



KEW
OBSERVATORY
1 JUN 1960
RICHMOND,
SURREY.

Kew
Geological Survey Office, - JAN 1960
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

The data herewith give the results from a network of seismographs intended particularly for the study of earthquakes occurring in or near South Africa. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

<u>Stations</u>	<u>Pretoria (Pret)</u>	<u>Grahamstown (Gram)</u>	<u>Pietermaritzburg (Piet)</u>	<u>Kimberley (Kim)</u>	<u>Windhoek (Wind)</u>
Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. A.E. Long	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

Notes: "Earth tremors" originating in the mining district of the Witwatersrand are recorded several times daily by the Pretoria station, and less frequently by others. These are not dealt with in this bulletin.

Data are occasionally reported herein by courtesy of the Union Observatory, Johannesburg, which operates a 200 kg. Wiechert Horizontal seismograph. This station is called J, and is at 26°10.9'S., 28°04.5'E., height 1806 metres.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg.
South Africa.

H.O. Oliver.
Seismological Officer.

JANUARY, 1960.

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	Kim	e	12.53.11			
		i	37		C	
1	Wind	i	15.33.42			
2	Kim	iP	03.33.37	87°	R	USCGS.H=03.21.52; 15½°S, 68°W. Bolivia. h=150 km. M 6¼.
2	Kim	iP	08.35.29	+48°		USCGS.H=08.27.14; Sandwich Is.
2	Kim	iP	12.28(30)	32°		USCGS.H=12.21.51; South Atlantic Ocean, west of Bouvet Is.
	Piet	iP	46	34°		
	Wind	eP	57	35°		
	Pret	iP	29.04	36°		
3	Kim	iPKP ₁	11.58.17	150°		USCGS.H=11.38.30, 61°N, 152°W. South Central Alaska.
4	Pret	i	07(37.27)			
6	Kim	i	18.58.35		C	
6	Kim	i	23.07.42			
7	Wind	eP	08.27.44	82°		USCGS.H=08.15.21; 6½°N 94°E.
7	Pret	i	00.14.36			
7	Pret	i	13(22.36)			USCGS.H=13.28.16, Sandwich Is. Mag. 6½.
	Wind	eP	36.39	+47°		
	Kim	iP	37.09	+50°	R	
7	Kim	i	23.30.40			USCGS.H=23.17.18; 6½°N 94½°E. Nicobar Is.
8	Kim	i	10.12.48			
8	Pret	(e)i	11.11.21			
8	Kim	iP	11.37.39	+47°		USCGS.H=11.29.18, 55°S, 27½°W; Sandwich Is.
8	Wind	e-	14.52.25	-		USCGS.H=14.45.53; 55½°S, 27½°W; Sandwich Is.
	Kim	iP	54.14	47°	C	
	Pret	iP	55.00	50°		
8	Kim	i	15.05.41		C	
8	Kim	i	15.36.53		R	
8	Wind	e	21.49.17			
	Kim	i	41		C	
9	Wind	e	06.08.59			
9	Pret	iP	07.34.43	75°		USCGS.H=07.23.50; 36°N, 69°E; Hindu Kush
	Wind	iP	35.35	80°		h = 150 km.
		i	46			
	Kim	iP	36	81°	C	
9	Pret	i	07.43.53			
10	Kim	i	03.33.33		R	
10	Wind	traces	14.18.12			
11	Wind	traces	03.22.59	88°		USCGS.H=03.10.14; 16°N, 96½°E; Near South Coast of Burma.
	Pret	i	(23.09)	-		
13	Wind	i	15.49.19	-		USCGS.H=15.40.34;
		iP	52.48	90°		16°S 72°W; Southern Peru
	Pret	i	04	-		h = 100 km. Mag. 7½.
	Kim	iP	53.16	90°		
13	Pret	i	16.49.25			
	Wind	i	31			
15	Wind	i	09.38.57			
		i	39.12			
15	Pret	i	09.43.08			
17	Pret	i	01.09.56			
19	Wind	e	09.35.50			
21	J	eP	19.26.42	80 km		H= 19.26.30 S.A.S.T.
		iS	50			26°50'S, 28°00'E.
	Kim	iP _n	27.23	370 km		Coalbrook (Tvl) district
		iS ₁	28.13			
	Piet	S ₁	28.13	370 km		

/continued.....

January, 1960 (cont.)

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<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> h. m. s.	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS.</u>
21	Kim	e	12.22.53			
		i	25.09			
22	Kim	e	12.35.59			
22	Kim	e	14.23.08			
		i	23.17		R	
22	Pret	e	23.55.23			
		i	48			
26	Pret	iP	10.02.31	63°		USCGS.H=09.52.00; 39½°N, 39½°E; Turkey.
26	Wind	eP	13.15.47	61°		USCGS.H=13.05.40; 38°N, 29°E, Turkey.
26	Kim	o	19.07.(51)			
26	Kim	i	19.42(38)		R	
26	Wind	i	20.23.51			
26	Pret	i	20.38.38			
26	Kim	i	21.44(21)		C	
26	Wind	ePKP	22.40.23	128°		USCGS.H=22.21.19; 30°S, 178°W. Kermadec Is.
27	Pret	i	04.26.22			
29	Pret	(e)i	07.44.47			
29	Kim	i	07.51.57			
	Wind	e	07.52.35			
30	Wind	e	13.10.20			
		i	32			
31	Kim	i	02.29.03		R	

A.A. Attridge.

18th March, 1960.

SEISMOLOGICAL BULLETIN.

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	Piet	iP	46	34°		west of Bouvet Is.
	Wind	eP	57	35°		
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7	Pret	i	13(22.36)			USCGS.H=13.28.16, Sandwich Is. Mag. 6½.
-	Wind	eP	36.39	+47°		
-	Kim	iP	37.09	±50°	R	
- 7	Kim	i	23.30.40			USCGS.H=23.17.18; 6½°N 94½°E. Nicobar Is.
8	Kim	i	10.12.48			
8	Pret	(e)i	11.11.21			
- 8	Kim	iP	11.37.39	+47°		USCGS.H=11.29.18, 55°S, 27½°W; Sandwich Is.
- 8	Wind	e-	14.52.25	-		USCGS.H=14.45.53; 55½°S, 27½°W; Sandwich Is.
	Kim	iP	54.14	47°	C	
	Pret	iP	55.00	50°		
- 8	Kim	i	15.05.41		C	
8	Kim	i	15.36.53		R	
8	Wind	e	21.49.17			
	Kim	i	41		C	
9	Wind	e	06.08.59			
- 9	Pret	iP	07.34.43	75°		USCGS.H=07.23.50; 36°N, 69°E; Hindu Kush
	Wind	iP	35.35	80°		h = 150 km.
		i	46			
- 9	Kim	iP	36	81°	C	
	Pret	i	07.43.53			
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17	Pret	i	01.09.56			
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22	Pret	e	23.55.23			
		i	48			
26	Pret	iP	10.02.31	63°		USCGS.H=09.52.00; 39½°N, 39½°E; Turkey.
26	Wind	eP	13.15.47	61°		USCGS.H=13.05.40; 38°N, 29°E, Turkey.
26	Kim	o	19.07.(51)			
26	Kim	i	19.42(38)		R	
26	Wind	i	20.23.51			
26	Pret	i	20.38.38			
26	Kim	i	21.44(21)		C	
26	Wind	ePKP	22.40.23	128°		USCGS.H=22.21.19; 30°S, 178°W. Kermadec Is.
27	Pret	i	04.26.22			
29	Pret	(e)i	07.44.47			
29	Kim	i	07.51.57			
	Wind	e	07.52.35			
30	Wind	e	13.10.20			
		i	32			
31	Kim	i	02.29.03		R	

A.A. Attridge.

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FEB 1960

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FEBRUARY, 1960.

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1	Kim	i	09.10.20		C	
1	Kim	ePKP	14.15.39	143°		USCGS.H=13.56.08; 50½°N 160°E; Off East Coast of Kamchatka.
		i	41			
1	Gram	e	21.21.02			
2	Kim	iP	09.25.15	81°		USCGS.H=09.12.52; 28½°S 69°W, San Juan Province, Argentina.
4	Gram	ePKP	04.05(00)	123°		USCGS.H= 03.46.30; 4½°S.
	Kim	(e)iPKP	26	132°		153½°E.
	Wind	ePKP	43	121°		New Ireland region.
	Pret	iPKP	59	120°		
7	Kim	iPKP	11.36(38)	137°	C	USCGS.H=11.16.54
7	Wind	e	23.00.25			
	Kim	i	02(20)		R	
8	Kim	i	03.53(05)		R	
8	Gram	iP	12.56.07	67°	R	USCGS.H=12.45.34; 58°S, 67°W; Drake Passage,
	Kim	iP	26	70°		
	Wind	eP	33	71°		
	Pret	iP	53	74°		
8	Kim	iP	19.06.08	79°	R	USCGS.H = 18.54.23; 36½°N, 70½°E; Afghanistan h = 150 km.
8	Kim	iP	19.18.54	95°	C	USCGS.H=19.06.16, 8½°S 74½°W, Peru, h = 200 km
8	Kim	i	19.19.54		C	
8	Kim	i	22.08.16			
10	Kim	e	00.09.36			
		i	36			
11	Gram	eP	13.05.34	79°		USCGS.H=12.53.59; 34°S, 70½°W, Chile, h=100 km
		i	06.10			
	Wind	iP	05.41	78°		
		i	06.01			
	Kim	iP	05.54	80°		
13	Wind	iP	20.52.06	81°		USCGS.H= 20.40.06, 17½°S
	Kim	iP	53.14	87°	C	70°W, Peru, h = 150 km.
14	Pret	(e)i	09.56.57			
14	Kim	iP	13.03.23	+79°		USCGS.H=12.51.15, Andaman Is.
14	Kim	iPKP	13.11.11	125°		USCGS.H=12.53.08, 23½°S 179°E, S.of Fiji Is. h = 500 km.
14	Kim	iPKP	15.58.37	121°		USCGS.H= 15.39.43, 29°S, 177°W, Kermadec Is.
*** see on next page.						
16	Gram	(e)i	10.12.20			
16	Kim	iP	13.27.04	85½°		USCGS.H= 13.14.31, 22°N 45½°W. Atlantic Ocean.
18	Pret	(e)i	22.19.39			
18	Wind	ePKP ₁	22.46.03	154°		USCGS.H=22.26.10, 52°N, 170°W, Fox Is. Aleutian Is
19	Pret	(e)iP	10.48.07	76°		USCGS.H=10.36.46, 36°N
	Kim	iP	31	81°		70½°E, Hindu Kush,
	Gram	iP	47	83°		h = 200 km.
		i	49.41			
20	Pret	(e)i	00.52.23			
20	Pret	e	11.10.47			
		i	11.11.37			
	Wind	e	12.43			
21	Wind	eP	08.23.41	62°		USCGS.H=08.13.31, 36°N
	Pret	iP	24.19	67°		4½°E; N. Algeria.
	Kim	iP	24.29	70°	R	

/continued.....

February, 1960. (continued)

<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> h. m. s.	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS.</u>
21	Wind	e	10.00.13			
21	Kim	i	11.45.16			
21	Pret	e	11.49.06			
21	Wind	iPKP ₁	17.41.53	152°		USCGS.H=17.21.59; 52°N
	Kim	iPKP ₁	42.00	155°		175°W; Aleutian Is.
23	Pret	iP	02.21(06)	75°		USCGS.H=02.09.42; 36°N
	Piet	iP	13	76°		70°E, Afghanistan.
	Wind	iP	26	80°		
	Kim	iP	27	78°	C	
23	Kim	iPKP	11.49.17	131°		USCGS.H=11.31.04; 19°S,
						178°W, Fiji Is. h=500 km
23	Kim	iPKP	16.23.44	123°	C	USCGS.H=16.04.50, 6°S,
						154½°E, Solomon Is.
						Mag. 6½.
23	Wind	i	16.27.25			
24	Pret	i	21.55.58			
	Kim	i	59			
	Wind		56.18			
24	Wind	i	21.59.40			
25	Wind	e	15.31.32			
26	Kim	(e)i	15.33.49			
26	Wind	ePKP ₁	23.49.10	153°		USCGS.H= 51½°; 178°W,
	Piet	iPKP ₂	18	150°	C	Aleutian Is.
	Kim	iPKP ₁	22	154°	C	Mag. 6½.
	Gram	iPKP ₂	43	157°		
27	Piet	ePKP ₁	00.27.04	153°		USCGS.H=00.07.10.
	Kim	iPKP ₁	06.	155°		
27	Pret	i	00.49.13			
27	Pret	iPKP ₁	08.29.21	151°		USCGS.H=08.10.03; 51½°N,
	Kim	ePKP ₁	36	155°		178°W, Aleutian Is.
		i	59			
27	Kim	i	09.17.15		C	
27	Pret	e	12.27.22			
		i	29.31			
	Kim	e	29.36			
	Kim	i	31.12			
	Wind	e	27.56			
29	Wind	iP	23.50.15	61°		USCGS.H= 23.40.12;
	Pret	(e)iP	51.08	68°		30°N, 9°W, Morocco
	Gram	eP	45	74°		(Agadir)
		i	47			

A.A. Attridge.

19th Apr 11, 1960.

15 Pret iP 01.49.06 200 km H = 01.48.34; 26° 20' S.
 1S 49.28 30°E; Ermelo Dist. Tvl.

only *Kew*

Kew OBSERVATORY
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Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. A.E. Long	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

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All times given are G.M.T.

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Address:

Bernard Price Institute of Geophysical Research,
 University of the Witwatersrand,
 Johannesburg.
 South Africa.

H.O. Oliver
 H.O. Oliver.
Seismological Officer.

FEBRUARY, 1960.

- 295 -

DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/ R	REMARKS.
			h.	m.	s.			
1	Kim	i	09.10.20					
1	Kim	ePKP	14.15.39			143°	USCGS.H=13.56.08; 50½° N 160°E; Off East Coast of Kamchatka.	
		i			41			
1	Gram	e	21.21.02					
2	Kim	iP	09.25.15			81°	USCGS.H=09.12.52; 28½° S 69°W, San Juan Province, Argentine.	
4	Gram	ePKP	04.05(00)			123°	USCGS.H= 03.46.30; 4½° S. 153½°E.	
	Kim	(e)iPKP			26	132°		
	Wind	ePKP			43	121°		
	Pret	iPKP			59	120°	New Ireland region.	
7	Kim	iPKP	11.36(38)			137°	USCGS.H=11.16.54	
7	Wind	e	23.00.25					
	Kim	i			02(20)			
8	Kim	i	03.58(05)					
8	Gram	iP	12.56.07			67°	USCGS.H=12.45.34; 58° S, 67°W; Drake Passage,	
	Kim	iP			26	70°		
	Wind	eP			33	71°		
	Pret	iP			53	74°		
8	Kim	iP	19.06.08			79°	USCGS.H = 18.54.23; 36½° N, 70½° E; Afghanistan h = 150 km.	
8	Kim	iP	19.18.54			95°	USCGS.H=19.06.16, 8½° S 74½° W, Peru, h = 200 km	
8	Kim	i	19.19.54					
8	Kim	i	22.08.16					
10	Kim	e	00.09.36					
		i			36			
11	Gram	eP	13.05.34			79°	USCGS.H=12.53.59; 34° S, 70½° W, Chile, h=100 km	
		i			06.10			
	Wind	iP	05.41			78°		
		i			06.01			
	Kim	iP			05.54	80°		
13	Wind	iP	20.52.06			81°	USCGS.H= 20.40.06, 17½° S 70°W, Peru, h = 150 km.	
	Kim	iP			53.14	87°		
14	Pret	(e)i	09.56.57					
14	Kim	iP	13.03.23			+79°	USCGS.H=12.51.15, Andaman Is.	
14	Kim	iPKP	13.11.11			125°	USCGS.H=12.53.08, 23½° S 179°E, S.of Fiji Is. h = 500 km.	
14	Kim	iPKP	15.58.37			121°	USCGS.H= 15.39.43, 29° S. 177°W, Kermadec Is.	
*** see on next page.								
16	Gram	(e)i	10.12.20					
16	Kim	iP	13.27.04			85½°	USCGS.H= 13.14.31, 22° N 45½° W. Atlantic Ocean.	
18	Pret	(e)i	22.19.39					
18	Wind	ePKP ₁	22.46.03			154°	USCGS.H=22.26.10, 52° N, 170° W, Fox Is. Aleutian Is	
19	Pret	(e)iP	10.48.07			76°	USCGS.H=10.36.46, 36° N 70½° E, Hindu Kush, h = 200 km.	
	Kim	iP			31	81°		
	Gram	iP			47	83°		
		i			49.41			
20	Pret	(e)i	00.52.23					
20	Pret	e	11.10.47					
		i			11.11.37			
	Wind	e			12.43			
21	Wind	eP	08.23.41			62°	USCGS.H=08.13.31, 36° N 4½° E; N. Algeria.	
	Pret	iP			24.19	67°		
	Kim	iP			24.29	70°		

/continued.....

February, 1960. (continued)

<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> h. m. s.	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS.</u>
21	Wind	e	10.00.13			
21	Kim	i	11.45.16			
21	Pret	e	11.49.06			
21	Wind	iPKP ₁	17.41.53	152°		USCGS.H=17.21.59; 52°N
	Kim	iPKP ₁	42.00	155°		175°W; Aleutian Is.
23	Pret	iP	02.21(06)	75°		USCGS.H=02.09.42; 36°N
	Piet	iP	16	76°		70°E, Afghanistan.
	Wind	iP	26	80°		
	Kim	iP	27	78°	C	
23	Kim	iPKP	11.49.17	131°		USCGS.H=11.31.04; 19°S, 178°W, Fiji Is. h=500 km
23	Kim	iPKP	16.23.44	123°	C	USCGS.H=16.04.50, 6°S, 154½°E, Solomon Is. Mag. 6½.
23	Wind	i	16.27.25			
24	Pret	i	21.55.58			
	Kim	i	59			
	Wind		56.18			
24	Wind	i	21.59.40			
25	Wind	e	15.31.32			
26	Kim	(e)i	15.33.49			
26	Wind	ePKP ₁	23.49.10	153°		USCGS.H= 51½°N, 178°W,
	Piet	iPKP ₂	18	150°	C	Aleutian Is.
	Kim	iPKP ₁	22	154°	C	Mag. 6½.
	Gram	iPKP ₂	43	157°		
27	Piet	ePKP ₁	00.27.04	153°		USCGS.H=00.07.10.
	Kim	iPKP ₁	06.	155°		
27	Pret	i	00.49.13			
27	Pret	iPKP ₁	08.29.21	151°		USCGS.H=08.10.03; 51½°N,
	Kim	ePKP ₁	36	155°		178°W, Aleutian Is.
		i	59			
27	Kim	i	09.17.15		C	
27	Pret	e	12.27.22			
		i	29.31			
	Kim	e	29.36			
	Kim	i	31.12			
	Wind	e	27.56			
29	Wind	iP	23.50.15	61°		USCGS.H= 23.40.12;
	Pret	(e)iP	51.08	68°		30°N, 9°W, Morocco
	Gram	eP	45	74°		(Agadir)
		i	47			

A.A. Attridge.

19th Apr 11, 1960.

15 Pret iP 01.49.06 200 km H = 01.48.34; 26°20' S.
 15 Pret iS 49.28 30°E; Ermelo Dist. Tvl.

WITWATERSRAND OBSERVATORY
 17 JUN 1960
 RICHMOND, SURREY

Geological Survey Office,
 Department of Mines,
 Union of South Africa.

MAR 1960

Kew

Mar/60

The data herewith give the results from a network of seismographs intended particularly for the study of earthquakes occurring in or near South Africa. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

Stations	Pretoria (Pret)	Grahamstown (Gram)	Pietermaritz- burg (Piet)	Kimberley (Kim)	Windhoek (Wind)
Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vert- ical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. A.E. Long.	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

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H.O. Oliver.
Seismological Officer.

MARCH, 1960. (continued)

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS
16	Kim	iPPP	00.41.31	47°	C	USCGS. H=00.33.05. 59°S. 26°W. Sandwich Island.
17	Kim	iPKP ₁	20.33.56	155°	C	USCGS. H=20.13.58. 51°N. 180° Andeanof Is.
20	Pret	ePKP	17.26.28	127°		USCGS, H=17.07.30. 40°N. 143½°E.
		i	37			
	Piet	ePKP	31	126°		Off East Coast of Honshu, Japan. Mag. 7 h=60km.
		i	38			
	Kim	iPKP	39	131°	C	
	Wind	ePKP	43	133°		
	Gram	iPKP	46	131°	C	
20	Kim	iP	23.40.53	87°		USCGS. H=23.28.28. 17°N. 46½°W. N. Atlantic Ocean
21	Kim	i	09.33.33			
21	Kim	i	09.37.32			
21	Kim	i	09.50.58			
21	Kim	iP	20.01.02	85°	R	USCGS. H=19.48.56. 21°S. 70½°W.
	Wind	iP	09	81°		
	Pret	eP	02.21	92°		Near coast of Chile
		i	30			
21	Kim	i	02.43.39			
22	Wind	iP	02.44.23	90°		USCGS. H=02.31.17. 61½°S 154°E. 400 mls.N.W. of Balleny Is.
22	Kim	i	20.04.00		C	
22	Kim	i	20.36.50			
23	Pret	i	00.17.07			
23	Wind	e	00.58.43			
23	Kim	iPKP	00.42.51	131°		USCGS. H=00.23.22.39½°N. 143°E. Near east coast of Honshu, Japan. Mag. 7
24	Kim	e	07.15.41			
24	Pret	iPKP ₁	10.15.55	153°		USCGS. H=095600 50½°N. 173°W. Andeanof Is.
24	Kim	i	11.16.20		R	
24	Kim	e	16.03.57			
25	Kim	i	09.54.07			
27	Pret	iP	18.11.59			South African. Approx. 220 km. from Pretoria. Probably Ermelo district, Trans.
		iS	12.21			
	Kim	iS ₁	12.48			
28	Kim	iPKP	12.56.54	127°		USCGS. H=12.37.50. 23°S. 176°W. Tonga Is. region.
29	Pret	e	06.21.33			
		i	22.30			
29	Kim	iPKP	06.49.45	124°		USCGS. H=06.30.54. 17°S 167°E. New Hebrides Is. Mag. 6¼.
	Wind	ePKP	50.18	133°		
29	Kim	i	08.29.01		R	
29	Kim	i	11.55.49			
29	Pret	iP	21.49.58			South African. Approx. 220 km from Pretoria.
		iS	50.20			
	Kim	iP _n	09			
		iP ₁	17			
		iS ₁	46			
30	Pret	i	07.17.34			
30	Pret	e	08.55.47			
		i	53			
	Kim	e	57.54			

UNION OBSERVATORY
17 JUN 1960
RICHMOND, SURREY

Geological Survey Office,
Department of Mines,
Union of South Africa.
MAR 1960
Kew
Mar/60

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Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°25.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vert- ical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
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South Africa.

H.O. Oliver.
Seismological Officer.

MARCH, 1960.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	Pret	e	00.15.04			
		i	(15.11)			
3	Gram	e	00.10.39			
	Pret	e	11.34			
3	Wind	i	15.51.30		C	
4	Wind	ePKP	02.35.48	153°		USCGS. H=02.15.56
	Pret	iPKP ₁	49	154°		50½°N. 177°W.
	Piet	iPKP ₁	53	154°		Andreanof Island
4	Gram		07.36.11			
4	Pret	eP	21.17.27	73°		USCGS. H=21.05.45
	Wind	eP	18.09	82°		7½°N. 94°E. Nicobar Island
5	Pret	eP	11.37.10	76°		USCGS. H=11.25.00
		i	17			29°N. 81°E. Nepal
5	Gram	iP	14.03.15.	103°		USCGS. H=13.49.16.
						1°N. 129°E. Halamahira Is.
7	Pret	iP	01.02.24	67°		Mag. 6½.
						USCGS. H=00.51.40. 34½°N.
8	Pret	iP	13.49.55	± 160 km		55°E. Iran
		iS	50.11			South African; about
8	Wind	ePKP	16.51.55	134°		160 km. from Pretoria
		i	52.27			USCGS. H=16.33.38
	Wind	i	33			16½°S. 168½°E.
			55.31			New Hebrides Is.
	Gram	iPKP	52.00	121½°		Mag. 7. h=250 km.
	Piet	iPKP	52.00.	122°		
	Pret	iPKP	09	126°		
8	Pret	i	17.02.03.			
	Piet	i	(15)			
	Gram	i	17			
10	Wind	i	00.06.32		C	
	Gram	i	07.06			
	Pret	e	(24)			
		i	55			
10	Wind	e	09.54.53			
10	Pret	i	(54)			
10	Pret	e	14.53.57			
		i	54.53			
12	Wind	iP	12.04.39	67°		USCGS. H=11.54.00
	Pret	iP	05.00	70°		42°N. 152°E.
	Kim	iP	17	73°		Eastern Yugoslavia
	Gram	iP	44	78°		
12	Wind	iP	13.59.20	77°	C	USCGS. H=13.47.52
	Gram	iP	23	73°	C	36½°S. 71°W. Chile -
	Kim	iP	32	79°	R	Argentine border. h=150 km
12	Wind	ePKP	20.49.52.	130°		USCGS. H=20.30.39 6°S.
						152°E. New Britain. Mag 6½
12	Kim	i	20.59.50			
12	Kim	i	21.49.34		R	
14	Pret	i	00.17.29			
14	Kim	i	11.02.27			
14	Pret	e	20.23.48			
15	Kim	iPKP	09.40.49	157°		USCGS. H=09.20.56 51°N.
	Piet	iPKP	53	156°	R	174½° W. Andreanof Is.
	Wind	e	10.40.45			
15	Pret	e	19.56.40			
15	Pret	e	19.59.46			
15	Kim	i	20.09.07		R	
	Wind	i	09		C	
15	Pret	i	20.10.11			

MARCH, 1960. (continued)

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS
16	Kim	iPPP	00.41.31	47°	C	USCGS. H=00.33.05. 59°S. 26°W. Sandwich Island.
17	Kim	iPKP ₁	20.33.56	155°	C	USCGS. H=20.13.58. 51°N. 180° Andeanof Is.
20	Pret	ePKP	17.26.28)	127°		USCGS. H=17.07.30. 40°N. 143½°E.
		i	37			
	Piet	ePKP	31	126°		Off East Coast of Honshu, Japan. Mag. 7 h=60km.
		i	38			
	Kim	iPKP	39	131°	C	
	Wind	ePKP	43	133°		
	Gram	iPKP	46	131°	C	
20	Kim	iP	23.40.53	87°		USCGS. H=23.28.28. 17°N. 46½°W. N. Atlantic Ocean
21	Kim	i	09.33.33			
21	Kim	i	09.37.32			
21	Kim	i	09.50.58			
21	Kim	iP	20.01.02	85°	R	USCGS. H=19.48.56. 21°S. 70½°W.
	Wind	iP	09	81°		
	Pret	eP	02.21	92°		Near coast of Chile
		i	30			
21	Kim	i	02.43.39			
22	Wind	iP	02.44.23	90°		USCGS. H=02.31.17. 61½°S 154°E. 400 mls.N.W. of Balleny Is.
22	Kim	i	20.04.00		C	
22	Kim	i	20.36.50.			
23	Pret	i	00.17.07.			
23	Wind	e	00.58.43			
23	Kim	iPKP	00.42.51	131°		USCGS. H=00.23.22.39½°N. 143°E. Near east coast of Honshu, Japan. Mag. 7
24	Kim	e	07.15.41			
24	Pret	iPKP ₁	10.15.55	153°		USCGS. H=095600 50½°N. 173°W. Andeanof Is.
24	Kim	i	11.16.20		R	
24	Kim	e	16.03.57			
25	Kim	i	09.54.07			
27	Pret	iP	18.11.59			South African. Approx. 220 km. from Pretoria. Probably Ermelo district, Trans.
		iS	12.21			
	Kim	iS ₁	12.48			
28	Kim	iPKP	12.56.54	127°		USCGS. H=12.37.50. 23°S. 176°W. Tonga Is. region.
29	Pret	e	06.21.33			
		i	22.30			
29	Kim	iPKP	06.49.45	124°		USCGS. H=06.30.54. 17°S 167°E. New Hebrides Is. Mag. 6½.
	Wind	ePKP	50.18	133°		
29	Kim	i	08.29.01		R	
29	Kim	i	11.55.49			
29	Pret	iP	21.49.58.			South African. Approx. 220 km from Pretoria.
		iS	50.20			
	Kim	iPn	09			
		iP ₁	17			
		iS ₁	46			
30	Pret	i	07.17.34			
30	Pret	e	03.55.47.			
		i	53			
	Kim	e	57.54			

MARCH, 1960. (continued)

<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> <u>h. m. s.</u>	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS</u>
30	Wind	e	09.01.58			
30	Kim	ePKP	11.08.17	125°		USCGS. H=10.49.47. 13 ¹⁰ 166°E. New Hebrides. Mag 6
30	Kim	e	12.51.07			
31	Kim	e	11.05.59			
31	Pret	e	13.43.44			
		i	45.01			

A.A. ATTRIDGE.

17th May, 1960.

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

MAR 1960

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Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
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Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

Notes: "Earth tremors" originating in the mining district of the Witwatersrand are recorded several times daily by the Pretoria station, and less frequently by others. These are not dealt with in this bulletin.

Data are occasionally reported herein by courtesy of the Union Observatory, Johannesburg, which operates a 200 kg. Wiechert Horizontal seismograph. This station is called J, and is at 26°10.9'S., 28°04.5'E., height 1806 metres.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg.
South Africa.

H.O. Oliver

H.O. Oliver.
Seismological Officer.

MARCH, 1960.

DATE	STATION	PHASE	G. M. T.		ARC DISTANCE	C/ R	REMARKS.
			h.	m. s.			
1	Pret	e	00.13	(04)			
		i		(15.11)			
3	Gram	e	00.10.39				
	Pret	e	11.34				
3	Wind	i	15.51.30			C	
4	Wind	ePKP	02.35.48		153°		USCGS. H=02.15.56
	Pret	iPKP ₁	49		154°		50½°N. 177°W.
	Piet	iPKP ₁	53		154°		Andreanof Island
4	Gram		07.36.11				
4	Pret	eP	21.17	(27)	73°		USCGS. H=21.05.45
	Wind	eP	18.09		82°		7½°N. 94°E. Nicobar Island
5	Pret	eP	11.37.10		76°		USCGS. H=11.25.00
		i	17				29°N. 81°E. Nepal
5	Gram	iP	14.03.15.		103°		USCGS. H=13.49.16.
							1°N. 129°E. Halamahira Is.
							Mag. 6¾.
7	Pret	iP	01.02.24		67°		USCGS. H=00.51.40. 34½°N.
							55°E. Iran
8	Pret	iP	13.49.55	±	160 km		South African; about
		iS	50.11				160 km. from Pretoria
8	Wind	ePKP	16.51.55		134°		USCGS. H=16.33.38
		i	52.27				16½°S. 168½°E.
	Wind	i	33				New Hebrides Is.
			55.31				Mag. 7. h=250 km.
	Gram	iPKP	52.00		121½°		
	Piet	iPKP	52.00.		122°		
	Pret	iPKP	09		126°		
8	Pret	i	17.02.03.				
	Piet	i		(15)			
	Gram	i	17				
10	Wind	i	00.06.32			C	
	Gram	i	07.06				
	Pret	e		(24)			
		i	55				
10	Wind	e	09.54.53				
10	Pret	i		(54)			
10	Pret	e	14.53.57				
		i	54.53				
12	Wind	iP	12.04	(39)	67°		USCGS. H=11.54.00
	Pret	iP	05.00		70°		42°N. 152°E.
	Kim	iP	17		73°		Eastern Yugoslavia
	Gram	iP	44		78°		
12	Wind	iP	13.59.20		77°	C	USCGS. H=13.47.52
	Gram	iP	23		73°	C	36½°S. 71°W. Chile -
	Kim	iP	32		79°	R	Argentine border. h=150 km
12	Wind	ePKP	20.49.52.		130°		USCGS. H=20.30.39 6°S.
							152°E. New Britain. Mag 6½
12	Kim	i	20.59.50				
12	Kim	i	21.49.34			R	
14	Pret	i	00.17.29				
14	Kim	i	11.02.27				
14	Pret	e	20.23.48				
15	Kim	iPKP ₁	09.40.49		157°		USCGS. H=09.20.56 51°N.
	Piet	iPKP ₁	53		156°	R	174½° W. Andreanof Is.
15	Wind	e	10.40.45				
15	Pret	e	19.56.40				
15	Pret	e	19.59.46				
15	Kim	i	20.09.07			R	
	Wind	i	09			C	
15	Pret	i	20.10.11				

MARCH, 1960. (continued)

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS
16	Kim	iPPP	00.41.31	47°	C	USCGS. H=00.33.05. 59°S. 26°W. Sandwich Island.
17	Kim	iPKP ₁	20.33.56	155°	C	USCGS. H=20.13.58. 51°N. 180° Andreevof Is.
20	Pret	ePKP	17.26.28)	127°		USCGS. H=17.07.30. 40°N. 143½°E.
		i	37			
	Piet	ePKP	31	126°		Off East Coast of Honshu, Japan. Mag. 7 h=60km.
		i	38			
	Kim	iPKP	39	131°	C	
	Wind	ePKP	43	133°		
	Gram	iPKP	46	131°	C	
20	Kim	iP	23.40.53	87°		USCGS. H=23.28.28. 17°N. 46½°W. N. Atlantic Ocean
21	Kim	i	09.33.33			
21	Kim	i	09.37.32			
21	Kim	i	09.50.58			
21	Kim	iP	20.01.02	85°	R	USCGS. H=19.48.56. 21°S. 70½°W.
	Wind	iP	09	81°		
	Pret	eP	02.21	92°		Near coast of Chile
		i	30			
21	Kim	i	02.43.39			
22	Wind	iP	02.44.23	90°		USCGS. H=02.31.17. 61½°S 154°E. 400 mls.N.W. of Balleny Is.
22	Kim	i	20.04.00		C	
22	Kim	i	20.36.50.			
23	Pret	i	00.17.07.			
23	Wind	e	00.38.43			
23	Kim	iPKP	00.42.31	131°		USCGS. H=00.23.22.39½°N. 143°E. Near east coast of Honshu, Japan. Mag. 7
24	Kim	e	07.15.41			
24	Pret	iPKP ₁	10.15.55	153°		USCGS. H=095600 50½°N. 173°W. Andreevof Is.
24	Kim	i	11.16.20		R	
24	Kim	e	16.03.57			
25	Kim	i	09.54.07			
27	Pret	iP	18.11.59			South African. Approx. 220 km. from Pretoria. Probably Ermelo district, Trans.
		iS	12.21			
	Kim	iS ₁	12.48			
28	Kim	iPKP	12.56.54	127°		USCGS. H=12.37.50. 23°S. 176°W. Tonga Is. region.
29	Pret	e	06.21.33			
		i	22.30			
29	Kim	iPKP	06.49.45	124°		USCGS. H=06.30.54. 17°S 167°E. New Hebrides Is. Mag. 6¼.
	Wind	ePKP	50.18	133°		
29	Kim	i	08.29.01		R	
29	Kim	i	11.55.49			
29	Pret	iP	21.49.58.			South African. Approx. 220 km from Pretoria.
		iS	50.20			
	Kim	iPn	09			
		iP ₁	17			
		iS ₁	46			
30	Pret	i	07.17.34			
30	Pret	e	08.55.47.			
		i	53			
	Kim	e	57.54			

MARCH, 1960. (continued)

<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> <u>h. m. s.</u>	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS</u>
30	Wind	e	09.01.58			
30	Kim	ePKP	11.08.17	125°		USCGS. H=10.49.47. 13 $\frac{1}{2}$ ° 166°E. New Hebrides. Mag 6
30	Kim	e	12.51.07			
31	Kim	e	11.05.59			
31	Pret	e	13.43.44			
		i	45.01			

A.A. ATTRIDGE.

17th May, 1960.

- APR 1960

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

The data herewith give the results for a network of seismographs intended particularly for the study of earthquakes occurring in the Federation. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

Stations :	<u>BULAWAYO (Bway)</u>	<u>BROKEN HILL (B.Hill)</u>
Latitude:	20° 08' 6" S.	14° 26' 46" S.
Longitude:	28° 36' 9" E.	28° 28' 08" E.
Lithologic foundation:	Hornblende schists of the Bulawayan system	Dolomite and shales of the middle Katanga system
Height:	1341 meters	1206 meters
Instrument:	Vertical & horizontal Willmore S.P.	Vertical & horizontal Willmore S.P.
Seismo. Officer:	Director, Federal Surveys	Director, Federal Surveys.
Observer:	Officer-in-charge, Goetz Observatory.	Officer-in-charge, Broken Hill Observatory.
Institution:	Department of Federal Surveys, Salisbury.	Department of Federal Surveys, Salisbury.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

H.O. Oliver

H.O. OLIVER
Seismological Officer.

Address:

Geophysical Research Institute,
University of the Witwatersrand,
Johannesburg..... South Africa.

APRIL, 1960.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	Bway	traces	03.12.58			
1	Bway	traces	04.24.53			
1	B.Hill	e	07.27.25			
		i	28.21			
1	Bway	eP	13.31.44	102°		USCGS.H=13.18.23, 4½°S 73½°W, Southern Peru h = + 100 km
1	Bway	ePKP ₂	14.31.51	148°		USCGS.H=14.12.05, 49°N 129½°W. Coast of Vancouver Is.
1	B.Hill	e	17.31.32			
		i	33.04			
	Bway	e	31.39			
		i	32.58			
		i	33.37			
1	B.Hill	e	19.08.50			Seismic probably local.
1	Bway	ePKP	23.20.54	133°		USCGS.H=23.02.31, 17½°S 180° Fiji Is. h+ 550 km
2	Bway	e	10.40.36			
2	Bway	eP _C P	23.15.05	78°		USCGS.H= 23.02.50, 11°S 113°E. off S. Coast of Java
2	Bway	eP	23.42.58	57°		USCGS.H=23.33.09, 34°N 48½°E. Iran.
3	B.Hill	e	00.05.18			
3	B.Hill	traces	00.32.00			
3	B.Hill	e	15.51.01			Seismic, probably local
3	B.Hill	i	16.21.36			Seismic, probably local
4	Bway	ePKP	08.15.08	123°		USCGS.H=07.56.15, 10°S, 161½°E. Solomon Is. h = + 100 km.
5	Bway	e	02.55.52			Seismic, probably local
		i	56.18			
	B.Hill	e	56.19			
		i	58			
5	Bway	iP	07.27.19	56°	R	USCGS.H= 07.17.45, 41½°S
	B.Hill	iP	54	61°	R	26°W Sandwich Is.
5	Bway	iP	12.45.49	56°	R	USCGS.H=12.36.15, 60½°S
	B.Hill	eP	46.23	61°	R	25°W. Sandwich Is.
5	B.Hill	traces	20.29.40			
6	Bway	eP	02.18.16	92°		USCGS.H=02.05.06, 20½°S 68°W, Chile-Bolivia border
		i	32			
	B.Hill	e	26			
6	Bway	e	08.22.01			
6	Bway	traces	15.42.45			W.W.rand earth tremor.
7	Bway	ePKP	14.05.35	130°		USCGS.H=13.47.28, 24°S, 179½°W, Fiji Is. h+ 500 km. M=6.
		i	08.14			
	B.Hill	ePKP	05.45	134°		
		i	08.33			
7	Bway	traces	20.27.00			
8	Bway	ePKP	00.14.32	134°		USCGS.H=23.55.54, 21°S, 177°W. Tonga Is. h+ 200 km. M=6.
		i	49			
		i	18.00			
	B.Hill	e	14.47			
		i	53.			
8	B.Hill	e	02.53.34			
8	Bway	e	21.06.21			probably W.W.rand tremor
9	B.Hill	traces	01.36.00			
9	Bway	i	13.39.35		C	
	B.Hill	i	40.24		C	
9	B.Hill	e	18.49.45			
9	B.Hill	e	19.37.53			
9	Bway	e	21.08.21			
9	B.Hill	e	22.00.40			
		i	01.51			

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April, 1960.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
10	B.Hill	e	09.20.58			Seismic, probably local
10	B.Hill	e	14.26.33			Seismic, probably local
		i	27.10			
10	B.Hill	e	15.50.07			
10	B.Hill	e	18.57.46			
		i	58.15			
10	B.Hill	traces	20.45.30	143°		USCGS.H=20.26.12, 53°N
	Bway	iPKP ₁	45.52	148°	C	167°W, Fox Is.
		i	47.43			Aleutian Is.
11	B.Hill	i	03.16.53		R	
12	Bway	e	04.18.12			
12	Bway	e	09.18.48			
12	B.Hill	e	12.42.20			Seismic, probably local
		i	43.00			
12	Bway	e	14.02.55			W.W.rand tremor.
12	Bway	e	14.05.02			W.W.rand tremor.
13	B.Hill	traces	00.24.10			
	Bway	i	24.58		R	
13	Bway	iPKP ₁	13.34.08	148°	C	USCGS.H=13.14.28, 52½°N
						169°W, Fox Is. Aleutian Is
13	Bway	e	14.53.45			
		e	58.27			
	B.Hill	e	54.29			
13	B.Hill	e	20.27.57			Probably Central Africa
		i	29.46			
13	B.Hill	e	23.58.17			
14	Bway	eP	06.37.14	86°		USCGS.H=06.24.30, 8°S,
	B.Hill	eP	18	87°		118°E, Sumbawa Is.
15	B.Hill	ePKP	11.57.35	119°		USCGS.H=11.39.01, 40½°N
	Bway	iPKP	41	121°		142°E N ear North Coast
						of Honshu, Japan, h+150 km
15	B.Hill	traces	12.49.11			
	Bway	traces	51.08			
15	Bway	ePKP	22.24.14	128°		USCGS.H=22.05.06, 13½°S
	B.Hill	iPKP	21	131°	C	166°E, New Hebrides Is.
						M=6½.
16	B.Hill	i	09.06.33			Probably Central Africa
		i	08.18			
		i	09.38			
	Bway	e	07.46			
16	B.Hill	e	18.26.09			Seismic, probably local
		i	41			
16	Bway	e	19.32.06			
	B.Hill	i	36		C	
17	Bway	iPKP ₁	01.32.21	149°		USCGS.H=01.12.44. 54°N,
						164°W. Unimak, Is. region
17	B.Hill	e	10.14.46			Seismic, probably local
		i	15.15			
17	B.Hill	e	11.29.20			Seismic, probably local
17	B.Hill	traces	18.06.48			Seismic, probably local
18	Bway	traces	19.01.10			W.W.RAND tremor.
19	Bway	iPKP ₁	19.45.38	149°		USCGS.H=19.26.00, 51°N,
						174°W. Andreanof Is.
19	Bway	iPKP ₁	20.52.29	149°	R	USCGS.H=20.32.51, 51°N,
						172½°W, Fox Is. Aleutian Is.
20.	B.Hill	e	00.16.34			Seismic probably local.
		i	17.18			
20	B.Hill	eP	11.09.12			260 Km from station.
		iS	38			
20	Bway	e	13.12.20			
20	Bway	i	15.39.39		R	
	B.Hill	i	39.53		R	
20	B.Hill	iP	19.33.27	64°	C	USCGS.H=19.23.04, 37°N
	Bway	iP	55	70°	C	71°E, Hindu Kush, h+ 200km
21	B.Hill	i	02.35.46			

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April, 1960.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
21	B.Hill	iP	06.49.37			360 km from station
		iS	50.13			
	Bway	e	06.50.40			
		i	52.05.			
21	B.Hill	traces	13.10.10			Seismic, probably local
21	B.Hill	iP	15.04.08			Seismic, probably local
		iS	05.22			
22	B.Hill	traces	07.15.26			
22	B.Hill	iP	12.51.59			Seismic, probably local
		iS	53.10			
	Bway	e	12.54.34			
22	B.Hill	e	13.05.56			Seismic, probably local
		i	06.41			
22	B.Hill	e	15.35.57			Seismic, probably local
		i	36.54			
22	B.Hill	i	16.26.07			
	Bway	i	26.12			
22	Bway	ePKP	20.45.18	133°		USCGS.H=20.26.28, 17½° S 174½° W, Tonga Is.
			32			h + 200 km.
	B.Hill	ePKP	33	135°		
23	Bway	eP	06.35.40	54°		USCGS.H=06.26.16, 31½° N 50½° E. Iran.
23	B.Hill	eP	13.21.22	87°	C	USCGS.H=13.08.35, 45° N 98° E. Outer Mongolia.
23	B.Hill	eP	14.26.15			Seismic Probably local
		iS	57			
23	B.Hill	e	15.34.03			Seismic, probably local
		i	44			
23	Bway	e	17.52.13			
23	Bway	eP	22.17.31			
	B.Hill	i	34		R	
		i	20.14			
24	Bway	iP	03.33.53	82°	R	USCGS.H=03.22.23, 6° S, 113½° E, Java Sea.
		i	35.01			
	B.Hill	iP	33.56	83°	R	h + 600 km
		i	36.03			
		i	43.20			
24	B.Hill	traces	03.58.31			
24	B.Hill	iP	12.23.17	50°	R	USCGS.H=12.14.26, 28° N
	Bway	iP	53	55°	C	54½° E. Southern Iran.
24	Bway	iP	15.03.32	89°	C	USCGS.H=14.50.45, 32½° S 72° W, Near Coast Central Chile.
24	Bway	e	15.41.57			
		i	42.41			
24	B.Hill	e	18.10.10			Seismic, probably local
		i	11.10			
	Bway	e	12.04			
		i	13.42			
25	Bway	iPKP ₁	15.13.32	147°	C	USCGS.H=14.53.53, 56° N 155° W. Kodiak Is. region
		iPKP ₂	38			
25	Bway	i	16.38.35		C	
25	Bway	e	17.22.49			Seismic probably local
		i	23.31			
		i	47			
	B.Hill	e	25.01			
26	Bway	traces	11.03.00			
26	Bway	traces	14.07.08			W.W.rand tremor.
26	Bway	traces	14.43.55			W.W.rand tremor.
26	B.Hill	iP	21.40.00	89°	C	USCGS.H=21.27.12, 39° N
	Bway	eP	15	92°		101° E, Kansu Prov. China
27	Bway	e	04.41.28			
27	Bway	e	07.29.57			
		i	30.19			

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April, 1960.

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
28	Bway	iPKP ₁	01.08.54	143°	R	USCGS.H=00.49.16, 53 $\frac{1}{2}$ °N 168°W, Fox Is. Aleutian Is.
28	Bway	iP	02.19.49	58°	C	USCGS.H=02.10.14, 59$\frac{1}{2}$°S
	B.Hill	iP	20.24	62	C	26°W, Sandwich Is.
28	Bway	iP _n	04.15.56			W.W.rand earth tremor
		i	17.31			
28	B.Hill	e	12.51.13			Seismic, probably local
		i	52.20			
		i	55			
	Bway	traces	54.05			
29	Bway	iP	02.25.19	58°	C	USCGS.H=02.15.35, 56$\frac{1}{2}$°S
	B.Hill	iP	44	62°	C	26°W, Sandwich Is.
29	Bway	iP	03.52.23	57°	R	USCGS.H=03.43.04, 55 $\frac{1}{2}$ °S
	B.Hill	iP	58	61°	C	25°W, Sandwich Is.
29	Bway	iP	05.54.45	58°	C	USCGS.H=05.45.14
	B.Hill	iP	55.19	62°	C	Sandwich Is.
29	Bway	iP	10.06.42	94°	C	USCGS.H=09.53.26. 0°
						122°E, Celebes.
29	Bway	eP	10.19.28	94°		USCGS.H=10.06.14, 0°,
	B.Hill	iP	30	95°		122°E, Celebes.
29	Bway	iP	13.46.32	94°	C	USCGS.H=13.33.17
		i	45	95°		0° 122° Celebes.
	B.Hill	iP	34		C	
29	Bway	iP	13.57.26	94°	C	USCGS.H=13.38.31, 30°S.
	B.Hill	iP	36	95°	C	178$\frac{1}{2}$°W, Kermadec Is.
29	Bway	iP	19.45.27	94°	C	USCGS.H=19.32.12, 0°
		i	40			122°E Celebes.
	B.Hill	iP	30	95°	C	
		i	47			
29	Bway	iP	20.57.41	94°	C	USCGS.H= 20.44.27,
		i	55			0° 122°E, Celebes.
	B.Hill	iP	43	95°		
		i	56			
30	Bway	eP	00.33.24	94°		USCGS.H=00.20.09, 0° 122°E, Celebes.
30	Bway	iP	04.14.47,	94°	C	USCGS.H=04.01.32, 0°
	B.Hill	iP	48	95°	C	122°E, Celebes.
		i	15.02			
30	Bway	traces	13.15.38			W.W.rand earth tremor.
30	B.Hill	i	15.34.07		C	
30	Bway	traces	20.36.01			W.W.rand earth tremor.
30=	Bway	traces	21.45.10			W.W.rand earth tremor.
30	B.Hill	e	22.02.36			Seismic, probably local
30	Bway	iP	22.22.21	92°	C	USCGS.H=22.10.07, 6°S,
	B.Hill	iP	25	93°	C	124$\frac{1}{2}$°E. Banda Sea,
						h ± 600 km.
30	B.Hill	e	22.39.10			
30	B.Hill	e	22.50.05			Seismic, probably local
		i	51.22			
	Bway	e	50.11			
		i	44			

H.O. Oliver.
Esme Milella.

20th July, 1960.

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

The data herewith give the results from a network of seismographs intended particularly for the study of earthquakes occurring in or near South Africa. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

<u>Stations</u>	<u>Pretoria (Pret)</u>	<u>Grahamstown (Gram)</u>	<u>Pietermaritzburg (Piet)</u>	<u>Kimberley (Kim)</u>	<u>Windhoek (Wind)</u>
Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. A.E. Long	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

Notes: "Earth tremors" originating in the mining district of the Witwatersrand are recorded several times daily by the Pretoria station, and less frequently by others. These are not dealt with in this bulletin.

Data are occasionally reported herein by courtesy of the Union Observatory, Johannesburg, which operates a 200 kg. Wiechert Horizontal seismograph. This station is called J, and is at 26°10.9'S., 28°04.5'E., height 1806 metres.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg.
South Africa.

H.O. Oliver
H.O. Oliver.
Seismological Officer.

APRIL, 1960.

- 300.-

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	Kim	e	14.32.45			
1	✓ Pret	e	17.35.12			
3	Pret	iP	02.14.08	220 km		S.A. earthquake 220 km from station.
		iS	30			
4	Kim	i	08.15(38)			
5	Wind	eP	07.26.27	48°		USCGS.H=07.17.45
	Kim	iP	39	46°	C	61°S 26°W
	✓ Pret	eP	41	50°		Sandwich Is.
5	Wind	eP	12.44.57	48°		USCGS.H=12.36.16
	Kim	iP	45.09	46°	C	60½°S, 25°W,
	✓ Pret	iP	12	50°		Sandwich Is.
6	Kim	iP	02.18.15	83°	C	USCGS.H= 02.05.06; 20°S, 68½°W; Chile-Bolivian border.
6	Kim	i	10.06.08		R	
7	Wind	ePKP	14.05.16	131°		USCGS.H=13.47.28; 24°S,
	Kim	iPKP	30	123°	C	179½°W, Fiji Is.
	✓ Pret	ePKP	36	124°		h = 500 km, Mag. 6.
7	Pret	iP	20.24.04	200km		S.A. earthquake,
		iS	24			probably Heilbron district
	Kim	iP	47	360km		O.F.S.
		iS	25.24			
8	Gram	iPKP	00.14.28	124°	C	USCGS.H=23.55.54; 21°S,
	Kim	iPKP	37	129°		177°W; Tonga Is. Mag.6
	✓ Pret	ePKP	45	129°		h=200 km.
8	Wind	e	00.17.19			
8	Kim	iP	21.03.20	280 km		S.A. earthquake; probably
		iS	48			Southern O.F.S.
	Pret	iP	40	360 km		
		iS	04.16			
9	Gram	i	13.37.47			
	Kim	i	38.43			
9	Kim	i	19.36.03			
10	Wind	ePKP₁	20.46.03	153°	C	USCGS.H=20.26.12; 53°N,
	Kim	ePKP ₁	05	156°		167½°W, Fox Is.
		i	16			
13	Gram	i	00.24.16			
	Kim	i	19			
	Pret	i	43			
13	Pret	iPKP ₁	05.10.17	149°		USCGS.H=04.50.28; 52°N,
	Wind	iPKP ₁	19	151°	C	175°W, Andreanof Is.
	Kim	(e)iPKP ₁	25	154°		
13	Piet	i	14.51.56			
		i	54.13			
	Kim	i	52.25			
	Pret	i	53.19			
15	Wind	e	14.54.02			
15	Kim	iPKP	22.23.15	124°		USCGS.H=22.05.06, 13½°S,
						166°E, New Hebrides Is.
						Mag. 6½.
16	Pret	i	09.10.40			
16	Wind	e	09.15.01			
16	Kim	i	09.17.20			
17	Kim	iPKP	22.07.38	126°	C	USCGS.H=21.49.24; 20°S,
						180°, Fiji Is. h=500 km.
18	Kim	i	07.56.17			
		i	34			
18	Pret	i	08.58.44			
18	Kim	i	11.35.49			
18	Pret	iP	16.16.14	220 km		S.A. earthquake
		iS	36			
	Kim	traces	16.16.30	280 km		
		(S-P)=28 secs				
19	Kim	ePKP ₁	19.45.01	154°		USCGS.H=19.26.00; 51½°N, 174°W
		i	46.14			Andreanof Is.

/continued.....

April, 1960 (continued)

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
19	Pret	ePKP ₂	20.53(09)	152°		USCGS.H=20.32.51, 51°N, 172½°W, Fox Is.
19	Wind	e	21.45.56			
20	Wind	e	15.38.40			
	Pret	e	39.57			
23	Pret	iP	17.49.24	360 km		S.A. earthquake, probably southern O.F.S.
		iS	50.00			
23	Kim	e	20.17.22			
		i	36			
23	Wind	i	22.15.25		C	
		i	16.27			
		i	55			
	Kim	i	18.36		R	
	Pret	e	20(41)			
		i	21.07			
		i	31			
		i	22.11			
	Gram		24.24			
24	Piet	iP	03.33.42	81°	C	USCGS.H=03.22.23, 6°S, 113½°E,
	Pret	iP	54	84°		Java Sea
	Gram	iP	34.00	85°	R	h = 200 km
		i	36.09		R	
	Kim	iP	34.06	86°	C	
	Wind	eP	42	94°		
		i	36.54			
24	Pret	i	03.43.19			
24	Gram	i	03.51.22			
24	Kim	i	08.25.25		C	
24	Kim	i	11.03.24		R	
24	Wind	iP	12.24.51	63°	R	USCGS.H=12.14.26, 28°N, 54½°E, Southern Iran
	Pret	iP	25.01	60°		
	Gram	iP	10	67°	R	
24	Pret	e	15.41.53			
		i	42.(44)			
25	Wind	ePKP ₁	15.13.38	148°		USCGS.H=14.53.53, 56°N 155°W, Kodiak Is. region
25	Kim	i	15.30.53		C	
25	Kim	iP	16.39.31	67½°		USCGS.H=16.28.32, 38½°N, 25°E, Aegean Sea.
25	Pret	e	17.24.(31)			
		i	(58)			
26	Kim	i	14.18.23			
28	Gram	eP	02.18.20	43°		USCGS.H=02.10.14, 59½°S, 26°W, Sandwich Is.
	Kim	iP	41	46°	R	
	Wind	eP	55	47°		
28	Kim	i	02.46.56		R	
28	Kim	e	04.15.12			
		i	38			
		i	10.27			
28	Gram	(e)i	04.18.05			
29	Gram	iP	02.25.39	42°		USCGS.H=02.15.35; 56½°S 26°W, Sandwich Islands.
	Kim	iP	24.03	44°		
	Wind	iP	12	46°		
	Piet	iP	21	48°		
	Pret	i	35.06			
29	Kim	iP	03.51.16	44°		USCGS.H=03.43.04; 56½°S, 25°W, Sandwich Is.
	Wind	eP	23	46°		
29	Gram	iP	05.53.14	+43°		USCGS.H=05.45.14, Sandwich Is.
	Kim	iP	38	+46°		
29	Gram	iP	19.45.35	-94°	R	USCGS.H=19.32.12, 0°, 122°E, Celebes.
	Kim	iP	43	96°		

/continued.....

April, 1960, (continued)

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<u>DATE</u>	<u>PHASE</u>	<u>STATION</u>	<u>G. M. T.</u> <u>h. m. s.</u>	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS.</u>
30	Pret	(e) iP	04.14.15	93°		USCGS.H=04.01.32, 0° 122°E, Celebes.
30	Pret	eP	22.22.16	96°		USCGS.H=22.10.07; 6°S, 124½°E, Banda Sea, h = 600 km
30	Pret	e	23.51(37)			

A.A. Attridge.

17th June, 1960.

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

MAY 1960

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Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
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Johannesburg.
South Africa.

H.O. Oliver
H.O. Oliver.
Seismological Officer.

MAY, 1960.

DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/R	REMARKS.
			h.	m.	s.			
1	Kim	i	12	51	43		R	
1	Piet	e	15	13	00			
1	Kim	(e)i	18	10	22		R	
1	Kim	i	18	50	30		R	
2	Kim	i	08	41	03		C	
2	Kim	i	08	49	13			
2	Wind	e			24			
2	Kim	i	08	50	38		R	
2	Kim	i P	12	23	29	97°		USCGS. H=12.10.11; 0° 121 ¹⁰ / ₂ ° E, Celebes.
2	Pret	iP			29	95°		
3	Kim	e	18	21	18			
		i			21		C	
3	Kim	i	05	09	26		C	
3	Pret	i	22	41	23			
	Kim	i			37		R	
4	Pret	i	02	22	58			
	Kim	e			23.57			
		i			30.23			
	Wind	e			29.08			
4	Pret	i	03	13	43			
	Kim	e			14.(38)			
		i			49			
		i			15.22			
		i			39			
4	Pret	e	15	32	(27)			
	Kim	i			35.24			
5	Kim	iPKP	11	45	35	139°		USCGS. H=11.26.00. 52 ¹⁰ / ₂ ° N 158 ¹⁰ / ₂ ° E. Near E. coast of Kamchatka.
5	Pret	ePKP			53	138°		
5	Kim	(e)iP	16	05	47	47°		USCGS. H=15.57.27, 60° S 23 ¹⁰ / ₂ ° W, Sandwich Is. region
	Pret	eP			06.09	51°		
6	Kim	iP	06	32	(04)	88°	C	USCGS. H=06.19.20, 21 ¹⁰ / ₂ ° S, 71° W, Near coast of Chile
6	Wind	e	15	38	08			
		i			39.53			
7	Pret	e	02	16	00			
8	Gram	e	04	29	06			
8	Pret	i	11	49	01			
		i			50.43			
	Kim	e			49.58			
		i			50.10			
		i			52.19			
9	Pret	i	13	37	(20)			
9	Kim	iP	16	38	13	66°		USCGS. H=16.27.26, 6 ¹⁰ / ₂ ° N 33 ¹⁰ / ₂ ° W. Atlantic Ocean
10	Kim	iP	11	04	25	46°		USCGS. H=10.56.02, 55 ¹⁰ / ₂ ° S 26° W, Sandwich Is.
13	Wind	iPKP ₁	16	26	59	151°		USCGS. H=16.07.12, 55° N, 161 ¹⁰ / ₂ ° W, W. Alaska Peninsula
13	Piet	iPKP ₁			27.13	157°		
13	Pret	iPKP ₂			13	148°		
13	Kim	iPKP ₂			31	156°		
13	Pret	i	17	57	51			
		i			58.32			
14	Kim	i	22	44	(26)			
15	Pret	iPKP ₁	21	57	01	152°		USCGS. H=21.37.08, 54 ¹⁰ / ₂ ° N 164 ¹⁰ / ₂ ° W. Alaska Peninsula
15	Wind	(e)i	21	57	02		R	
18	Kim	iPKP	06	53	(47)	119°		USCGS. H=06.35.09, 29° N, 130° E. Ryakju Is. h=100 km
18	Pret	e	08	45	57			
18	Kim	iP	08	51	24	64°		USCGS. H=08.40.57. 27° N 52 ¹⁰ / ₂ ° E. Persian Gulf
18	Kim	e	11	42	39			
		i			44.37			
18	Pret	e	12	45	23			
		i			46.35			

/continued.....

May, 1960 (continued)

DATE	STATION	PHASE	G. M. T.		ARC DISTANCE	C/R	REMARKS.
			h.	m. s.			
19	Piet	iP	02.18.34		78°	R	USCGS.H=02.07.00, 36° N 71° E, Hindu Kush, h = 200 km
	Kim	iP	(46)		80°	R	
	Pret	iP	50		76°		
	Gram	iP	19.01		83°	C	
19	Piet	(e)i	10.18.31				
	Pret	e	58				
		i	19.10				
	Kim	i	25			C	
20	Wind	e	20.23		0°		USCGS.H=11.12.31. 26° S, 167½° E, Norfolk I. Mag. 6¾
	Kim	ePKP	11.31.12		115°		
21	Gram	i	09.34.55				
21	Wind	iP	10.14.47		79°		USCGS.H=10.02.50, 37½° S 73½° W. Near coast of Chile. Mag. 7½.
	Gram	iP	48		80°		
	Piet	iP	15.17		85°		
	Pret	iP	(22)		86°		
	Kim	iP	(24)		81°	R	
21	Kim	i	10.35.01				
21	Gram	i	10.46.02				
21	Kim	i	(26)				USCGS.H=10.53.51, 37½° S 72½° W, Chile.
	Wind	eP	11.05.48		79°		
21		i	50				USCGS.H=10.53.51, 37½° S 72½° W, Chile.
	Gram	iP	51		80°	C	
	Kim	iP	06.01		81°		
	Piet	iP	18		84°		
	Pret	iP	52		85°		
21	Gram	e	11.59(27)				
21	Gram	iP	12.33.14		81°	C	USCGS.H=12.21.16, 37½° S 73° W, Chile.
	Kim	iP	43		79°		
21	Wind	iP	13.11.54		79°	R	USCGS.H=12.59.59. 37½° S 72½° W, Chile.
	Gram	iP	55		79°	C	
	Kim	iP	12.04		80°		
	Piet	iP	23		84°		
	Pret	iP	26		85°		
21	Wind	eP	14.11.15		79°		USCGS.H=13.59.17, 37½° S. 72½° W, Chile.
	Gram	iP	16		79°		
	Kim	iP	(26)		81°		
	Piet	iP	43		85°	C	
21	Kim	e	14.38.48				
21	Gram	iP	14.43.59		79°	C	USCGS.H=14.31.55, 37° S 72½° W, Chile.
	Kim	iP	44.07		81°	C	
21	Kim	iP	15.21.32		81°		USCGS.H=15.08.45, 37½° S 73° W, Chile.
21	Kim	(e)i	16.30.54				
21	Kim	e	20.33.06				
21	Kim	i	21.18.26				
21	Kim	i	22.39.02				
21	Kim	i	23.51.30				
22	Kim	e	00.21(26)				
22	Kim	i	01.43.55				USCGS.H=03.46.22, 37½° S, 73° W, Chile.
	Wind	i(P)	03.58.22		79°	R	
	Gram	iP	26		80°		
	Piet	eP	49		84°		
	Pret	iP	54		85°		
	Kim	i(P)	59.04		81°		
22	Kim	i	04.28.(26)				
22	Kim	iP	06.14(33)		81°		USCGS.H=06.01.36, 38° S 73½° W, Chile.
22	Kim	i	07.47.52				
22	Kim	iP	08.22.45		81°	R	USCGS.H=08.10.53, 37½° S 73° W, Chile.
	Piet	eP	23.16		84°		
22	Kim	i	10.28.41				

/continued.....

MAY, 1960 (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
22	Kim	i(P)	10.42(08)	81°	R	USCGS.H= 10.30.39, 38°S,
	Wind	iP	33	79°	C	73½°W, Near coast of Chile
	Gram	iP	34	80°	C	Mag 6½.
	Piet	iP	43.00	84°	R	
	Pret	iP	37	85°		
22	Wind	eP	10.44.05	79°		USCGS.H= 10.32.43, 37½°S
		i	07			73°W
	Gram	iP	37	80°		Near coast of Chile.
	Piet	iP	45.02	85°	C	Mag. 7½.
22	Pret	i	10.55.50			
22	Wind	eP	12.28.38	79°		USCGS.H=12.16.43. 38°S
	Pret	e(P)	29.40	85°		73°W. Chile
		i	41(40)			
22=	Kim	i	13.14.46		R	
	Piet	e	15.14			
22	Piet	i	16.29.02			
22	Gram	eP	19.07.18	80°		USCGS.H=18.55.57; 38°S
		i	24			73½°W.
	Kim	iP	50	81°		Near coast of chile
	Wind	eP	50	79°		Mag. 7¼
		i	53			
	Pret	iP	08.14	86°		
22	Kim	iP	19.21.53	81°		USCGS.H=19.10.47. 38°S
	Gram	eP	22.31	80°		73½°W. Near coast of
		i	33		C	Chile. Mag. 7¾.
	Wind	(e)iP	33	79°		
22	Wind	i	20.10.24		R	
22	Wind	i	20.18.46			
22	Wind	e	21.36.41			
		i	37.15			
22	Wind	e	21.56.41			
22	Kim	i	21.59.45			
22	Gram	i	22.03.36			
	Wind	e	04.00			
22	Gram	e	22.19.13		C	
	Wind	e	17			
	Pret=	i	20.00			
22	Gram	i	22.22.13			
22	Pret	i	22.36.35			
22	Wind	e	22.56.52			
22	Gram	i	23.16.29		C	
	Wind	e	33			
22	Wind	i	23.26.03			
22	Gram	e	23.36.21			
		i	24			
22	Gram		23.39.22			
22	Kim	iPcP	23.41.33	79°		USCGS.H=23.29.18
	Pret	i(P)	42.27	84°		
22	Gram		23.46.29			
22	Gram=	i	23.50.34			
	Kim	i	38			
	Pret	i	51.15			
23	Gram	i	00.07.53			
	Wind	i	58			
	Pret	i	08.27			
23	Wind	i	00.19.45			
23	Wind	e	00.22.56			
23	Gram	i	00.32.40			
23	Kim	iP	00.37.46	82°	R	USCGS.H= 00.25.44
	Pret	iP	38.42	87°		38½°S. 75°W.
						Near coast of Chile
23	Wind	e	00.41.26			
23	Wind	e	00.44.26			
23	Wind	i	00.47.46			
23	Wind	i	00.50.41			

/continued.....

MAY, 1960 (Continued)

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
23	Kim	i	00.53.31		R	
	Pret	i	54.36			
23	Kim	i(P)	01.02.56	80°		USCGS.H=00.51.12, 37½°S.
	Wind	(e)i P	03.07	78°		72°W. Chile
	Gram	iP	07	78°		
23	Pret	i	01.04.00			
23	Gram	i	01.05.47			
	Wind	e	48			
23	Kim	i	01.13.28			
	Gram	e	36			
		i	38			
23	Wind	e	01.37.39			
		i	42			
23	Kim	i(P)	01.46.08	81°	C	USCGS.H=01.34.53, 39½°S
	Gram	iP	45	79°		74°W. Near coast of Chile
23	Wind	i	01.53.36			
	Kim	i	54.33		R	
23	Kim	i	01.55.52			
	Gram	i	58		C	
	Wind	e	56.05			
23	Wind	e	02.18.30			
	Gram	e	30			
23	Gram.	(e)i	02.28.44			
23	Kim	i	02.34.18		R	
23	Wind	i	02.37.46			
23	Kim	i	02.51.43			
23	Wind	i	02.55.53			
23	Kim	iP	02.58.14	79°	R	USCGS.H=02.46.30, 41½°S.
	Gram	iP	16	77°	C	73½°W. S. Chile.
23	Kim	i(P)	03.07.47	81°		USCGS.H=02.56.17, 43°S
	Gram	i(P)	08.06	80°		75½°W. Near coast of
	Wind	e(P)	12	80°		Chile
		i	22			
	Pret	iP	39	86°		
23	Kim	i	03.14.47			
	Wind	e	57			
23	Kim	i	03.30.08		C	
23	Wind	i	03.58.20			
23	Kim	i(P)	05.24.49	81°		USCGS.H=05.13.35, 38°S
	Gram	iP	25.29	80°		73½°W Chile.
23	Kim	i	06.20.07			
	Gram	i	40			
23	Wind	e	06.25.27			
		i	29			
23	Kim	i	06.29(07)			
23	Kim	i	06.35.(37)			
23	Kim	i	06.44.(37)			
		i	50.(37)			
23	Kim	i	07.14.(37)			
23	Kim	i(P)	07.20.37	79°		USCGS.H=07.09.17, 48°S,
	Wind	e(P)	21.05	78°		77°W. Off coast of Chile
	Pret	iP	28			
23	Pret	i	07.26.00			
	Kim	i	(37)			
23	Kim	i	07.43(07)			
23	Kim	i	08.07(37)			
23	Kim	i(P)	08.24(37)	77°		USCGS.H=08.13.15, 40½°S
	Pret	i P	25(33)	81°		75½°W. Near coast of Chile
23	Kim	i	09.37(37)			
23	Kim	i	09.57(37)			
23	Gram	i	09(59.15)			
23	Kim	i(P)	10.03(37)	81°		USCGS.H=09.52.20, 37°S
	Wind	eP	04.11	79°		73°W. Chile.
		i	13		R	
	Pret	iP	49	85°		

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MAY, 1960 (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
23	Gram	i	10.44(43)			
23	Kim	i(P)	10.49(07)	78°		USCGS.H=10.37.59, 43½°S 73½°W. Chile.
	Wind	eP	45	77		
		i	47			
	Pret	iP	50.09	83°		
23	Kim	i	11.09(37)			
23	Kim	i	12.01(37)			
23	Kim	i	12.15(37)			
23	Kim	i	13.24(07)			
23	Gram	i	14.08.16			
23	Kim	i	14.11.37			
	Pret	i	12.44			
	Kim	i	13(07)			
	Wind	i	25			
23	Kim	i	14.19(07)			
23	Wind	i	14.56(46)			
23	Kim	i	15.56(37)			
23	Kim	i	19.07(07)			
23	Kim	i	19.57(07)			
23	Pret	i	22.54.37			
24	Kim	i	06.15.02			
24	Kim	i	08.35.37		C	
24	Kim	i	09.19.24		R	
24	Kim	i	14.18.41		R	
24	Kim	i	15.27.59		C	
24	Kim	i	15.37.23		C	
24	Kim	i	16.13.08		C	
24	Gram	iP	20.44.02	74°		USCGS.H=20.32.43, 50½°S 74°W, Southern Chile
	Wind	eP	14	76°		
		i	19			
	Kim	iP	15	76°		
	Piet	iP	31	82°		
	Pret	iP	45.11	82°		
24	Kim	i	22.09.37			
24	Kim	i	22.49.51			
25	Pret	i	01.02.33			
25	Kim	i	06.45.39			
25	Gram	i	08.06.03			
25	Gram	e(P)	08.46.07	78°		USCGS.H=08.34.53, 45°S 76°W. Off coast of Chile
		i	21	79°		
	Wind	iP	46.34	80°	R	Mag. 6¼
	Kim	iP	(36)	83°		
	Piet	eP	46			
		i	47.01			
	Pret	iP	03			
25	Kim	i	10.01.31		C	
25	Wind	e	12.57.28			
	Kim	i	46		R	
25	Kim	i	13.00.32			
25	Kim	i	15.04.01		C	
25	Kim	i	15.50.59		C	
25	Kim	i	16.58.44			
25	Kim	i	18.04.11			
25	Kim	i	18.32.49			
25	Kim	iPoP	19.34.15	77°	R	USCGS.H=19.21.48. 40°S 75½°W. Chile.
25	Pret	i	22.21.43			
26	Kim	i	00.13.19		R	
26	Kim	i	00.21.21			
26	Kim	i	01.39.24		C	
26	Pret	i	01.42(02)			
26	Wind	iP	05.20.42	65°		USCGS.H=05.10.05, 40°N 20°E, Albania-Greece border
	Pret	iP	21.04	64°		
	Piet	eP	29	72		Mag. 6½.
		i	33			
	Gram	iP	51	76°		

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MAY, 1960 (Continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
26	Kim	i	06.47.12			
26	Kim	i	06.53.38			
26	Kim	i	06.55.25			
26	Kim	i	08.55.53		C	
26	Kim	i	12.07.06		C	
26	Gram	i	15.18.14			
	Pret	i	38			
26	Kim	i	15.19.05			
26	Kim	i	15.21.03			
26	Pret	i	17.15.(35)			
	Kim	i	40		R	
26	Kim	i	19.25.45		C	
26	Kim	i	19.29.35			
26	Kim	i	19.46(30)		C	
26	Kim	i	20.11.00			
26	Piet	e	20.17.30			
26	Kim	iP	20.18(00)	88°	R	USCGS.H=20.05.07, 27°N
	Gram	iP	05	89°		93°E. Eastern India.
26	Kim	i	23.11.(00)		R	
27	Pret	i	00.33.34			
27	Kim	i	00.48.30			
27	Kim	i	01.12.13			
27	Pret	iP	03.29.43	85°		USCGS.H=03.17.21. 41°S
	Kim	i(P)	30(00)	81°	C	76°W. Off coast of Chile
27	Kim	i	03.47.40		C	
27	Gram	i	05.15.52			
27	Kim	i	08.09(30)			
27	Kim	i	09.37(31)			
27	Kim	i	10.39(38)			
27	Kim	i	14.14(37)		C	
27	Kim	i	14.52(18)		R	
27	Pret	i	17.28(38)			
	Kim	i	(63)		C	
27	Kim	i	17.44(46)		C	
27	Kim	i	21.02(46)		C	
27	Gram	iP	23.18.39	79°		USCGS.H=23.06.55, 45°S
	Wind	eP	50	80°		77°W. Off coast of Chile
	Pret	iP	19(14)	85°		
	Kim	i(P)	31	81°		
27	Kim	i	23.27.08			
27	Gram	i	23.32.17			
	Pret	i	33.29			
	Kim	i	(31)			
28	Kim	i	01.39.40		R	
28	Kim	i	02.26.11			
28	Pret	e	03.15(05)			
	Kim	i	(37)			
28	Kim	iPcP	03.18.43	80°		USCGS.H=03.05.53, 39½°S
						74½°W. Chile.
28.	Kim	i	06.17.42		R	
28	Kim	i	10.56.00		R	
	Pret	e	31			
28	Wind	eP	11.17.34	79°		USCGS.H=11.05.40, 38°S
	Gram	iP	35	80°		73°W. Chile.
	Kim	iP	37	81°	R	
	Pret	i(P)	18.15	85°		
28	Kim	i	11.51.27		R	
	Pret	e	52.01			
29	Pret	e	01.40(09)			
29	Kim	i	02.44.36			
29	Kim	i	03.45.24		C	
29	Kim	i	05.39.52		C	

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MAY, 1960 (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
29	Wind	eP	07.51.14	79°		USCGS.H=0.39.29, 38° S
		i	(18)			73° W.
	Gram	iP	25	80°		Chile.
	Kim	iP	30	81°	R	Mag. 6½.
	Pret	(e)iP	56	85°		
29	Wind	iP	08.46.15	79°	(R)	USCGS.H= 08.34.20
	Gram	iP	17	80°	(C)	37½° S. 73° W.
	Kim	iP	26	81°	(R)	Southern Chile
	Pret	e(P)	47.32	85°		
		i	41			
29	Kim	e	09.29.08			
29	Kim	i	10.29.35			
29	Pret	ePcp	14.18(25)	84°		USCGS.H=14.05.25, 37½° S
		i	36			73° W. Near coast of Chile
29	Wind	iP	21.35.52	79°		USCGS.H=21.23.54. Near
	Kim	iP	55	81°		coast of Southern Chile
	Pret	(e)iP	36.51	86°		
29	Kim	i	21.51(57)			
30	Kim	e	01.19(53)			
30	Kim	i	07.12.34		R	
	Pret	i	13.06			
30	Kim	i	16.57.33			
30	Kim	i	17.58.43			
	Pret	i	59.12			
50	Kim	i	21.49.57			
31	Kim	(e)i	00.33.02			
31	Kim	i	01.18.55		R	
31	Gram	iP	02.52.01	79°	R	USCGS.H=02.40.00, 39½° S
	Piet	iP	28	84°	R	75° W. Chile.
	Pret	iPcp	53.01	85°		Mag. 6.
31	Kim	i	04.45.08		C	
31	Gram	i	16.31.47			
	Pret	i	32.40			
31	Kim	i	16.40.23			
31	Kim	i	20.24.07			
31	Piet	iP	21.11.46	82°		USCGS.H=21.00.40
	Pret	iP	54	84°		5½° S, 109½° E. Java Sea
						h = 600 km
31	Kim	i	21.20.45			
31	Kim	e	22.07.41			

A.A. Attridge.

28th July, 1960.

/MAM.

JUN 1960

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

The data herewith give the results from a network of seismographs intended particularly for the study of earthquakes occurring in or near South Africa. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

<u>Stations</u>	<u>Pretoria (Pret)</u>	<u>Grahamstown (Gram)</u>	<u>Pietermaritz- burg (Piet)</u>	<u>Kimberley (Kim)</u>	<u>Windhoek (Wind)</u>
Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vert- ical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. A.E. Long.	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

Notes: "Earth tremors" originating in the mining district of the Witwatersrand are recorded several times daily by the Pretoria station, and less frequently by others. These are not dealt with in this bulletin.

Data are occasionally reported herein by courtesy of the Union Observatory, Johannesburg, which operates a 200 kg. Wiechert Horizontal seismograph. This station is called J, and is at 26°10.9'S., 28°04.5'E., height 1806 metres.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg.
South Africa.

H.O. Oliver
H.O. Oliver,
Seismological Officer.

DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/R	REMARKS
			h.	m.	s.			
1	Piet	iP	05.15.19			84°		USCGS. H=05.02.56. 38°S 73°W. Chile.
1	Gram	i	06.08.36					
1	Kim	i	12.28.34					
1	Kim=	e	12.35.14					
		i	21					
1	Kim	i	13.10.52					
1	Kim	i	14.07.47					
1	Kim	i	14.18.39					
1	Pret	i	14.19.03					
1	Kim	iP	21.24.47			80°		USCGS. H=21.12.50. 42°S 74°W. Near coast of Chile
1	Kim	i	22.43.(35)					
1	Kim	i	23.36.43					
1	Kim	i	23.46.02					
	Pret	i	24					
2	Kim	i	02.50.49					
2	Kim	e	03.32(04)					
2	Kim	i	06.09.50					
2	Pret	(e)i	10.18					
2	Kim	iP	07.33.43			72°		USCGS. H=07.22.30. 33½°N 60°E. Iran.
2	Kim	iPKP	08.06.02			122°		USCGS. H=07.47.11. 5½°S 151½°E. New Britain. Mag 6¼
2	Kim	i	08.21.08					
2	Kim	iP	08.48.08			80°		USCGS. H=08.36.10, 40°S 74°W. Near coast of Chile
2	Kim	i	09.44.14					
2	Kim	i	12.53.24					
2	Wind	i	13.42.32					
	Kim	e	36					
2	Kim	i	17.03.26					
2	Kim	i	17.25.56					
2	Gram	iPP	18.25.19			100°		USCGS. H=18.07.51, 18½°N 61°W. Leeward Is. region
2	Pret	iPP	26.15					
2	Kim	iPKP	19.17.10			128°		USCGS. H=18.59.05, 20½°S 178½°W. Fiji Is. h=550km
2	Gram	iPcP	21.43.26			75°		USCGS. H=21.30.58, 38½°S 74°W. Near coast of Chile
2	Kim	i	22.28.18					
3	Kim	i	10.09(40)					
3	Kim	i	12.33(47)					
3	Kim	i	12.35(56)					
3	Kim	iPP	13.44(49)			131°		USCGS. H=13.23.37, 17½°S 179°W. Fiji Is. Mag. 6 h=600km.
3	Kim	i	17.30(30)					
3	Wind	iP	18.29.18			80°		USCGS. H=18.17.36, 42½°S 75°W. Off coast of S. Chile
	Pret	iP	58			84°		
3	Kim	i	20.08(33)					
3	Kim	iPKP ₂	21.58(31)			146°		USCGS. H=21.38.02, 31½°N 114°W. Gulf of California
3	Kim	i	22.01(33)					
4	Kim	i	01.07(56)					
4	Kim	i	03.01(39)					
4	Kim	i	03.04(08)					
4	Pret	i	03.26.36					
4	Kim	i	03.30(16)					
4	Kim	i	03.56(42)					
4	Kim	i	09.47(44)					
4	Kim	i	10.35(10)					
4	Kim	i	11.44(45)					
4	Gram	e	22.43.11					
5	Kim	i	03.59(41)					
5	Kim	i	05.09.08					
5	Wind	e	20.39.34					
	Kim	i	48					

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/R	REMARKS.
5	Pret	iP	22.37.00	23 km		
	Pret	iS	23	from		
	Kim	i	13	station		
6	Kim	iPKP ₁	01.37.38	156°		USCGS.H=01.17.48; 41°N
	Pret	iPKP ₂	58	155°		125°W. Off coast of California. Mag. 5 ³ / ₄
6	Pret	i	02.38.28			
6	Gram	iP	06.07.20	75°	R	USCGS.H=05.55.44; 45 ¹ / ₂ °S
	Kim	iP	(27)	78°		73 ¹ / ₂ °W. Near coast of Chile
						Mag. 7.
6	Pret	i	06.11.-			
6	Kim	i	22.46(32)			
7	Kim	i	03.46(43)			
7	Kim	iP	05.34.26	74°		USCGS.H=05.22.34; 40 ¹ / ₂ °S
						72°W. Southern Chile.
7	Kim	i	11.03(29)			
7	Kim	iP	13.08(04)	+ 80°		USCGS.H=12.55.51; Off coast of S. Chile.
7	Kim	i	13.33(44)			
7	Wind	e	14.14.05			
		i	11			
	Kim	i	09			
8	Kim	i	09.47(21)			
8	Kim	i	13.39(41)			
8	Kim	i	16.27(26)			
8	Kim	i	21.53(28)			
9	Pret	(e)i	00.05.16			
9	Kim	i	08.55(59)			
9	Kim	i	10.42(51)			
9	Kim	i	16.55(59)			
10	Gram	i	04.12.50			
		i	54			
		i	13.20			
10	Kim	iP	14.41(52)	82°		USCGS.H=14.29.47. 37°S
						75°W. Near coast of Chile
10	Kim	i	20.09.20			
10	Kim	iPKP	21.31.26	136°		USCGS.H=21.12.05, 15 ¹ / ₂ °S,
						174°W. Samoa Is. region
						Mag. 5 ¹ / ₂ .
11	Kim	iP	00.46.35	81°		USCGS.H=00.34.40, 21°S,
	Gram	iP	44	82°	C	64 ¹ / ₂ °W. S. Bolivia; h=300km
11	Kim	i	04.09.40			
11	Kim	iPKP	16.56.35	118°		USCGS.H=16.37.40; 9 ¹ / ₂ °S
						152 ¹ / ₂ °E, D'Entrecasteaux Is
						Mag. 6.
11	Kim	i	18.33.29			
12	Kim	i	08.16(27)		R	
12	Kim	i	16.16(44)		R	
12	Kim	i	21.15(57)			
12	Kim	i	23.01.50		R	
13	Kim	iP	05.59.04	83°	C	USCGS.H=05.47.05; 44 ¹ / ₂ °S
						76 ¹ / ₂ °W. Off west coast of Chile.
13	Kim	i	23.43.51		R	
14	Kim	iP	03.06.11	79°	R	USCGS.H=02.54.13.43°S
						73°W. Near coast of Chile
15	Kim	i	09.52.40			
15	Kim	i	11.30.10			
16	Piet	i	00.34.31			
		i=	35.19			
	Kim	e	35.40			
		i	37.06			
	Gram	e	34			
		i	38.21			
16	Piet	i	03.12.08			
16	Kim	i	04.14.40			
16	Pret	iP	10.28.25	48°		USCGS.H=10.20.04, 2°S
						69°E. Indian Ocean.

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
16	Kim	i	21.47.10			
		i	21			
		i	53			
		i	48.09			
	Gram	(e)i	49.36			
17	Pret	iPKP₁	16.55.26	152°		USCGS.H=16.35.32; 52¹/₂° N
	Kim	iPKP₂	39	156°		173¹/₂° W, Andeanof Is.
	Gram	(e)iPKP₂	56.01	160°	R	Mag. 6³/₄.
17	Kim	i	17.54.17			
18	Pret	(e)i	21.41.14			
19	Gram	i	02.10.03			
19	Kim	i	03.51.37			
19	Kim	i	05.37.13			
19	Pret	i	10.10.21			
19	Pret	(e)i	10.29.47			
19	Kim	i	12.25.35			
19	Pret	(e)i	16.41.51			
19	Pret	(e)i	20.08.25			
19	Kim	i	21.55.07			
20	Kim	iP	02.13.13	80°		USCGS.H=02.01.08; 38° S
	Pret	iP	31	85°		73¹/₂° W, Near coast of Chile
						Mag. 7¹/₃.
20	Pret	i	02.24.04			
20	Wind	iP	13.11.35	74°		USCGS.H=12.59.40; 39¹/₂° S
	Kim	iP	42	80°	R	73° W, Chile. Mag. 7.
	Pret	iP	12.07	84°		
20	Pret	i	13.21.14			
20	Kim	i	13.35.39			
20	Kim	iP	14.35.34	+ 80°		USCGS.H=14.23.30, Near coast of S.Chile.
20	Kim	iP	17.11.42	81°		USCGS.H=16.59.35, 38 ¹ / ₂ ° S 74° W, Off coast of Chile
21	Pret	i	08.24.53			
21	Pret	i	11.06.00			
21	Pret	i	20.19.10			
21	Gram	iP	21.41.03	43°		USCGS.H=21.33.45; 61° S
	Kim	iP	59	45°		21° W, Sandwich Is.
	Wind	iP	42.16	48°		region.
	Pret	iP	30	50°		
22	Wind	eP	06.52.02	+ 78°		USCGS.H=06.40.10
22	Wind	eP	08.23.40	+ 78°		USCGS.H=08.11.50,
		i	46	-		Near coast of Chile.
	Kim	iP	40	+ 80°		
22	Kim	i	09.09.23			
22	Kim	i	09.48.23			
22	Wind	e	14.08.55			
22	Pret	iP	16.20.37	48°		USCGS.H=16.12.00, 12° N
	Kim	iP	21.11	52°		57¹/₂° E, Arabian Sea.
	Wind	eP	19	54°		
22	Wind	iP	20.25.14	74°		USCGS.H=20.13.18, 38 ¹ / ₂ ° S
	Gram	iP	14	79°	C	73 ¹ / ₂ ° W, Near coast of Chile.
	Kim	iP	23	80°		
	Pret	iP	50	84°		
23	Pret	i	23.50.39			
24	Kim	i	18.07.59			
25	Kim	iPKP	15.00.48	121°		USCGS.H=14.41.42; 30¹/₂° S
	Wind	eP	54	128°		177° W, Kermadec Is. Mag 6³/₄
25	Kim	iP	19.47(25)	80°		USCGS.H=19.35.27; 28° S
	Pret	iP	48.21	85°		68° W, Catamarca Province, Argentine. h=100 km.
25	Kim	i	22.49.(25)			
26	Pret	i	01.20.36			
26	Kim	i	06.28(39)			
26	Pret	i	21.20.15			
27	Kim	i	03.24.19			
27	Kim	i	21.32.27			
27	Pret	(e)i	22.05.02			
	Kim		06.22			

/continued.....

June, 1960.

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<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> <u>h. m. s.</u>	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS.</u>
28	Pret	e	04.02.30			
28	Kim	i	14.23.44			
	Pret	i	48			
28	Wind	e	15.38.10			
28	Pret	e	17.19.42			
		i	20.30			
29	Wind	e	01.28.53			
	Pret	e	29.57			
	Piet	29i	30.22			
	Kim	i	30.39			
29	Gram	iP	02.08.59	+ 80°		USCGS.H=01.57.14;
	Wind	iP	09.03	+ 78°		Southern Chile.
	Kim	iP	11	+ 80°	R	
	Piet	eP	26	+ 85°		
	Pret	iP	34	+ 85°		
29	Pret	i	15.54.47			
29	Kim	e	17.25.(34)			
29	Pret	iPKP₂	17.27.19	158°		USCGS.H=17.27.19. 53° N
						168¹/₂° W. Fox Is.
30	Kim	i	20.10.44		C	
30	Pret	iPKP₁	20.18.11	148°		USCGS.H=19.58.33. 60° N
	Piet	iPKP₁	22	152°		151° W.
	Gram	iPKP₁	30	156°		Kenoi Peninsula, Alaska.

A.A. Attridge.

8th September, 1960.

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

The data herewith give the results from a network of seismographs intended particularly for the study of earthquakes occurring in or near South Africa. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

<u>Stations</u>	<u>Pretoria (Pret)</u>	<u>Grahamstown (Gran)</u>	<u>Pietermaritzburg (Piet)</u>	<u>Kimberley (Kim)</u>	<u>Windhoek (Wind)</u>
Lat:	25°45.2'S.	35°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlan	Mr. M.J.R. Hoch	Rev. Br. A.E. Long	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

Notes: "Earth tremors" originating in the mining district of the Witwatersrand are recorded several times daily by the Pretoria station, and less frequently by others. These are not dealt with in this bulletin.

Data are occasionally reported herein by courtesy of the Union Observatory, Johannesburg, which operates a 200 kg. Wiechert Horizontal seismograph. This station is called J, and is at 26°10.9'S., 28°04.5'E., height 1806 metres.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg.
South Africa.

H.O. Oliver

H.O. Oliver.
Seismological Officer.

JULY, 1960.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
2	Kim	(e)i	01.49.26			
2	Pret	iPKP₁	04.49.17	150°		USCGS.H=04.29.30; 51 1/2° N
2	Kim	iP	09.09(14)	75°	R	USCGS.H=08.58.05; 45 1/2° S
2	Wind	iP	51	75°	C	73 1/2° W. Southern Chile
2	Kim	iP	12.03(39)	45°		USCGS.H=11.55.41; 56° S
2	Gram	iP	45	42°		27° W. Sandwich Is.
2	Wind	iP	04.13	46°	R	
2	Pret	i	05.38			
2	Kim	i	12.08.54		R	
2	Kim	iPKP ₁	22.13(04)	154°	R	USCGS.H=21.53.22; 51 1/2° N
	Pret	(e)iPKP ₁	09	150°		175 1/2° W. Andreanof Is.
	Wind	iPKP ₁	11	150°	R	
3	Kim	iPKP₁	03.39(19)	154°		USCGS.H=03.19.19, 52° N
3	Pret	iPKP₂	44	150°		174 W. Andreanof Is.
3	Pret	(e)iPKP ₁	05.36.03	151°		USCGS.H=05.16.08, 52° N
	Kim	iPKP ₂	(21)	154°		173 W. Andreanof Is.
3	Wind	(e)iPKP ₁	07.36.09	154°	R	USCGS.H=07.16.14; 52° N
						173 1/2° W. Andreanof Is.
3	Kim	iPKP₁	20.40(08)	153°		USCGS.H=20.22.46; 50 1/2° N
3	Gram	iPKP₁	13	157°		177 W. Andreanof Is.
		i	40			Mag 6 1/2.
	Wind	ePKP₁	34	150°		
		i	40			
3	Viet	iPKP₁	41	153°		
3	Wind	ePKP₁	23.12.18	151°		USCGS.H=22.52.24; 50 1/2° N
	Kim	iPKP ₁	22	155°		177° W. Andreanof Is.
	Gram	iPKP ₂	48	158°		
4	Pret	i	03.48.57			
4	Kim	i	03.54(08)			
4	Kim	iPKP₁	04.48(25)	152°		USCGS.H=04.28.33; 52° N,
						131 1/2° W. QueenCharlotte Is.
						Mag. 6 1/2.
4	Kim	iPKP₂	13.30(05)	151°		USCGS.H=13.10.05; 52° N
						131° W. QueenCharlotte Is.
						Mag 6.
4	Gram	i	21.41.03			
	Wind	i	08			
	Kim	i	(25)			
4	Pret	i	22.12.14			
5	Pret	iPKP₁	05.27.42	149°		USCGS.H=05.07.59; 51 1/2° N
						178 1/2° W. Andreanof Is.
5	Kim	iP	05.57(34)	79°		USCGS.H=05.45.26; 39° S
						73 1/2° W. Near coast of Chile.
5	Wind	iP	08.18.25	77°	C	USCGS.H=08.06.30. 38 1/2° S
	Kim	iP	(29)	79°		73 1/2° W. Near coast of Chile
6	Pret	iP	05.28.14	73°		USCGS.H=05.16.44; 36 1/2° N
	Kim	iP	(26)	77°	C	70 1/2° E. Hindu Kush region
	Gram	iP	39	79°	C	h = 200 km
6	Pret	i	05.37.24			
6	Gram	i	07.09.56			
	Kim	i	10(47)			
	Pret	i	57			
7	Wind	e	15.59.09			
		i	14			
	Gram	i	10			
	Kim	i	(11)			
7	Kim	i	17.49(28)			
	Gram	i	41			
	Wind	i	41			
	Pret	i	50.13			
8	Kim	iPKP	13.10(05)	117°	C	USCGS.H=12.51.21; 31° N,
						130 1/2° E, Near South Coast
						of Kyashu, Japan.

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JULY, 1960 (continued)

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DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/ R	REMARKS.
			h.	m.	s.			
8	Pret	i	18.40.04				Probably Central Africa.	
		i	46.57					
	Piet	e	40.36					
		i	48.33					
	Kim	i	41.19					
	Wind	e	46.11					
		i	49(03)					
	Gram	e	48(47)					
		i	51.24					
8	Kim	i	19.33(21)					
9	Kim	e	00.35.(16)					
		i	(31)					
9	Kim	i	06.17(26)					
9	Kim	e	17.55.58					
10	Pret	i	00.15.57					
10	Piet	eP	00.16.49	71°		USCGS.H=00.05.18, 0° 98°E. Off west coast of Sumatra		
	Gram	eP	17.06	75°				
	Kim	iP	12					
	Kim	i	25	76°				
10	Kim	i	14.59.46					
10	Kim	i	20.28.12					
11	Kim	i	10.40.32					
11	Pret	iPKP₁	12.14.09	150°		USCGS.H=11.54.16; 51½°N 173°W. Andreanof Is.		
	Wind	iPKP₂	17	151°				
	Kim	ePKP₂	59	155°				
	i	15.08						
11	Pret	e	22.52.38					
		i	43					
13	Gram	iP	08.01.57	26°		USCGS.H=07.55.54; 53½°S 1½°E. Bouvet Is. region Mag. 6.		
	Kim	iP	02.15	30°				
	Wind	iP	46	33°				
	Pret	iP	49	34°				
13	Wind	iP	13.11.32	64°		USCGS.H=13.01.00, 41°N 23½°E. Greece.		
	Kim	iP	12.10	70°	R			
	Kim	i	13.41.25		C			
13	Kim	i	13.41.25					
14	Kim	i	18.45.00	58°				
14	Pret	(e)iP	22.22.29	74°		USCGS.H=22.11.06; 36°N 70°E. Hindu Kush. h = 100 km.		
	Gram	eP	25.09	80°				
	i	33						
15	Wind	iPn	01.09.54	1050 km				
		iSn	11.10					
		iSl	12.10					
	Pret	iPn	10.24	1400 km				
		i	12.39					
		i	14.15					
	Kim	iPn	10.43	1600 km				
	Piet	ePn	11.30	1900 km				
		i	15.52					
15	Kim	i	02.56.53					
15	Pret	e	03.14.23					
	Wind	e	15.08					
		i	16.12					
	Kim	e	17.51					
		i	18.15					
15	Pret	iP	05.06.49	22°		USCGS.H=05.02.05; 12°S 45½°E. Off N.W. coast of Madagascar.		
	Piet	iP	07.04	23°				
	Kim	iP	50	26°	C			
	Wind	eP	08.12	30°				
16	Piet	e	01.52.08					
16	Kim	iP	04.50.46	81°		USCGS.H=04.44.34; 21½°S, 67°W. Southern Bolivia. h = 150 km.		
					R			
** 14	Kim	i	10.43.13					

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JULY, 1960 (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
17	Pret	i	01.53.10			
17	Kim	i	04.37.24			
18	Pret	i	01.55(59)			
18	Kim	(e)iPP	02.05.43	119°		USCGS.H=01.43.29; 4½°S 151°E. New Britain region h= 200 km.
18	Kim	i	02.27.13			
18	Kim	i	03.02.03			
18	Kim	e	03.55.43			
		i	56.01			
18	Wind	eP	18.57.47	36°		USCGS.H=18.50.32, 7°S 51½°E. Amirante Is.
18	Kim	i	19.56.47		R	
18	Pret	(e)i	20.28.57			
19	Pret	i	03.26.01			
19	Pret	i	09.06.(49)			
20	Kim	iPKP	09.50(11)	140°	R	USCGS.H=09.30.38; 49°N 157½°E, Kurile Is. region
20	Kim	iP	21.49(33)	+ 78°	R	USCGS.H=21.38.20; Southern Chile.
21	Wind	e	02.04.15			
22	Pret	i	01.57.49			
		i	59.14			
	Kim	i	58.45			
22	Pret	iPn	19.33.05	880 km		H=19.31.10; 24°S
	Piet	iPn	07	880 km		37°E. Off the coast of Mocambique.
		i	34.25			
	Kim	iPn	34(24)	1500 km		
		i	36.06			
	Gram	(e)iP	36.08			
23	Pret	e	08.05.22			
		i	56			
	Wind=	e	33			
23	Kim	e	17.21.40			
23	Pret	e	11.33(28)			
		i	55			
24	Kim	i	10.42.59			
24	Wind	e	10.49.21			
	Kim	i	22			
	Pret	(e)i	35			
25	Pret	e	04.04.39			
		i	49			
25	Pret	e	11.30(45)			Probably Central Africa.
		i	31(00)			
		i	(15)			
		i	42			
		i	34.28			
	Piet	e	31.03			
		i	14			
		i	34.34			
	Kim	e	31.05			
		i	16			
	Wind	i	31.10			
		i	34.42			
	Gram	e	31.14			
		i	18			
26	Kim	iP	12.47.39	70°	R	USCGS.H=12.36.20, 40½°N 37°E. Turkey.
27	Wind	iP	10.16.47	76°		USCGS.H=10.04.53; 44.7°S
	Kim	iP	51	77°	C	75.1°W. Near coast of Southern Chile.
	Piet	iP	17.08	81°		Mag. 6 h= 25 km.
	Pret	iP	15	81°		
		i	24			

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JULY, 1960 (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
26	Kim	iP	12.27.39	70°	R	USCGS.H=12.36.27; 40 $\frac{1}{2}$ °N 37°E. Turkey.
27	Wind	iP	10.16.27	76°	C	USCGS.H=10.04.53; 44.7°S 75.1 W., Near coast of Southern Chile. Mag. 6. h=75 km.
	Kim	iP	51	77°		
	Piet	iP	17.08	81°		
	Pret	iP	15	81°		
		///	24	/		
28	Kim	i	01.37.53		C	
28	Pret	e	03.29(31)			
		i	30.14			
28	Kim	i	20.22.12			
29	Pret	iP	14.44.27	67°		USCGS.H=14.33.46; 31.7°N 67°E. Eastern Afghanistan h = 64 km.
29	Kim	iPKP	17.50.06	123°		USCGS.H=17.31.40; 40.1°N 142.3°E. Honshu, Japan. Mag. 7
	Pret	iPKP	34	125°		
	Gram	iPKP	47	130°		
	Wind	eDKP	50	131°		
30	Wind	e	03.09.44			
30	Pret	iP	05.46.37			about 210 km from station
		iS	58			
31	Pret	ePKP	03.14.02	115°		USCGS.H=02.55.46; 5.6°S 150°E. New Britain. h = 25 km. Mag. 6.
31	Pret	e	14.07.17			
		i	21			
31	Gram	eP	15.06.40	+ 78°		USCGS.H=14.55.03; Near coast of central Chile. h = 97 km.
		i	46	-		
	Wind	iP	48	+ 77°	R	
	Kim	iP	51	+ 80°		
31	Gram	e	18.49.52			
		i	51(23)			
	Wind	e	52(34)			
		i	53.28			
31	Pret	(e)i	21.56.57			
31.	Kim	iP	22.57.32	64°	C	USCGS.H=22.27.01 27.9°N, 54.6°E. Southern Iran. h= 127 km.
	Gram	iP	44	67		

A.A. Attridge.

29th September, 1960.

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

-- AUG 1960

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<u>Stations</u>	<u>Pretoria (Pret)</u>	<u>Grahamstown (Gran)</u>	<u>Pietermaritzburg (Piet)</u>	<u>Kimberley (Kim)</u>	<u>Windhoek (Wind)</u>
Lat:	25°45.2'S.	35°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. N.E. Long	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

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Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg,
South Africa.

H.O. Oliver

H.O. Oliver.
Seismological Officer.

AUGUST, 1960.

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DATE	STATION	PHASE	G. M.T. h. m.s.	ARC DISTANCE	C/ R	REMARKS
1	Pret	(e)i	01.30.47			
1	Kim	i	18.37.34			
1	Kim	i	20.24.50		R	
2	Pret	(e)i	01.07.(04)			
2	Kim	iPKP	05.26.39	121°	R	USCGS. H=05.07.22. 22.2°S. 171.5° E. Loyalty Is. Mag 6½ h=103 km
2	Wind	iPKP ₂	06.34.35	150°	C	USCGS. H= 06.14.47 51.5°N, 178.3°W Andreanof Is
	Kim	iPKP ₂	41	150°	R	h= 34 km
2	Kim	iPKP	09.49.12	120°		USCGS. H=09.30.27. H=28.2° S, 176.6°W. Kermadec Is. h= 61 km.
3	Kim	i	01.25.26			
3	Kim	i	11.00.54			
3	Wind	(e)i	19.20.02			
3	Kim	i	20.20.09		C	
3	Kim	i	22.00.47			
4	Kim	iPKP ₁	07.54(30)	147°		USCGS. H=07.34.54 51.4°N. 179.1°E. Rat Is. Mag 6
	Pret.	iPKP ₂	31	147°		
4	Wind	iPKP ₂	36	146°	R	h= 83 km.
4	Kim	iPn	07.16.30			
		iSn	17.30			
4	Wind	ePKP ₂	09.28.16	146°		USCGS. H= 09.08.36. 51°N, 179.4°E Rat Is. h=100km
	Kim	i	20			
	Kim	iPKP ₂	20	147°	R	
	Pret	(e)iPKP ₂	21	147°		
4	Wind	i	11.27.46			
	Kim	i	(54)		C	
4	Pret	iPKP ₂	14.25.08	147°		USCGS. H=14.05.28. 51.3°N. 178.8°E. Rat Is. h=59km
	Wind	iPKP ₂	12	146°		
	Kim	iPKP ₂	(38)	147°	R	
4	Wind	i	11.27.46			
	Kim	i	(54)		C	
4	Pret	iPKP₂	14.25.08	147°		USCGS. H=14.05.28, 51.3°N. 178.8°E Rat Is. h=59km
	Wind	iPKP₂	12	146°		
	Kim	iPKP₂	(38)	147°	R	
4	Pret	(e)i	18.31.54			
5	Pret	e	19.53.47			
		i	54.42			
5	Piet	iPKP ₂	22.47.22	150°	C	USCGS. H=22.27.34. 51°N
	Kim	iPKP ₂	27	147°	C	179°E. Rat Is. h=15km.
6	Piet	e	00.27.11			
6	Kim	iP	15.01.45	77°	R	USCGS. H=14.49.45. 42.4°S, 74.8°W. Near coast of Chile h=35km
			02.11			
6	Kim	i	17.45.45		C	
6	Pret	i	17.47.13			
7	Pret	iPn	00.18.20			
		iSn	39			
		iP ₁	19.45			
		iS ₁	20.06			
	Kim	e	45			
		i	20.00			
7	Kim	i	16.29.42		R	
7	Kim	i	23.08.16			
8	Pret	i	04.19.47			
8	Kim	iP	12.36.24	45°	C	USCGS. H=12.28.10. 12°N., 44.4°E. Gulf of Aden. h=24km
8	Kim	iP	15.42(35)	43°		USCGS. H=15.34.27. 1.9°S, 11°W. South Atlantic Ocean. h=60km.
9	Kim	i	04.19.01		C	
9	Kim	i	07.59.21			
9	Kim	iPKP	17.05.19	123°		USCGS H=16.46.38. 24.5°S 177°W Tonga Is. region. Mag 6

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS
9	Kim	i	18.39.56		R	
	Pret	e	40.45			
9	Kim	iPKP	23.55.47	136°	R	USCGS. H=21.36.52. 11.5°S, 166.3°E. Santa Cruz Is. h= 80 km.
10	Kim	i	11.40(30)		R	
11	Pret	eP	03.06.36	90°		USCGS. H=02.53.16. 0°
11	Kim	i	03.58(40)		C	121.6°E. Celebes Is. h= 46 km.
11	Kim	i	10.07.28			
11	Kim	(e)i	19.38.18			
12	Kim	i	04.22.18			
12	Pret	e	19.42.44			
13	Piet	i	04.24.29		C	
13	Kim	iPKP	07.30(28)	129°	R	USCGS. H= 07.11.06 40.6°N, 142°E Near east coast of Honshu
13	Wind	iP	14.26.51	77°		USCGS H=14.14.58. 39.7°S, 74.8°W. Near coast of
	Piet	eP	27.14	82°		Southern Chile. H= 61 km.
		i	17			
	Kim	iP	(24)	79°	C	
	Gram	iPcP	48	77°		
	Pret	iPcP	50	83°		
14	Gram	iP	22.57.52	79°		USCGS. H= 22.46.08. 23.5° S, 66.4° W. Jujuy Province, Argentine.
	Kim	iP	54	79°	R	
	Pret	iP	58.14	83°		h= 245 km
	Piet	iP	17	84°	C	
15	Pret	iP	07.06.18	38°		USCGS. H=06.58.56. 13.4° S, 65.8°E. Indian Ocean
	Kim	iP	43	42°		h= 15 km
15	Kim	iP	14.41(31)	43°		USCGS. H=14.33.38. 13.5°S 67°E. Indian Ocean h=25 km
16	Pret	e	08.01(10)			
		i	02(25)			
17	Pret	iPP	09.41.51	33°		USCGS. H=09.33.49. 20°S 11.4°W. South Atlantic h=87 km.
17	Kim	iP	11.31(03)	45°		USCGS. H=11.24.07. 19.8°S 12.2°W. South Atlantic
	Pret	eP	52	47°		h=25 km.
17	Kim	i	13.23(23)			
18	Kim	iPKP	23.02.44	126°		USCGS. H=22.43.46. 11.4° S, 166.2°E. Santa Cruz Is. h=62 km.
20	Kim	i	00.38.14			
20	Kim	iP	20.11.12	22° Probably		USCGS. H=20.08.39 35.6°S 15.4°W Tristan da Cunha region h=37 km
20	Gram	i	20.15.56			
	Pret	i	16.30			
20	Kim	i	21.22.26			
20	Gram	i	21.26.41		R	
20	Kim	iPn	22.00.18			
		iSn	27			
		iP ₁	01.01			
		iS ₁	01.17			
20	Piet	iPn	22.04.43			
		i	05.34			
20	Gram	i	22.05.13			
		i	07.09			
23	Pret	eP	09.08.18	57½°		USCGS. H=08.58.12. 29°N 59.9°E. S.E. Iran
	Kim	iPcP	(55)	62°		h=116 km
23	Kim	i	12.52.21			
		i	45			
23	Pret	iP	12.57.35			310 Km. from station South Africa
		is	58.06			

DATE	STATION	PHASE	G. M. T.		320 ARC DISTANCE	C/ R	REMARKS
			h.	m. s.			
23	Kim	iP	14.18.00		52°	R	USCGS. H=14.08.15. 0.9°N. 26°W. Atlantic Ocean h=25km.
24	Kim	i	02.03.40				
24	Kim	iPKP	06.08.05		130°		USCGS. H=05.49.01. 19°S, 174°W. Tonga Is. H=42 km.
24	Kim	iP	19.40.22		86°	C	USCGS. H=19.27.53. 24.4°N, 95°E. Burma-India border h=145 km.
24	Kim	i	21.07.02				
25	Kim	i	06.21.07				
25	Wind	iPKP ₁	18.01.47		152°	R	USCGS H=17.41.59. 52.7°N, 169.6°W. Fox Is. h=38km.
	Kim	iPKP ₁	48		155°		
25	Pret		48				
25	Kim	iP	23.14.23		79°		USCGS. H=23.02.27. 37.8°S, 73.5°W Near coast of Chile h=109 km.
26	Kim	iP	00.26.10		79°	R	USCGS. H=00.14.05. 37.8°S 73.2°W Near coast of Chile h=25km.
26	Kim	i	02.07.43				
26	Pret	e	04.05.06				
		i	56				
26	Wind	e	15.03.17				
		i	04.24				
26	Kim	iPKP	18.46.14		123°	C	USCGS. H=18.27.18 13.5°S 163°E. New Hebrides Is. h=56 km
26	Pret	e	20.35.26				
		i	36.10				
26	Kim	e	11.14.11				
		i	20				
27	Wind	ePKP	18.35.07		138°		USCGS. H=18.16.16 49.9°N, 154°W. Kurile Is. h=220km.
		i	15				
	Kim	ePKP	04		138°		
		i	15				
	Piet	iPKP	21		134°		
	Pret	(e)iPKP	41		133°		
27	Wind	e	18.49.07				
27	Kim	i	20.44.22			R	
	Gram	(e)i	45.18				
	Piet	i	24				
		i	26				
		i	46.20				
28	Wind	i	09.40.48				
28	Kim	e	19.23(20)				
29	Kim	e	05.38(00)				
		i	39(17)				
	Wind	e	(24)				
		i	40.11				
	Piet	e	39.56				
			40.28				
31	Kim	i	06.45(51)				
31	Kim	i	11.05(11)				
31	Kim	i	12.40(08)				
31	Kim	i	23.23(33)				

A.A. ATTRIDGE.

22 SEP 1960

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

The data herewith give the results from a network of seismographs intended particularly for the study of earthquakes occurring in or near South Africa. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

<u>Stations</u>	<u>Pretoria (Pret)</u>	<u>Grahamstown (Gram)</u>	<u>Pietermaritzburg (Piet)</u>	<u>Kimberley (Kim)</u>	<u>Windhoek (Wind)</u>
Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlan	Mr. M.J.R. Hoch	Rev. Br. A.E. Long.	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

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Data are occasionally reported herein by courtesy of the Union Observatory, Johannesburg, which operates a 200 kg. Wiechert Horizontal seismograph. This station is called J, and is at 26°10.9'S., 28°04.5'E., height 1806 metres.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg.
South Africa.

H.O. Oliver

H.O. Oliver.
Seismological Officer.

SEPTEMBER, 1960.

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC (°) DISTANCE	C/ R	REMARKS.
1	Pret	i	10.30.29			
1	Pret	iP	12.05.11			S.A. Quake. 90 km from station.
		iS	20			
1	Pret	iPKP ₁	15.57.10	151		USCGS.H=15.37.14.4, 56.1 N 153.7 W. Kodiak Is, Alaska h = 24 km. Mag. 6 $\frac{1}{4}$.
2	Pret	iP	04.23.40			S.A. Quake. 95 Km from station.
		iS	49.5			
2	Wind	e	11.16.20			
2	Piet	eP	13.58.53	86 $\frac{1}{2}$		USCGS.H=13.46.10; 28.7 N 98.3E, h=48 km. Tibet.
	Pret	(e)iP	58	87		
	Wind	iP	59.24	95		
2	Wind	eP	18.44.04	75		USCGS.H=18.32.19; 31.9 S 68.9 W. San Juan Province Argentine. h= 25 km.
2	Wind	iPKP ₁	22.22.34	153		USCGS.H= 22.02.49; 50 N 171.4 W. Fox Is.
	Piet	iPKP ₁	44	155		
	Pret	iPKP ₂	23.07	153		h = 49 km. Mag.= 6.
	Gram	(e)iPKP ₂	13	160		
3	Wind	ePKP	12.59.56	130		USCGS.H=12.41.35; 6.1 S 154.5 E. Solomon Is. h=457 M = 6 $\frac{3}{4}$.
		i	13.02.40			
3	Pret	e	13.09.50			
	Gram	i	50			
3	Pret	iPKP	13.41.48	125		USCGS.H=13.22.54; 40.9 N 142.5 E. Near north coast of Honshu, Japan.h=112 Km
4	Pret	i	04.06.50			
5	Wind	e	14.09.24			
		i	10.04			
5	Wind	e	18.29.29			
		i	21.50			
5	Kim	i	15.00.50			
6	Wind	i	07.46.34			
6	Pret	(e)i	09.59.(06)			
6	Wind	e	10.49.59			
6	Wind	e	11.02.27			
6	Wind	i	11.58.19			
6	Wind	i	12.35.51			
6	Kim	iPKP	14.22.10	120		USCGS.H= 14.03.02; 20.4 S 169.4 E. Loyalty Is. h=35 km; Mag. 6 $\frac{1}{2}$.
7	Wind	iP	01.24.04	32		USCGS.H=01.17.39.1; 37.2S 16.1 W. Tristan da Cunha. h = 25 km.
	Kim	iP	57	35		
	Piet	iP	25.11	39 $\frac{1}{2}$		
	Pret	iP	31	39		
8	Pret	e	03.52(13)			
		i	22			
8	Kim	i	06.43.46			
8	Wind	e	13.51.17			
9	Wind	i	17.59.08		C	
	Kim	i	(25)			
9	Wind	e	23.59.35			
		i	43			
10	Wind	eP	00.29.31	58		USCGS.H=00.19.08.4; 34.4N 26.4 E; Crete. h = 10 km.
10	Pret	iP	10.57.18	95		USCGS.H=10.44.51.2; 4 N, 122.6 E. Celebes Sea h= 629 km.
10	Kim	iP	15.56.08	74		USCGS.H=15.45.23; 6.6N, 93.8 E. Nicobar Is. h=29km
11	Pret	i	09.49.05			
12	Wind	i	00.54.47			

/continued

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
12	Kim	i(P)	12(33)(30)	115		USCGS.H=12.17.08, 27.3N, 128.4E, Ryuku Is. h=48 km Mag.=6 $\frac{1}{2}$.
12	Gram	iP	16.13.48	87		USCGS.H=16.02.06; 7.0 S, 117 E. Java Sea. h=61 km
	Piet	iP	59	83		
	Kim	iP	14.(-)	89		
13	Kim	i	00.55(-)			
	Piet	e	16			
13	Wind	e	09.17.56			
14	Wind	i	14.27.22			
14	Pret	(e)i	19.29.38			
15	Wind	e	18.16.17			
15	Kim	iPF	18.17.59	125		USCGS.H=17.57.43; 21.4N 142.9 E. Volcano Is. region. h=361 km.
16	Pret	iPcP	01.51.13	75		USCGS.H=01.39.03.3; 38.5N 68.7E. Tadzhik USSR. h=88 km.
17	Pret	e	07.40.50			
		i	41.00			
		i	44.02			
	Kim	i	41.15			
	Wind	i	47			
17	Wind	e	11.33.50			
17	Kim	iPKP	20.15.16	128		USCGS.H=19.56.11, 20.9 S 174.5 W. Tonga Is. h=28 km Mag. 6
18	Pret	i	09.53.54			
18	Kim	i	09.56.33		R	
18	Kim	i	12.00.38			
19	Wind	eP	19.14.55	96		USCGS.H=19.01.25.1; 6.9N 77.5 W. Colombia-Panama border. h=66 km. Mag=6.
	Pret	eP	18.(35)	101		
20	Wind	(e)i	13.30.09			
20	Pret	e	16.12.23			
		i	57			
20	Pret	e	16.56.24			
21	Kim	iPKP ₂	10.58.43	156		USCGS.H=10.38.31. 53.4N 166.1 W. Fox Is. h=38 km
21	Kim	iP	23.15.45	65	C	USCGS.H=23.05.09, 31.9 N 50.4 E. Iran. h=84 km.
22	Wind	iP	05.43.09	23	C	USCGS.H=05.38.14.4; 3.4 S 29.1 E. Congo. h=29 km
	Kim	iP	38	26	C	
	Pret	iP	41	22 $\frac{1}{2}$		
	Piet	iP	41	26 $\frac{1}{2}$		
22	Wind	e	08.49(04)			
		i	57(02)			
	Pret	i	55.09			
	Kim	e	56.32			
		i	57.25			
22	Pret	iP	09.17.29	23		USCGS.H=09.05.36.8; 3.3S, 29 E. Congo. Mag. 6 $\frac{1}{4}$ to 6 $\frac{1}{2}$. h = 28 km.
	Wind	iP	32	23 $\frac{1}{2}$		
	Kim	iP	11.00	26 $\frac{1}{2}$		
	Piet	iP	09	27		
	Gram	iP	42	30		
22	Wind	e	10.34.54			
22	Wind	e	11.09(30)			
		i	16.06			
	Pret	i	11.12.38			
22	Pret	i	13.23.38			
22	Wind	e	13.29.05			
		i	31.13			
22	Pret	i	15.18.26			
22	Wind	e	15.23.55			
		i	28.31			
	Piet	e	24.38			
		i	27.21			

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SEPTEMBER, 1960 (continued)

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DATE	STATION	PHASE	G. M. T.			ARC (°) DISTANCE	C/ R	REMARKS.
			h.	m.	s.			
22	Kim	e	22.25.26					
		i	29.22					
	Pret	e	26.38					
		i	28.08					
	Wind	e	28.33					
		i	31.44					
22	Wind	iPKP	23.06.54			152		USCGS.H=22.47.01, 51.5 N, 168.8 W. Fox Is. h=23km.
23	Wind	e	09.09.09					
23	Pret	i	09.48.29					
23	Wind	e	10.08(04)					
	Pret	(e)i	49					
23	Pret	(e)i	10.15.29					
23	Wind	e	23.15.19					
		i	18.04					
	Pret	e	15.38					
		i	16(31)					
	Kim	i	18.23					
23	Kim	iP	23.28.49			77	C	USCGS.H=23.17.11.5; 30.5 S 67.2 W. LaRioja Province, Argentine.
24	Wind	e	06.25.51					
24	Wind	e	16.35.37					
24	Pret	e	21.43.08					
24	Pret	i	22.16.35					
24	Wind	e	22.18.33					
25	Pret	(e)i	07.27.51					
25	Kim	iP	08.46.46			63	C	USCGS.H=08.36.37.6, 28.2N 53.2 E. Southern Iran h = 53 km.
25	Wind	e	14.25.41					
26	Wind	eP	00.44.00			76		USCGS.H=00.32.05; 24.7 S 68.2 W. Catamarca Province Argentine. h= 25 km.
26	Kim	i	08.44.19				R	
26	Pret	i	14.00.34					
26	Wind	iPKP ₁	15.23.17			153	(R)	USCGS.H=15.13.26.51.6N, 172.2 W; Fox Is. h=44 km
	Kim	iPKP ₁	27			156		
	Pret	i	34.18					
26	Wind	iP	17.10.34			84	C	USCGS.H= 16.58.14. 15.9 S 72.9 W. S. Peru. h=115 km
	Kim	iP	59			89		
27	Wind	iP	02.25.35			74	C	USCGS.H=02.13.50.6; 44.6 S
	Kim	iP	41			75	R	73.6 W. Coast of S. Chile h = 59 km.
28	Kim	i	02.29.15					
28	Kim	e	09.11.36					
		i	38					
29	Kim	iP	06.40.28			85	R	USCGS.H=06.27.56.3; 17.3S
	Pret	i(P)	41.17			(89)		68.5W. Peru-Bolivian border h = 115 km.
29	Gram	i	11.36(04)					
	Wind	e	37.03					
		i	13					
		i	40.04					
	Kim	(e)i	37.07					
	Pret	i	38.03					
29	Kim	i	21.53.26					
29	Kim	(e)iP	22.24.23			80		USCGS.H=22.12.19. 32.5S, 70.2 W. Central Chile.
30	Wind	iP	07.48.52			76		USCGS.H=07.37.05.5; 41.4 S
	Kim	iP	59			77		73.5 W. Southern Chile.
	Pret	iP	49.21			81		h= 53 km
30	Kim	i	14.56.52					

A.A. ATTRIDGE.

25th November, 1960.

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

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Lat:	25°45.2'S.	35°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P.vert- ical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. A.E. Long.	Mr. J.A. Meyer.
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University of the Witwatersrand,
Johannesburg.
South Africa.

H.O. Oliver

H.O. Oliver.
Seismological Officer.

OCTOBER, 1960.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	Kim	i	03.13.24			
1	Wind	e	08.33.06			
		i	35.38			
	Pret	i	34.01			
1	Wind	ePKP ₁	16.30.45	152		USCGS.H=16.10.57; 52.2N 172.6 W
		i	48			
	Kim	iPKP ₁	46	156		Fox Is. h=41 km. Mag. 6½.
	Piet	iPKP ₂	51	153	C	
	Pret	iPKP ₁	31.16	154		
2	Pret	i	02.04.41			
2	Wind	e	02.08.48			
		i	11(30)			
2	Kim	(e)i	02.13(17)			
2	Kim	iP	04.46.06	46		USCGS.H=04.37.50; 61 S
	Wind	iP	21	48		23.3 W. h= 77 km.
	Pret	(e)iP	47.15	50		Sandwich Is.
2	Wind	e	12.06(42)			
2	Kim	i	12.08(38)			
2	Pret	iPcP	18.20.27	76		USCGS.H=18.08.12; 18.6N
2	Wind	eP	49	87		94.9 E h=104 km Burma.
		i	21.05			
2	Wind	e	21.15.28			
3	Kim	i	01.02.25			
3	Wind	iP	05.22.35	79		USCGS.H=05.10.37; 38.7 S 75.3 W; h=43 km. Near coast of S. Chile.
3	Kim	i	05.29.38			
4	Kim	i	06.55.11			
4	Kim	i	09.15.51			
	Wind	i	16.10			
4	Pret	i	18.01.56			
4	Pret	i	21.10.27			
5	Pret	e	01.44.21			
		i	45.15			
6	Wind	iP	16.28.36	79	R	USCGS.H=16.16.38; 38.3 S
	Kim	iP	45	81		74.9 W. h= 53 km Near
	Pret	iP	29.06	85		coast of S. Chile.
6	Pret	i	20.27.13			
	Wind	e	20			
	Kim	i	28			
6	Wind	e	22.23.12			
	Pret	e	24			
		i	26.26			
	Kim	e	28.45			
		i	29.05			
7	Pret	iP	00.57.05			South African earthquake
		iS	27=			220 km from station.
7	Wind	e	09.06.41			
		i	09.39			
	Pret	e	06.53			
		i	08.38			
7	Kim	iP	15.32.18	104		USCGS.H=15.18.31; 7.4 S,
	Pret	iP	32	101		130.7 E; h=45 km
	Wind	eP	59	112		Banda Sea; Mag. 7.
	Gram	iP	(48)	101		
7	Wind	e	15.48.13			
	Kim	i	16			
7	Pret	i	17.25(25)			
8	Pret	e	06.08.25			USCGS.H=05.53.01; 40 N.
		iPKP	10.39	117		129.7 E; h=608 km; Sea
	Kim	iPKP	48	122		of Japan. Mag.6½.
	Gram	iPKP	48	122		
	Wind	(e)iPKP	51	124		
8	Pret	iP	11.17.27			South African Earthquake
		iS	50			230 km from station
8	Pret	i	19.54.25			/.....

October, 1960. (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
8	Pret	iP	20.51.27	73		USCGS.H=20.40.07; 7.9 N, 92.9 E. h= 84 km Nicobar Is.
	Kim	iP	48	77		
	Wind	iP	52.16	82		
9	Kim	iPKP	09.19.35	131	R	USCGS.H= 09.00.42; 40.8 N 141.2 E; h= 155 km. Near coast of northern Honshu, Mag. = 6.
	Wind	iPKP	40	133		
	Pret	iPKP	58	127		
9	Kim	iPKP	10.10.25	133		USCGS.H=09.51.19; 15.1 S 174.0 W. h=129 km Samoa Is. region.
	Wind	ePKP	35	142		
	Wind	i	44			
9	Wind	i	12.27.32			
11	Pret	iP	01.51.01			South African earthquake 250 km from station.
		iS	26			
11	Wind	(e)i	14.24.10			
12	Wind	e	12.03.(53)			
		i	04.18			
12	Pret	i	14.03.22			
12	Wind	e	15.09.10.			
12	Kim	i	21.06.39			
	Pret	e	57			
13	Pret	e	11.29.25			
13	Kim	ePKP	15.11.52	141		USCGS.H=14.52.35; 54.8 N 161.2 E. Kamchatka. h= 35 km. Mag. 6 $\frac{1}{2}$.
	Wind	iPKP	53	140		
14	Kim	iPKP ₁	13.31.48	155	C	USCGS.H= 13.12.08; h=32km 59.8N, 136.4W. S.E. Alaska Off coast of Chile. Mag. 5 $\frac{1}{2}$.
		i	55			
14	Kim	iP	18.00.02	80	R	USCGS.H=17.48.29; 37.9S 74.7 W. h=25 km .Off coast of Chile. Mag. 5 $\frac{1}{2}$.
	Wind	iP	21	79		
	Pret	iP	54	85		
14	Wind	ePKP ₁	21.33.56	153		USCGS.H=21.19.11. 51.7N 172.1W; h=50 km. Fox Is. Mag. 6 $\frac{1}{2}$.
		i	39.00			
	Kim	iPKP ₁	21	156		
16	Pret	i	17.12.26			
18	Wind	iPKP	00.41.38	155		USCGS.H=00.21.47; 52.5N 170.2W; h=33 km. Fox Is. Mag. 5
	Piet	ePKP ₁	44	155		
		i	53			
18	Kim	eP	10.39.22	87	R	USCGS.H=10.26.53; h=25km 42.1 N, 78.3 E. Kirghiz U.S.S.R.
19	Wind	(e)i	15.38.09			
20	Kim	iPKP	11.25(47)	126	C	USCGS.H=11.05.58; 11.0S 164.9E. h=40km Santa Cruz Is. region. Mag. 6.
	Wind	(e)iPKP	25.15	135		
	Pret	iPKP	27	126		
21	Kim	i	02.11(47)			
22	Pret	i	07.21.-			
22	Kim	iPKP	08.40(42)	125	R	USCGS.H=08.22.01. h=93km 10.3S, 161.2 E. Solomon Is. region. Mag. 7.
	Wind	iPKP	41.08	135		
22	Wind	e	12.30.29			
22	Wind	e	17.40.34			
		i	41.15			
24	Pret	e	04.03.16			
		i	19			
	Kim	(e)i	(50)			
	Piet	e	57			
		i	10.10			
	Gram	e	12.18			
		i	14.03			
24	Kim	i	10.29.28		R	
	Wind	i	29		R	
24	Wind	e	12.05.29			
24	Pret	i	15.12.27		C	

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October, 1960.

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
25	Wind	iP	12.26.32	78	R	USCGS.H=12.14.48; h=32 km 43.5S; 74.6W; Near coast of Chile.
	Kim	iP	38	79	C	
25	Pret	i	17.43.23			
25	Pret	i	23.09.25			
27	Pret	e	05.03.(30)			
27	Pret	e	07.49.26			
		i	38			
27	Kim	iPKP	22.46.42	134		USCGS.H=22.27.55. h=253 km 15.2S; 175W. Samoa Is region
	Wind	iPKP	52	142		
27	Pret	e	23.39.39			
		i	40.14			
28	Wind	e	01.07.22			
	Kim	e	09.(52)			
28	Piet	iPKP	13.37.16	137		USCGS.H=13.18.14; 52 N. 157.4 E; h=96 km. Kamchatka.
		i	40.41			
	Wind	ePKP	37.20	140		
		i	24			
	Kim	iPKP	22	141	C	
	Pret	iPKP	26	136		
30	Wind	iP	12.26.40	81		USCGS.H=12.14.36, h=76 km 23.3S, 70.3W. Near coast of Chile. Mag. 6 $\frac{3}{4}$.
	Kim	iP	27.14	85		
30	Pret	i	17.45.25			
30	Gram	iP	21.44.(17)	83	R	USCGS.H=21.32.48. h=60 km 22.8 S, 68W. Chile-Bolivian border. Mag. 6 $\frac{3}{4}$.
	Wind	iP	43	78	C	
31	Pret	(e)i	06.39.59			
31	Pret	(e)i	12.38.02			
31	Pret	e	13.02.(40)			
		i	03.25			
31	Pret	i	19.13.45.			

A.A. Attridge.

16.1.61.

Geological Survey Office,
Department of Mines,
Union of South Africa

SEISMOLOGICAL BULLETIN.

F-NOV 1960

The data herewith give the results from a network of seismographs intended particularly for the study of earthquakes occurring in or near South Africa. This bulletin, however, is prepared regularly and will be sent to interested organisations on request.

<u>Stations</u>	<u>Pretoria (Pret)</u>	<u>Grahamstown (Gram)</u>	<u>Pietermaritzburg (Piet)</u>	<u>Kimberley (Kim)</u>	<u>Windhoek (Wind)</u>
Lat:	25°45.2'S.	35°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlan	Mr. M.J.R. Hoch	Rev. Br. A.E. Long	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College	Weather Office.

Notes: "Earth tremors" originating in the mining district of the Witwatersrand are recorded several times daily by the Pretoria station, and less frequently by others. These are not dealt with in this bulletin.

Data are occasionally reported herein by courtesy of the Union Observatory, Johannesburg, which operates a 200 kg. Wiechert Horizontal seismograph. This station is called J, and is at 26°10.9'S., 28°04.5'E., height 1806 metres.

All times given are G.M.T.

The supervision of this network and bulletin is at present in the hands of the undersigned, to whom all inquiries should be addressed.

Address:

Bernard Price Institute of Geophysical Research,
University of the Witwatersrand,
Johannesburg,
South Africa.

H.O. Oliver

H.O. Oliver.
Seismological Officer.

NOVEMBER, 1960.

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DATE	STATION	PHASE	G. M. T.		ARC DISTANCE	C/ R	REMARKS.
			h.	m. s.			
1	Wind	(e) iP	06.21.47		31		USCGS.H=06.15.29; 11.1S 12.7W. h=35 Km. Mag. 5. Ascension Is. region.
	Kim	iP	22.(52)		40		
1	Pret	i	08.53.27				
		i	09.09.08				
1	Wind	iP	08.57.56		78	C	USCGS.H=08.46.02, 38.4S 74.4W. h=97km. Mag. 7.
	Kim	iP	(59)		80		
	Piet	iP	58.22		84	C	Near coast of Chile
1	Pret	i	10.20.33				
1	Wind	iP	12.41.27		79		USCGS.H=12.29.32, 38.5S 75W, h=64km. Near coast of Chile. Mag. 5.
	Pret	iP	59		85		
1	Pret	i	12.52.38				
1	Kim	iPP	19.28(42)		138		USCGS.H=19.06.23.50.1N 153.9W, h=162Km. Near coast of Kamchatka.
2	Pret	i	01.44.34				
2	Wind	o	08.07.00				
		i	08.40				
2	Kim	iPKP	15.49.(37)		135		USCGS.H=15.29.49, 57.6N. 153.8W. h=96km. Kodiak Is.
2	Kim	iP	16.44(13)		85		USCGS.H=16.31.54; 23.1N, 93.8E. h=126km. Burma- East Pakistan border.
	Wind	iP	34		88	C	
2	Piet	iPKP	17.33.44		122	R	USCGS.H=17.14.49; 10.9S 164.9E. h=25km. Santa Cruz Is.
	Pret	iPKP	51		125 $\frac{1}{2}$		
	Kim	iPKP	(56)		126 $\frac{1}{2}$		
	Wind	ePKP	57		135 $\frac{1}{2}$		
		i	34.09				
2	Kim	i-	18.17.22		-		USCGS.H=18.09.49; 44.8S 80.2E, h=23 km. South Indian Ocean.
	Pret	eP	18.13		49		
		i	26				
	Wind	eP	19.28		58		
3	Wind	e	12.27.46				
4	Kim	i	18.28(17)				
	Wind	i	19			C	
5	Wind	iP	20.51.07		64	R	USCGS.H=20.20.54; 39.2N 20.5E, h=49.km Mag.5 Near coast of Greece.
	Kim	iP	(29)		69		
		e	52(05)				
** 6	Pret	e	02.05.17				
6	Pret	iPKP	04.57.37		137		USCGS.h=04.38.17; 53N 159.8E. h=32km. Mag.6 Near coast of Kamchatka
	Kim	iPKP	(38)		142		
	Piet	ePKP	27		138		
		i	41				
6	Kim	iPKP ₁	22.29(53)		154		USCGS.H=22.10.06; 57.2N 168 W. h=42km. Mag. 5. Fox Is.
	Wind	iPKP ₁	55		151		
	Piet	iPKP ₂	30.04		151		
	Pret	iPKP ₂	33		149	C	
7	Wind	i	00.06.29				
8	Wind	(e)i	16.32.07				
8	Pret	i	18.35.54				
8	Pret	e	18.37.59				
9	Wind	iP	01.29.(23)		78	R	USCGS.H=01.17.37; 21.5S 67.5W. h=131 km. Near Chile-Bolivia border.
9	Kim	iP	03.26(23)		47		USCGS.H=03.17.59; 60.7S 24.8W. h=37 km. Mag. 6 $\frac{1}{2}$ Sandwich Is.
	Piet	iP	37		49		
	Wind	iP	44		49		
	Pret	iP	27.21		51		
		i	47				
9	Wind	iP	20.18.24		81		USCGS.H=20.06.16; 23.2S 70.6W, h=52 km. Mag.5 $\frac{1}{2}$. Near coast of Chile.
	Kim	iP	47		83		
10	Kim	i	15.02.21				
	Wind	i	03.36			C	
** 6	Pret	i	03.25.45				

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November, 1960 (continued) - 328 -

DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/ R	REMARKS.
			h.	m.	s.			
10	Kim	(e)i	15.14.22					
10	Kim	(e)iPKP	16.48.55			120		USCGS.H=16.30.16; 22S, 171.6E. h=128 km. Loyalty IS. region.
10	Wind	i	20.04.10				R	
11	Pret	iP	05.29.21 $\frac{1}{2}$			175 mls.		S.A. quake.
		iS	39			from stn		
12	Wind	e	17.28.29					
12	Pret	i	17.45.00					
12	Pret	(e)i	18.11.18					
13	Wind	iPKP ₁	09.40.21			151		USCGS.H=09.20.37; 51.1N 168.8W. h=65km. Mag. 7
	Pret	ePKP ₂	22			149		Fox Is.
		i	28					
	Kim	iPKP ₁	25			154		
	Piet	ePKP ₂	(27)			151		
		i	32					
16	Kim	i	18.04.(53)					
		i	05.(43)					
17	Wind	iP	01.40.32			78	R	USCGS.H=01.28.40; 38.5S 73.6W. h=25 km. Near coast of Chile.
	Kim	iP	37			80		
17	Kim	iP	05.27(48)			78		USCGS.H=05.16.10, 43.5S 74.4W. h=123 km. Near coast of Chile.
	Wind	iP	53			77		
	Pret	iP	28.(59)			82		
17	Kim	i	09.13(08)					
17	Wind	iPKP ₁	20.06.31			152		USCGS.H=19.46.46; 53.3N 170.3W. h=16 km. Fox Is.
	Pret	iPKP ₂	42			151		
	Kim	iPKP ₂	48			155		
19	Pret	e	10.25.12					
		i	28.29					
	Wind	e	44					
	Kim	i	29.13					
20	Wind	eP	22.15.09			97		USCGS.H=22.01.59.9; 6.8S 80.7W, h=93km. Near coast of Peru. Mag. 6 $\frac{1}{2}$.
	Kim	iP	39			104		
21	Pret	i	04.47.16					
22	Piet	iP	06.26.16			25	R	USCGS.H=06.21.45; h=21km
	Gram	iP	35			24	C	Mag. 6 $\frac{3}{4}$. Indian Ocean N. of Crozet Is.
	Pret	iP	52			29		
	Wind	iP	27(13)			38		
	Kim	iP	28.25			29	R	
22	Wind	(e)iP	12.40.46			78		USCGS.H=12.28.58. 40S 74.3W, h=107 km. Mag. 6 $\frac{1}{2}$ Near coast of S. Chile
	Kim	iP	58			80		
	Pret	iP	41.17			84		
23	Pret	ePKP	14.31.03			126		USCGS.H=14.12.21, 24.2S 176.1W. h=28 km. Mag. 7
	Kim	iPKP	(15)			125		South of Tonga Is. region
	Wind	ePKP	38			134		
		i	44					
23	Kim	iPKP	18.15.(29)			125	C	USCGS.H=17.56.38, 24S, 176.3 W. h=51 km. South of Tonga Is. region.
	Wind	(e)iPKP	38			134		
24	Wind	(e)i	05.09.21				R	
24	Wind	i	05.12.36				C	
24	Gram	ePKP	07.11.31			121		USCGS.H=06.52.41, 24.2S 176.1W, h=23 km. Mag. 7 $\frac{1}{4}$. South of Tonga Is. region.
		i	33					
	Kim	iPKP	(40)			125		
	Piet	ePKP	42			122		
	Wind	ePKP	58			134		
		i	12.00					
	Pret	i-	31					
24	Kim	iPKP	08.45(12)			125		USCGS.H=08.26.14, 24.5S 175.9W. h=25km. South of Tonga Is. region.
24	Wind	i	22.48.13					

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November, 1960.

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<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> <u>h. m. s.</u>	<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS.</u>
25	✓ Kim	i	22.23(58)			
25	Kim	i	14.31(59)			
26	Kim	i	15.41(48)			
27	Kim	e	08.26.57			
		i	28.33			
27	Kim	iPKP ₁	12.19.52	148		USCGS.H=12.00.26; h=171 km. 62.9N, 150.9W. Alaska
27	Wind	e	18.34.13			
27	Kim	e-	20.42(21)	-		USCGS.H=20.37.26, 3.1S 29.1E. h=60 km.
		i-	26	-		
	✓ Wind	(e)iP	26	23		Belgian Congo.
27	Piet	e	48(27)			
		i	50.39			
	Gram	e	52.56			
27	Wind	e	21.31.(31)			
27	Wind	i	21.36.24			
	Kim	i	33		R	
29	✓ Gram	iP	09.43.42	76		USCGS.H=09.32.02, 44S, 74.9W. h=86 km. Mag. 5 $\frac{1}{4}$
	Wind	iP	48	77		Near coast of S. Chile.
29	Kim	i	12.01.24			
29	Wind	iP	19.29.32	86	R	USCGS.H=19.17.07, 15.8S 73.3W. h=100 km. Near coast of Peru.
30	Kim	i	15.53.58			

A.A. Attridge.

6:2:61.

SOUTH AFRICA

Geological Survey Office,
Department of Mines,
Union of South Africa.

SEISMOLOGICAL BULLETIN.

2- DEC 1960

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Lat:	25°45.2'S.	33°18.6'S.	29°37.2'S.	28°45.1'S.	22°34'S.
Long.:	28°11.4'E	26°34.5'E.	30°23.8'E.	24°46.8'E.	17°06'E.
Lithologic foundation:	Weathered Shale (Pretoria series)	Dwyka Shale	Soft Ecca Shale	Dolerite boulders embedded in decayed dolerite	Mica Schist.
Height:	1350 m.	558 m.	656 m.	1321 m.	1728 m.
Instrument:	Willmore S.P. vertical and horizontal	Benioff S.P. vertical with short and long period recorders.	Benioff S.P. vertical	Benioff S.P. vertical	Benioff S.P. vertical.
Seismo. Officer:	The Director	Professor of Physics	Professor of Physics	Rev. Br. T.N. Purcell	Officer in Charge.
Observer:	Mr. T.E. Dicker	Mr. A.R. Scanlen	Mr. M.J.R. Hoch	Rev. Br. A.E. Long	Mr. J.A. Meyer.
Institution:	Geological Survey Office	Rhodes University	Natal University	Christian Brothers College.	Weather Office.

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Johannesburg.
South Africa.

H.O. Oliver

H.O. Oliver.

Seismological Officer.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC (°) DISTANCE	C/ R	REMARKS.
1	Kim	iPKP ₁	21.09.40	150		USCGS.H=20.49.46. 48.8N 129.3 W. Off Vancouver Is. h = 15 km. Mag. 6.
1	Kim	iPKP ₁	22.09.30	151	R	USCGS.H=21.49.37. 49N, 129.3W. Near Coast of Vancouver. h=60 km.
2	Pret	(e)i	00.32.06			
2	Piet	i	08.50.52			
2	Pret	i	09.09.00			
2	Gram	i	09.14(48)			
2	Wind	iP	09.22.26	79		USCGS.H=09.10.41, 24.5 S 69.9W. Near coast of Chile h = 37 km. Mag. 7.
	Kim	iP	23.06	84	R	
	Piet	iP	33	88		
2	Gram		09.41(33)			
2	Wind	iP	09.49.39K	79	R	USCGS.H=09.37.39; 24.3S, 69.8 W. Near coast of Chile. h=64 km. Mag. 6 $\frac{3}{4}$
			50.01		R	
2	Piet	i	12.56.53			
2	Wind	(e)i	13.48.24			
	Kim	e	49.53			
		i	58			
2	Kim	i	18.24.48		C	
2	Kim	iP	22.42.28	83		USCGS.H=22.30.00; 24.2S 69.6W. Northern Chile. h= 45 km.
3	Kim	iP	04.38.12	102		USCGS.H=04.24.17.5, 42.8N 104.5E. Outer Mongolia. h = 45 km. Mag. 7.
3	Wind	iPKP ₁	07.27.20	150	R	USCGS.H=07.07.43; 52.5N 177.3W. Andeanof Is. h=79 km.
	Kim	iPKP ₁	22	153	R	
** 5	Kim	i	00.13.23		C	
5	Kim	iPKP	18.27.12K	140	R	USCGS.H=18.07.27, 54.3N 161.2E. Near East coast of Kamchatka. h=25 km.
6	Gram	i	09.04.09			
6	Wind	iP	09.08.17	78	R	USCGS.H= 08.56.08. 21.4S 69.0W. Northern Chile. Mag. 5 $\frac{1}{2}$. h=25 km.
	Kim	iP	41	88	R	
6	Wind	e	10.19.24			
		i	27			
8	Wind	i	01.44.59			
8	Piet	i	15.47.02			
11	Pret	i	08.43.41			
13	Gram	e	07.43.55			
13	Kim	iP	07.49(10)	91		USCGS.H=07.36.14; 52.1S 161 E. Macquarie Is. Mag. 7 $\frac{1}{4}$. h=29 km.
	Piet	eP	40	89		
	Pret	iP	50.16	93		
	Wind	iP	30	100		
14	Kim	iPKP	00.39(47)	125		USCGS.H=00.20.53.10.7S 165.3E. Santa Cruz Is. h= 51 km.
14	Kim	i	01.16.(20)			
14	Wind	i	09.32.17			
14	Pret	i	13.35.49			
14	Wind	e	14.36.54			
14	Pret	i	21.49.03			
14	Pret	i	23.08.37			
14	Kim	i	23.13(24)			
15	Pret	i	00.04.52			
	Kim	i	05(15)			
15	Kim	i	00.21.26			
15	Pret	i	13.47.18			

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DECEMBER, 1960 (continued) - 331 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC (°) DISTANCE	C/ R	REMARKS.
15	Pret	iP	22.52.52			S.A. Earthquake = 230 km from station.
		iS	53.15			
17	Wind	eP	07.50.58	91		USCGS.H=07.38.31. 15.1°S 73.5W. Southern Peru. h = 28 km.
		i	51.20			
17	Piet	i	10.48.42			
	Gram	i	57			
	Kim	i	49.07		C	
	Wind	i	44		C	
17	Pret	i	14.47.40			
17	Pret	i	18.46.03			
	Wind	i	05			
17	Piet	e	18.51.41			
		i	54.26			
	Kim	(e)i	53.06			
19	Wind	eP	13.34.08	78		USCGS.H=13.22.01, 24.3S 69.6W. Northern Chile. h = 17 km.
21	Kim	iPKP ₁	14.59.33	152	C	USCGS.H=14.40.02, 61.6N 152.3 W. Alaska. h=169 km
	Gram	iPKP ₁	40	144	R	Mag. 5 $\frac{3}{4}$.
22	Pret	iP	03.13.49	72		USCGS.H=03.02.29, 9.8N, 94.2E. Nicobar Is. h=60km
	Kim	iP	14.15	76		
	Wind	iP	37	80	R	
22	Kim	iPKP	06.50.01	118		USCGS.H=06.31.22, 30.8S 177.1W. Kermadec Is. region
22	Kim	i	12.33.32			
22	Pret	(e)i	13.46.39			
22	Kim	iPKP ₁	14.47.27	154		USCGS.H=14.27.40, 53.7N
	Wind	iPKP ₁	27	148	R	168.1W. Fox Is. h=57 km.
	Pret	iPKP ₁	30	150		
22	Kim	i	16.32.41			
22	Kim	iPKP	21.20.42	122		USCGS.H=21.02.41, 6.8S, 155.3E. Solomon Is. h = 469 km. Mag. 5 $\frac{1}{2}$.
	Wind	ePKP	21(04)	130		
		i	25.47			
22	Kim	i	21.21.49			
23	Pret	iP	09.53.07	75		USCGS.H=09.41.48, 3.3S, 101.9E. Near coast of Sumatra. h=134 km.
	Kim	iP	30	78		
	Wind	iP	54.08	85		
23	Pret	e	14.56.06			
		i	57.09			
	Wind	e	18			
24	Pret	e	03.39.01			
		i	09			
25	Piet	e	00.40.38			
	Kim	i	41.29		R	
25	Kim	i	16.47.18		R	
26	Kim	i	03.46.08			
26	Gram	iP	04.39.27	42		USCGS.H=04.32.30, 57.4S 26.2W, Sandwich Is. h = 25 km. Mag. 5 $\frac{1}{2}$.
	Kim	iP	47.57	45	C	
	Piet	iP	41.08	48		
	Pret	iP	53	49		
26	Kim	i	17.59.25		R	
26	Pret	e	20.43.27			
		i	44.11			
26	Kim	e	20.46.06			

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC (°) DISTANCE	C/ R	REMARKS.
27	Wind	e -	17.54.35	-		USCGS.H=17.35.28, 41.3N 124.9W. Off coast of N. California. h=3 km. Mag. 6.
	Kim	iPKP ₁	55.24	155		
	Pret	ePKP ₁	(26)	153		
27	Wind	eP	18.21.46	91		USCGS.H=18.09.42, 13.7S, 74.3W. Near coast of Peru. h = 82 km.
28	Piet	e	17.48.51			
		i	55			
28	Pret	e	19.44.(25)			
		i	55			
29	Pret	e	21.32(57)			
29	Wind	i	10.48.32			
	Kim	(e)i	34			
	Pret	i	58			
29	Kim	i	19.13.49			
29	Kim	i	20.44.14			
	Wind	e	13			
29	Wind	e	21.44.?			
		i	07			
31	Wind	iP	13.49.03			S.African local earthquake 23 km from station.
		iS	26			
31	Wind	eP	18.19.56	76		USCGS.H=18.08.12, 43.9S 75.0W. Near coast of Southern Chile. h=92km. Mag. 6½.
		i	20.11			
	Pret	iP	20.54	82		

A.A. Attridge.

14.3.61.

** 5	Wind	i	12.12.09		R	
	Kim	i	15			
5	Kim	iPKP	18.27.12	140	R	USCGS.H=18.07.27, 54.3N, 161.2E. Near East Coast of Kamchatka. h=25 km.