 : 53 : 01.1 h about 608 km.	125 ¹ / ₂ °	
Oct. 8	e F	21 02 22 15			Very weak
Oct. 9	e PKS e F	09 23 12 33 17 10 55	USCGS: 40.8 N, 141.2E (Near Japan) H = 09 : 00 : 42.0 h about 155 km.	134 ¹ / ₂ °	Very weak

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ meas	Remarks
Oct. 13	e F	15 14 17 10			Weak Phases obscured by micro- seisms.
Oct. 14	e F	18 24 18 54			Traces.
Oct. 14	e F	21 45 24 00			Weak
Oct. 17	e F	16 39 16 48			Disturbed by micro- seisms.
Oct. 22	e F	08 59 09 34			Very weak.
Oct. 24	e e i i F	04 14 .. 15 22 17 13 17 22 04 34			"Near" earth- quake.
Oct. 28	e F	05 11 05 30			Traces.
Oct. 28	i PKP i i i F	13 37 47 40 44 41 14 41 49 15 00	USCGS: 52.0 N, 157.4 E (Kamchatka) H = 13 : 18 : 14.3. h about 96 km.	145 ¹ / ₂ °	Weak
Oct. 30	e P e S F	12 26 28 12 36 15 14 15	USCGS: 23.3 S, 70.3W (Near Coast of Chili) H = 12 : 14 : 36 h about 76 km.	77°	
Oct. 30	e S F	21 54 06 22 40	USCGS: 22.8 S., 68.0W (Chili Bolivia border) H = 21 : 32 : 47.7 h about 60 km.	75°	



SEISMOLOGICAL BULLETINMAGNETIC OBSERVATORY, HERMANUS.NOVEMBER 1960.LOCATION

Lat. 34° 25.5 S., Long. 19° 13.5 E.

85 feet above mean sea-level, 700 yards from coast.

INSTRUMENTS

Two Milne-Shaw seismographs, recording N-S and E-W horizontal ground movements. Nominal magnification 250; damping ratio 20:1; recording speed 8mm/min. Free periods: E-W, 12 secs; N-S, 10 secs. The time is recorded in the form of a 2-3 sec. break in the record every minute excepting on the hour and half-hour. The clock correction is determined daily to an accuracy of 0.2 sec.

Date 1960	Phase	G.M.T. h m s	Epicentre and Time of Shock	Δ_{meas}	Remarks
Nov. 1	i e e F	06 23 45 24 18 06 28 33 07 10	USCGS: 11.1S. 12.7W. (Ascencion Isl. region) H = 06 : 15 : 29.4 h about 35 km.	37°	Very weak
Nov. 1	i P i PoP i PP i F	08 57 24 57 41 09 00 00 09 06 51 12 00	USCGS: 38.4S., 74.4W. (Near coast of Chili) H = 08 : 46 : 01.9 h about 97 km.	72°	
Nov. 1	i S F	12 50 25 14 00	USCGS: 38.5S., 75.0W. (Near coast of Chili) H = 12 : 29 : 31.6 h about 64 km.	73°	Very weak
Nov. 2	i F	17 35 32 20 06	USCGS: 10.9S., 164.9E (Santa Cruz Isl.) H = 17 : 14 : 49.3 h about 25 km.	124 ¹ / ₂ °	Weak
Nov. 3	e F	03 42 04 07			Traces
Nov. 5	e F	20 57 21 22			Weak
Nov. 6	e F	05 51 ?			Weak
Nov. 6	e S e SS F	06 41.9 06 50 00 08 10	USCGS: 31.0S., 177.7W. (Kermadec Isl. region) H = 06 : 15 : 05.7 h about 184 km.	113°	Weak
Nov. 6	e F	23 42 24 12			Traces
Nov. 9	e i PcS i i F	03 25(30) 03 31 21 35 52 36 55 04 42	USCGS: 60.7S., 24.8W. (Sandwich Islands) H = 03 : 17 : 58.5 h about 37 km.	38°	

Date 1960	Phase	G.M.T. h m s	Epicentre and time of shock.	Δ_{meas}	Remarks
Nov. 9	e F	11 33 12 15			Very weak
Nov. 9	e PcP i ScS F	20 18 14 28 09 22 02	USCGS: 23.2S., 70.6W (Near coast of Chili) H = 20 : 06 : 16.2 h about 52 km.	$76^{1/2}^{\circ}$	
Nov. 10	e SKS e i PS e PKKP F	15 10.1 12 44 13 44 14.5 16 32	USCGS: 2.6S., 139.4E. (Near coast of New Guinea) H = 14 : 44 : 47.3 h about 25 km.	113°	Weak
Nov. 11	e F	06 12 06 19			Traces
Nov. 13	e PKP ₂ e i PP e i(PPP) eSKKS i F	09 41 21 43(19) 45 07 47(22) 48 55 51 52 52 41 12 53	USCGS: 51.1N., 168.8W. (Aleutian Islands) H = 09 : 20 : 36.8 h about 65 km.	162°	
Nov. 15	e F	07 04 07 21			Traces
Nov. 20	e e PP e e e F	22 16(00) 19(00) 19 48 25(58) 26 41 01 39	USCGS: 6.8S., 80.7W. (Near coast of Peru) H = 22 : 01 : 59.9. h about 93 km.	94°	At 22h 55 ¹ / ₂ m, T _G = 19 secs., A _N = 35 μ A _E = 106 μ
Nov. 22	i P i i S i SS F	06 27 34 29 34 32 07 33 28 07 51	USCGS: 35.9S., 52.3E. (Indian Ocean, north of Crozet Islands) H = 06 : 21 : 45.0 h about 21 km.	27°	Phases 8 secs. later than expected.
Nov. 22	i P i(S) i SKS F	12 40 16 49 35 49 57 14 42	USCGS: 40.0S., 74.3W. (Near coast of south- ern Chili) H = 12 : 28 : 58.4 h about 107 km.	$71^{1/2}^{\circ}$	
Nov. 23	e SS F	14 49(07) 17 15	USCGS: 24.2S., 176.1W (South of Tonga Islands region) H = 14 : 12 : 21.1 h about 28 km.	120°	
Nov. 24	e PP e e SS F	07 13 10 13 41 29 27 10 15	USCGS: 24.2S., 176.1W. (South of Tonga Islands region) H = 06 : 52 : 41.1 h about 23 km.	120°	

Date 1960	Phase	G.M.T. h m s	Epicentre and time of shock	Δ_{meas}	Remarks
Nov. 27	e L e(ScS) F	20 53 50 54 23 21 12	USCGS: 3.1S., 29.1E (Congo) H = 20 : 37 : 26.4 h about 60 km.	32°	Very weak phases
Nov. 29	e(?)P i S F	09 43 14 52 25 11 03	USCGS: 44.0S., 74.9W (Near coast of south- ern Chili) H = 09 : 32 : 01.5 h about 86 km.	69 ¹ / ₂ °	
Dec. 1	e F	22 04 22 50			Traces
Dec. 2	i P e S e i L F	09 22 39 32 22 32 37 47 05 13 00	USCGS: 24.5S., 69.9W (Near coast of Chili) H = 09 : 10 : 41.0 h about 37 km.	76°	
Dec. 2	e i F	13 59 46 14 00 18 14 20 ..			Very similar to Nov.27 'quake re- ported - above
Dec. 3	i PP F	04 43 19 06 ..	USCGS: 42.8N., 104.5E (Outer Mongolia) H = 04 : 24 : 17.5 h about 45 km.	109°	
Dec. 6	i P i(PcP) e SKS (or ScS)	09 08 07 08 22 18 20	USCGS: 21.4S., 69.0W (Northern Chili) H = 08 : 56 : 07.6 h about 25 km;	76 ¹ / ₂ °	
Dec. 11	e	19 44 20 19			Traces
Dec. 13	e e i e F	07 49 43 08 00 12 03 39 13 12 11 00	USCGS: 52.1S., 160.9E (Macquarie Islands) H = 07 : 36 : 13.8 h about 29 km.	88°	
Dec. 14/15	i PP i PPP i SKS e PS e(PPS) e e SS F	00 10 01 12 22 16 13 19 17 20(03) 21 10 24 59 01 30	USCGS: 2.9N, 126.5E (Molucca Passage) H = 23 : 51 : 28.6 h about 77 km.	106 ¹ / ₂ °	
Dec.16	e F	17 17 .. 17 28			"Near" earth- quake; weak

Date 1960	Phase	G.M.T. h m s	Epicentre and time of shock	Δ_{meas}	Remarks
Dec. 17	e F	18 58 03 19 04			Ditto
Dec. 21	e F	23 10 23 17			Traces
Dec. 22	e F	15 15 15 28			Traces
Dec. 24	e F	03 45 03 55			Traces
Dec. 25	e F	00 09 00 27			Traces
Dec. 26	e P i S i i SSS e F	04 39 47 45 37 46 13 48 38 49 28 05 21	USCGS: 57.4S., 26.2W (Sandwich Islands) H = 04 : 32 : 30.1 h about 25 km.	38°	
Dec. 27	e F	18 33 18 45			Traces
Dec. 28	e F	06 17 06 21			Ditto
Dec. 29	e S F	10 57 10 12 00	USCGS: 44.8S., 75.6W (Near coast of south- ern Chili) H = 10 : 36 : 40.0 h about 30 km.	70°	
Dec. 29	e F	18 57 .. 19 01			
Dec. 31	i P i S e(PS) F	18 19 28 28 33 29 16 19 38	USCGS: 43.9S., 75.0W (Near coast of south- ern Chili) H = 18 : 08 : 12.3 h about 92 km.	70°	