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Accepted FEB 1959
E MAR 1959

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' 8" 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.

FEBRUARY 1959.

... a ...

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
✓ 1	✓ Bway	iP	03.24.17		70°	USCGS H.=03.13.26, 36 $\frac{1}{2}$ °N. 71°E. Hindu Kush.h=200 km
2	x Bway	e	13.17.42			
2	x Bway	traces	14.24.30			W.W.Rand earth tremor
3	x Bway	traces	19.34.30			W. W.Rand earth tremor
4	x Bway	traces	21.32.30			Probably Central Africa
✓ 5	✓ Bway	e	01.24.15			
6	✓ Bway	traces	05.56.30			
6	✓ Bway	e	12.21.08			Double W.W.Rand earth tremor
6	✓ x Bway	i	14.52.32			
7	✓ x Bway	iP	09.51.16		110°	USCGS.H=09.36.51, 4°S, 81 $\frac{1}{2}$ °W. Near Coast of N. Peru. M= 7 $\frac{1}{2}$.
	x	i	52.35			
8	✓ Bway	e	00.03.33			Seismic, probably local
	x	i	43			
	x	i	04.20			
✓ 8	✓ Bway	e	01.15.10			
9	✓ Bway	iPKP ₁	05.02.08		142°	USCGS.H= 04.42.33, 50 $\frac{1}{2}$ °N 177 $\frac{1}{2}$ °W. Andreanof Is.
9	x Bway	i	19.19.09			
10	x Bway	i	09.10.37			Probably Central Africa
	x	i	13.27			
11	x Bway	traces	09.38.30			W.W.rand earth tremor
11	x Bway	i	09.51.25			Probably Central Africa
	x	i	53.03			
	x	i	54.05			
11	x Bway	traces	16.44.10			Probably Central Africa
	x	i	45.32			
	x	i	46.14			
12	x Bway	e	07.32.05			
13	x Bway	iPKP	02.03.45			USCGS.H=01.44.47. Tonga -Kermadec Islands Region
	x	i	06.16			
13	x Bway	i	02.11.11			
13	x Bway	e	11.06.52			
13	✓ Bway	e	14.19.42			Seismic, probably local
13	x Bway	e	19.45.05			
✓ 14	✓ Bway	iP	04.49.15		92°	USCGS H= 04.36.10, 7 $\frac{1}{2}$ °S 122°E, Flores Sea
14	x Bway	i	22.16.06			
14	x Bway	i	23.00.43			
15	x Bway	traces	01.45.30			W.W.rand earth tremor
✓ 15	✓ Bway	eP	04.08.58		55°	USCGS H.= 03.59.25, 59 $\frac{1}{2}$ °S. 25°W. Sandwich Islands. M = 6 $\frac{1}{2}$.
	x	i	09.16			
✓ 15	✓ Bway	iP	04.52.08		55°	USCGS.H = 04.42.35, 59 $\frac{1}{2}$ °S. 26°W. Sandwich Island. M = 6 $\frac{3}{4}$
15	x Bway	e	08.02.20			
15	✓ Bway	i	13.20.19			
✓ 16	x Bway	e	22.54.15			W.W.rand earth tremor
17	x Bway	i	00.04.31			
✓ 17	x Bway	iPKP ₁	12.22.45		147°	USCGS.H= 12.03.05, 51 $\frac{1}{2}$ °N. 171°W. Fox Islands, M=6 $\frac{1}{4}$
17	x Bway	e	15.00.54			Seismic Probably local.
17	x Bway	e	15.17.15			W.W.Rand earth tremor.
			18.24			

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February, 1959.

... b ...

<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> <u>h. m. s.</u>	<u>C/</u> <u>R</u>	<u>ARC</u> <u>DISTANCE</u>	<u>REMARKS.</u>
18	> Bway	i	14.32.56			Probably Central Africa
		i	33.06			
		i	34.40			
		i	35.56			
19	x Bway	e	01.42.15			W.W.rand earth tremor.
19	x Bway	e	03.23.52			Probably Central Africa.
✓ 20	x Bway	iP	04.25.41		90°	USCGS.H = 04.12.54, 30 ¹ / ₂ ° S. 71° W. Central Chile. M = 6 ¹ / ₄ . h = 100 km.
22	✓ Bway	e	04.19.05			
	x	i	33			
✓ 23	x Bway	iPKP	22.40.04		126°	USCGS H = 22.20.58, 28 ¹ / ₂ ° S. 177° W. Kermadec Is
25	x Bway	e	15.35.07			Seismic, probably local.
26	Bway	e	18.54.15			Seismic, probably local.
		i	55.40			
28	x Bway	i	21.43.53			Probably Central Africa
		i	46.04			
		i	47.22			

M. Scott
H.O. Oliver.

12th October, 1959.

MARCH 1959.

... c ...

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
1	✓ Bway	eP i	17.03.24 07.30		106°	USCGS.H=16.49.13; 1/2°S 134 1/2°E. Near N. Coast of New Guinea, M = 7, h = 100 km.
2	✓ Bway	iP	01.49.24		74°	USCGS.H=01.37.59; 7°S. 104°E. Sunda Straits. h + 100 km.
2	✓ Bway	iP	16.02.24		72°	USCGS.H= 15.51.37; 37°N 70 1/2°E, Hindu Kush, h = + 200 km
2	✗ Bway	traces	18.30.00			W.W.rand earth tremor
4	✗ Bway	traces	03.11.30			" " " "
4	✗ Bway	traces	14.23.46			" " " "
4	✗ Bway	e	16.35.14			Probably Central Africa
4	✓ Bway	iP	20.09.19		71°	USCGS.H= 19.57.55, 11 1/2°N. 91 1/2°E. Adaman Is.
5	✓ Bway	iP	23.06.51		73°	USCGS.H=22.55.28, 2°N. 98° E. Sumatra.
6	✗ Bway	e	03.46.56			
7	✗ Bway	e	13.42.18			Seismic, probably local.
		i	54			
✓ 7	✗ Bway	iP	09.24.05		74°	USCGS.H= 09.12.26, 3° S. 102° E. Sumatra.
✓ 7	✗ Bway	iPKP ₁	16.01.57		145°	USCGS.H= 15.42.17, 53 1/2°N. 161 1/2° W. S. Alaska Penin- sula.
8	✗ Bway	e	11.11.19			Seismic Probably local.
	✗	i	12.24			
8	✗ Bway	traces	11.40.30			W.W.rand earth tremor.
✓ 9	✓ Bway	e	21.05.35			Seismic, probably local
✓ 10	✗ Bway	iP	17.49.39			Probably Rhodesia - Mozambique border.
	✗	iS	50.34			
✓ 13	✗ Bway	iP	19.17.34		57°	USCGS.H = 19.08.00, Mediterranean Sea near Crete
14	✗ Bway	traces	12.54.31			W.W.rand earth tremor.
16	✗ Bway	iPKP ₁	23.54.22		147°	USCGS.H=23.34.48, 53°N. 168 1/2°W. Fox Is.
17	✗ Bway	traces	02.28.06			W.W.rand earth tremor.
✓ 17	✓ Bway	eP	13.00.58			Seismic, probably local
	✗	iS	01.27			
17	✓ Bway	iP	13.08.23		55°	USCGS.H=12.58.57, 57° S 25°W. Sandwich Islands.
	✓	i	08.37			
17	✗ Bway	e	23.56.34			
19	✗ Bway	e	21.58.53			
20	✗ Bway	e	15.57.54			Seismic, probably local
	✗	i	58.31			
		i	58.50			
20	✗ Bway	iP	23.11.24			about 180 km from station
		iS	42			
✓ 21	✗ Bway	iP	00.06.04		86°	USCGS.H= 23.53.24, 10° S. 117°E, Sumbawa Is. region about 180 km from station
21	✗ Bway	iP	01.53.30			
		iS	48			
21	✗ Bway	iS	02.21.07			Probably local, seismic
21	✗ Bway	eP	04.45.25			Probably local.
		iS	38			
21	✗ Bway	e	11.10.12			W.W.rand earth tremor.
✓ 21	✗ Bway	iPKP ₁	19.56.49		147°	USCGS.H=19.37.08, 53 1/2°N. 165°W. Unimak Is. region.

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MARCH, 1959 (continued) ... d ...

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
23	x Bway	iP iS	03.11.58 12.15			about 170 km from station
23	x Bway	e	04.14.36			W.W.rand earth tremor
23	x Bway	iPKP ₂	07.30.02		148°	USCGS.H = 07.10.22. 40° N 118° W. Nevada. M=6½.
23	x Bway	e	18.16.50			Seismic probably local
25	x Bway	i	06.47.41			W.W.rand earth tremor
		i	48.33			
		i	49.19			
26	✓ Bway	iPKP	02.43.04		124°	USCGS.H= 02.24.12, 7° S. 155½° E. Salomon Is. h = 60 km.
27	x Bway	e	10.59.56			
27	x Bway	i	22.49.18			W.W.rand earth tremor
		i	51.30			
28	Bway	iP	12.05.43			W.W.rand earth tremor
		i	51			
		i	06.21			
31	Bway	i	01.25.07			

M. Scott.
H. Oliver.

12th October, 1959.

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

Capra

SEISMOLOGICAL BULLETIN.

APR 1959

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.

Station: BULAWAYO

Latitude: 20° 08.6' S.

Longitude: 28° 36.8' E.

Lithologic Hornblende schists of the Bulawayan system
Foundation:

Height: 1341 meters.

Instrument: Vertical and horizontal Willmore S.P.

Seismo.
Officer: Director, Federal Surveys.

Observer: Officer in Charge, Goetz Observatory.

Institution: 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, 1959.

Page .. 1 ..

BULAWAYO.

DATE	STATION	PHASE	G. h.	M. m.	T. s.	ARC DISTANCE.	REMARKS.
1	✓ x B.	iP	00.45.15.		19.	68°	USCGS.H=00.54.18. 27½°N.21°W.Canary Is. Mag. 6¼.
1	x B.	e	18.05.10.				Witwatersrand Tremor
2	✓ B.	e	17.07.01				Probably Witwatersrand Tremor.
3	✓ B.	eP	07.30.54				Local earthquake
		iS		31.31			
3	x B.	i	14.49.05				Local earthquake
		i		22			Distance about 300 - 400 km.
				34			
				50			
6	✓ x B.	i	14.25.32			86°	USCGS.H=14.12.36,10°S. 120½°E. Sumba Is. Mag. 6¼.
7	x B.	e	12.02.54				
8	✓ x B.	i	01.41.35			121°	USCGS.H=01.23.26 32½°S.179½°E.h=+400km Mag.6¼.Kermadec Is.
8	x B.	i	04.47.12				
				53.11			
8	✓ x B.	iP	11.56.47			87°	USCGS.H=11.44.25.50½° S. 73°W.S.Chile/Argentine border.
9	✓ x B.	iP	06.27.53.			44°	USCGS.H=06.18.30. 36°S. 76°E.Indian Ocean.+1000mls. north of Kergeulen Is.
10	✓ ✓ B.	iPKP	06.05.34			134°	USCGS.H=05.47.34. 25°S.178½°E.South of Fiji Is.h=+ 600 km.
12	✓ ✓ B.	i	08.23.40				
12	✓ x B.	iPKP	10.13.45.			130°	USCGS.H=09.54.51, 17½°N.95°W. Mexico. h=+ 100km. Mag. 6¼.
12	✓ ✓ B.	ePKP	21.13.28			141°	USCGS.H.=20.54.00 15½°S.173°W. Samoa Is.region. Mag. 6½.
		i		46.			
13	✓ x B.	iP	18.43.45			75°	USCGS.H=18.31.57.23°N 93½°E.India-Burma border.
14	✓ x B.	iPKP ₁	07.39.54			143°	USCGS.H=07.20.28. 57½°N.155°W. Alaska Peninsula h=+ 60 km Witwatersrand Tremor
14	x B.	e	09.20.13				
		i		30.50			
14	x B.	e	09.38.54				Central African Earthquake.
				38.59			
				40.39			
				41.26			
15	x B.	e	13.05.42				Witwatersrand tremor
15	x B.	e	14.18.53				Witwatersrand earth tremor.
17	x B.	e	15.56.24				Witwatersrand earth tremor.
19	✓ B.	e	16.38.18				Witwatersrand earth tremor.

April 1959 (continued)

DATE	STATION	PHASE	G. h.	M. .	T. s.	ARC DISTANCE	REMARKS.
20	✓ x B.	iPKP	03.46.32			116°	USCGS. H=03.27.52.6°S. 149½°E. New Britain. Felt: Walindi, Kamorian; h=+ 100 km.
21	x B.	e	07.45.30				Irsac Katanga
22	✓ x B.	iPKP ₂	11.14.41			147°	USCGS. H=10.55.05, 54°N. 167°W. Fox Islands, Aleutian Islands
23	x B.	e	01.58.42				Witwatersrand tremor
23	x B.	e	03.01.42				Witwatersrand tremor
24	x B.	e	13.53.24				Witwatersrand tremor
24	x B.	e	14.33.08				Witwatersrand tremor
24	✓ x B.	iPKP	18.16.59			124°	USCGS. H=17.57.58.31°S. 178°W. Kermadec Is. Mag. 6½-6¾ (Berk.) 6¾-7 (Pas.)
25	✓ x B.	iP	00.36.28			60°	USCGS. H=00.26.40.37°N. 28½°E. Turkey.
25	✓ x B.	iP	01.15.28				USCGS. H=01.05.37. Dodecanese Is.
26	x B.	e	13.37.24				Local earthquake about 300 km. from station
26	x B.	iP	20.54.18			102°	USCGS. H=20.40.38.25°N 122½°E. Formosa. h=+ 150 km. Mag. 7½ - 7¾ (Pas), 7¾-7½ (Berk)
27	x B.	e	05.45.15				Local earthquake.
27	✓ x B.	eP	10.01.24			95°	USCGS. H=09.48.09. 7°S 129°E. Banda Sea.
27	✓ x B.	i	13.21.37				
28	✓ x B.	iPKP	11.28.29			128°	USCGS. H=11.09.30.15°N 93°W. Mexico-Guatemala border. Mag. 6½ (Berk) 6½-6¾ (Pas)
29	x B.	e	10.32.23				Local earthquake
29	x B.		15.33.52				Local earthquake about 300 km. from station.
	x		34.23				
	x		34.40				
30	✓ x B.	eP	13.35.40			57°	USCGS. H= 13.25.35 55½°S. 26°W. Sandwich Islands.
			36.06				

M. Scott.

21st August, 1959.

KEW
OBSERVATORY
20 OCT 1959
RICHMOND,
SURREY.

Handwritten signature: Harold Under Johannesburg

MAY 1959

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

Handwritten signature: June July

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' 16" S.	14° 26' 46" S.
Longitude:	28° 36' 18" 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.

Handwritten signature: H.O. Oliver

H.O. OLIVER
Seismological Officer.

Address:

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

Handwritten word: Kew

MAY 1959.

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
1	x Bway	e	00.39.06			W.W.rand earthtremor
1	x B.Hill	e	08.33.31			Local earthquake
1	x B.Hill	e	11.04.14			Local earthquake
1	x B.Hill	e	13.30.11			Local earthquake
3	x Bway	iP	04.57.23		120°	USCGS.H=04.41.24, 12½°N, 87½°W. Coast of Nicaragua h= 100 km.
4	x Bway	e	01.49.37			Local earthquake
4	x B.Hill	iPKP	07.33.10		130°	USCGS.H=07.15.42, 52½°N, 159½°E. Near Kamchatka, M=8, h= 60 km.
4	x Bway	ePKP	34.52		132°	
4	x B.Hill	i	16.28.00		Δ=200 km	Probably Central Africa
4	x Bway	i	29.13			
4	x Bway	i	29.08		Δ=1500 km	
4	x Bway	i	31.22			
5	x B.Hill	iPcP	11.50.58		66°	USCGS.H=11.40.08, 34½°N, 71½°E, Afghanistan.
5	x Bway	iPcP	51.25		68°	
6	x Bway	e	03.49.24			W.W.rand earth tremor
6	x B.Hill	e	13.29.19			Probably local earthquake
6	x B.Hill	e	13.33.05			Probably local earthquake
6	x Bway	e	15.10.59			W.W.rand earth tremor
6	x Bway	e	17.51.10			Seismic, probably local
7	x Bway	e	14.53.16			W.W.rand earth tremor
7	x B.Hill	i	20.36.00			Local earthquake.
7	x Bway	e	21.40.14			W.W.rand earth tremor
7	x Bway	eP	20.35.56		93°	USCGS.H=20.22.41, 8½°S. 123½° E. Flores Is.
8	x B.Hill	e	02.20.40			Seismic, probably local
8	x B.Hill	e	08.20.37			Seismic, probably local
8	x B.Hill	e	09.14.25			Seismic, probably local
8	x B.Hill	eP	09.44.51		Δ = 126 km	Local earthquake
8	x B.Hill	iS	55			
8	x B.Hill	e	09.48.52			Seismic, probably local
8	x B.Hill	iPKP	11.53.49		130°	USCGS.H=11.34.50, 53½°N, 160½° E, Kamchatka, M=6, h= 60 km.
8	x Bway	iPKP	58		132°	
8	x B.Hill	e	21.32.52			Seismic, probably local
8	x B.Hill	e	21.32.33			
9	x Bway	e	04.16.18			W.W.rand earth tremor
9	x Bway	e	14.33.32			W.W.rand earth tremor
10	x Bway	e	10.16.55			Seismic, probably local.
10	x Bway	e	17.12			
10	x B.Hill	e	10.30.45			Seismic, probably local.
10	x B.Hill	e	18.54.17			Seismic, probably local.
10	x B.Hill	e	22.27.09			Seismic, probably local.
11	x B.Hill	ePKP	16.47.51		130°	USCGS.H=16.28.49,
11	x Bway	ePKP	48.00		132°	Kamchatka
12	x Bway	iP	09.59.32		88°	USCGS.H=09.46.51, 23½°S.
12	x B.Hill	iP	44		89°	64½°W, Argentine
12	x Bway	iP	10.26.27		87°	USCGS.H=10.14.00, 20½°S
12	x B.Hill	iP	26.38		88°	63½°W. Bolivia.
12	x Bway	iPKP ₂	21.59.55		147°	USCGS.H=21.40.22, 51½°N,
12	x B.Hill	i	22.12(03)			177°W. Andreanof Is.
12	x Bway	iPKP ₂	22.19.27		147°	USCGS.H=21.59.56. 51½°N, 177°W. Andreanof Is.
13	x Bway	e	10.55.07			W.W.rand earthtremor
13	x B.Hill	e	56.16			
13	x B.Hill	e	56.19			
14	x Bway	e	01.00.00			Probably local earthquake
14	x Bway	e	09			

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May 1959 (cont.)

... Page 4

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
14	✓ Bway	iPcP	06.46.27		57°	USCGS.H=06.35.57, 35½°N, 24½°E, Crete, M=6½
	✓ B.Hill	iPP	46.46		52°	
14	✓ Bway	e	13.26(34)			W.W.rand earthquake
16	✓ Bway	iPKP	06.35.11		122°	USCGS.H=06.16.23, 4½°S, 153½°E, New Britain, M=6½, h=60 km
	✓ B.Hill	iPKP	18		124°	
16	✓ Bway	traces	14.22.(30)			
16	✓ B.Hill	"	14.41(52)			
17	✓ B.Hill	e	11.44.26			Seismic, probably local
		i	45.43			
17	✓ B.Hill	e	19.05.32			Seismic, probably local
		i	07.45			
17	✓ B.Hill	e	16.12.57			Seismic, probably local
18	✓ B.Hill	e	12.00.08			Seismic, probably local
18	✓ B.Hill	traces	22.35.44			
19	✓ Bway	e	11.20.21			
19	✓ Bway	traces	14.15.20			
19	✓ B.Hill	e	15.27.47			
	✓ Bway	traces	28(20)			
20	✓ B.Hill	e	03.40.02			Seismic, probably local
		e	33			
20	✓ B.Hill	e	12.17.24			Seismic, probably local
20	✓ B.Hill	eP	19.59.03		60°	USCGS.H=19.49.12, 41½°N, 42°E, Georgia, U.S.S.R.
	✓ Bway	eP	59.40		65°	
21	✓ Bway	iPKP ₁	07.11.16		147°	USCGS.H=06.51.40, 52½°N, 170½°W, Fox islands.
21	✓ Bway	iP	11.47.15		88°	USCGS.H=11.34.23, Chile Argentine Border, M=6, h=60 km
	✓ B.Hill	iP	47.28		92°	
21	✓ B.Hill	i	17.12.48			Seismic, probably local
		i	13.01			Probably local earthquake
22	✓ Bway	e	02.25.06			
		e	39			
	✓ B.Hill	e	12			
		e	26.28			
22	✓ B.Hill	e	03.45.44			Seismic, probably local
		e	46.11			
22	✓ B.Hill	traces	08.16.53			
22	✓ B.Hill	traces	08.43.04			
22	✓ B.Hill	e	23.57.05			
23	✓ B.Hill	e	12.23.24			Seismic, probably local
23	✓ B.Hill	e	13.16.04			Seismic, probably local
23	✓ Bway	e	13.54.52			Seismic, probably local
		e	55.18			
24	✓ B.Hill	i	11.39.46			USCGS.H= 11.28.18, India
	✓ Bway	e	40.05			
24	✓ B.Hill	ePKP	19.36.22		130°	USCGS.H=19.17.40, 17½°N, 97°W, Mexico, M6¼, h=100km
		i	41			
		i	37.00			
	✓ Bway	iPKP	36.28		132°	
		e	37.03			
25	✓ B.Hill	traces	06.14.26			Seismic, probably local
25	✓ Bway	traces	07.47.06			
25	✓ B.Hill	i	19.32.12			USCGS.H=19.20.48, East India.
	✓ Bway	e	32.27			
26	✓ B.Hill	i	04.26.58			Seismic, probably local
		e	30.54			
		i	31.17			
26	✓ Bway	e	07.47.06			Seismic, probably local
26	✓ Bway	e	21.55.15			
	✓ B.Hill	e	55.29			

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Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

JUN 1959

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' 8" 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.

June 1959 (cont.)

... Page 7 ...

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
10	✓ Bway	i	11.35.09			
10	✓ Bway	eP	14.11.31			about 300 km from station
		iS	12.00			
10	× Bway	eP	20.03.13			about 300 km from station
		iS	43			
10	× B.Hill	iP	20.04.29			about 300 km from station
		iS	59			
11	× B.Hill	iP	05.34.31			Probably Central Africa
		i	35.42			
	× Bway	e	35.36			
		e	38.18			
11	✓ Bway	i	23.45.42			USCGS. H=23.32.47, 21 ¹ / ₂ °S. 69 ¹ / ₂ °W. n.Chile.
12	→ B.Hill	iP	00.08.22		Δ=190 km	Probably Kariba.
		iS	41			
	→ Bway	iP	50		Δ=410 km	
		iS	09.31			
12	→ Bway	iPKP ₂	01.05.33		143°	USCGS. H=00.45.56, 51 ¹ / ₂ °N 175°W. Fox Islands. Seismic, probably local.
13	✓ Bway	e	06.32.21			
14	✓ Bway	iP	00.24.51		90°	USCGS. H= 00.11.57
	→ B.Hill	iP	25.02		91°	20 ¹ / ₂ °S. 68°W. Bolivia, M = 7 ¹ / ₂ .
	×	i	35.30			
	×	i	36.00			
	×	i	27			
	→	i	37.00			
14	✓ B.Hill	eP _n	15.05.45		Δ=1350 km.	BPI H.= 15.02.52. 21°10'S. 17°E.
	✓	eS _n	07.44			Otjiwarongo dist. S.W.Africa.
	×	i	08.11			
	×	i	58			
		i	09.40			
14	× B.Hill	iP	18.10.35			about 290 km from station
		iS	11.04			
14	→ Bway	i	23.55.22			
15	× B.Hill	iP	12.45.10			about 360 km from station.
		iS	46			
15	× Bway	e	21.37.36			
		i	38.03			
	× B.Hill	e	40.55			
16	✓ Bway	e	01.38.30			
	✓ B.Hill	e	01.43.56			
	✓	e	44.10			
	✓	i	44.50			
16	✓ Bway	e	01.49.26			
	✓	i	50.09			
	×	i	50.21			
16	× Bway	e	08(26.55)			
16	✓ Bway	e	17.12.25			
	×	e	43			
16	× B.Hill	e	17.46.49			
17	× B.Hill	iP	15.41.46			about 400 km from station.
	×	iS	42.26			
17	✓ Bway	e	16.19.04			
17	✓ B.Hill	eP	17.15.01			about 160 km from station
	×	iS	17			
18	✓ × B.Hill	ePKP	15.50.30		128°	USCGS. H=15.31.25, 54°N. 160°E. Near East coast of Kamchatka, M=6 ¹ / ₂ .
	✓ × Bway	ePKP	37		132°	
18	✓ ✓ B.Hill	ePKP	16.17.59		128°	USCGS. H=15.58.38, 54°N. 161°E. Near east coast of Kamchatka M.=6 ³ / ₄ .
18	× B.Hill	traces	21.30.45			
19	× B.Hill	e	12.02.12			Probably Central Africa
		i	04.40			
	×	i	05.48			
	→ Bway	i	12.03.26			

/continued...

June 1959 (continued)

... Page 8 ...

DATE	STATION	PHASE	G. H. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
19	x Bway	iP	13.36.01			about 130 km from station.
		iS	13			
20	B.Hill	i	12.19.40			
		i	21.04			
20	x Bway	e	14.27.32			
20	x B.Hill	eP	16.54.40		84°	USCGS.H=16.42.25, 32°N. 40°W. Atlantic Ocean.
21	Bway	i	14.26.51			
21	x B.Hill	traces	19.28.00			Seismic, probably local.
21	x B.Hill	traces	22.26.00			Seismic, probably local.
21	x Bway	iP	23.42.59		88°	USCGS.H=23.30.05, Jujuy Province, Argentine Probably Central Africa.
22	x B.Hill	e	04.45.47			
		i	47.05			
		i	52			
23	x Bway	traces	14.54.42			
23	B.Hill	iP	20.35.38		△ = 300 km	Local earthquake
		iS	36.08			
	x Bway	iP	36.02		△ = 420 km	
		iS	42			
23	x B.Hill	i	21.53.27			
24.	x B.Hill	eP	00.00.47			about 300 km. from station
		iS	01.17			
24	x Bway	traces	14.16.16			W.W.rand earth tremor
24	x B.Hill	eP	18.10.33			about 270 km from station
		iS	11.00			
24	x B.Hill	e	22.52.08			Probably Central Africa
		i	54.21			
25	x B.Hill	e	01.00.50			
	x Bway	traces	54.56			
25	x B.Hill	e	03.23.15			USCGS.H=03.12.28, Hindu Kush.
	x Bway	i	23.42			
26	x Bway	traces	05.20.39			
26	x Bway	e	14.04.47			
		i	05.52			
27	x B.Hill	i	03.48.15			
27	x Bway	e	08.15.27			
27	x B.Hill	iPKP	19.23.00			USCGS H.=19.04.27, 33°S. 179°W. South of Kermadec Is. M= 6 $\frac{3}{4}$ h = + 100 km.
		i	23			
	x Bway	iPKP	12			
		i	33.21			
28	x Bway	iP	19.56.28		91°	USCGS. H= 19.43.22
	x B.Hill	iP	35		93°	9 $\frac{1}{2}$ °S. 122 $\frac{1}{2}$ °E. Sawoe Sea
		i	20.07.03			
		i	31			
		i	08.31			
28	x B.Hill	i	20.13.53			
	x Bway	e	13.56			
		e	14.00			
29	x B.Hill	e	04.06.23			
29	x Bway	e	14.27.37			
		e	28.47			
	B.Hill	i	28.53			
30	x Bway	traces	05.52.00			
30	x B.Hill	e	22.42.28			

M. Scott.
H.O. Oliver.

25th September, 1959.

JUL - AUG - SEP 1959

Copied.

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 (Eway)</u>	<u>BROKEN HILL (B.Hill)</u>
Latitude:	20° 02' 16" S.	14° 26' 46" S.
Longitude:	28° 36' 18" 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

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Address:

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JULY, 1959.

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
1	Bway B.Hill	iPKP ePKP	02.45.34 46.30		117 $\frac{1}{2}$ ^o 118 ^o	USCGS.H=02.27.46, 23 ^o N 139 $\frac{1}{2}$ ^o E. Bouin Is. h +550km M = 6.
1	x B.Hill	i	05.43.04			
	x Bway	i	05.43.22			
1	x Bway	i	08.42.27			
		e	32			
1	x B.Hill	e	17.00.13			
1	x B.Hill	iP	21.14.33			about 190 km from sta- tion
		iS	52			
2	x Bway	iPKP	11.52.55		130 ^o	USCGS.H=11.34.20, 20 ^o S 178 $\frac{1}{2}$ ^o E. Fiji Islands h + 650 km.
	x					Seismic, probably local
2	x Bway	eP	13.38.49			
		iS	39.06			
2	x B.Hill	iP _n	17.00.44			Probably Central Africa.
	x	iP ₁	01.19			
		i	02.31			
	x Bway	iP _n	02.00			
	x	iP ₁	02.35			
	x	i	03.44			
		i	04.25			
3	B.Hill	iPKP	18.14.32		133 ^o	USCGS.H=17.55.29, 16 ^o S 172 $\frac{1}{2}$ ^o . New Hebrides
		i	15.12			
	Bway	iPKP	14.42		128 ^o	Is. M $\frac{3}{4}$ 6 $\frac{1}{2}$. h + 200 km
		i	15.34			
4	x B.Hill	e	18.25.31			
4	x B.Hill	e	22.18.27			
		e	19.26			
5	x B.Hill	e	09.49.49			Probably Central Africa
		i	52.03			
		i	53.32			
6	x Bway	iP	09.21.41		86 ^o	USCGS.H=09.10.17, 26 $\frac{1}{2}$ ^o S 61 $\frac{1}{2}$ ^o W. Chaco, Argentina M = 6 $\frac{3}{4}$, h + 600 km.
	x	i	31.02			Seismic, probably local. W.W.rand earth tremor.
6	x Bway	i	13.46.04			
6	x Bway	e	20.38.43			
7	x Bway	traces	12.19.30			
	x B.Hill	i	20.39			
7	Bway	iP	13.42.38		89 ^o	USCGS.H=13.29.59, 21 $\frac{1}{2}$ ^o S 67 W. Bolivia, h + 200 km
7	x Bway	e	16.51.48			
8	x B.Hill	e	02.51.00			Seismic, probably local
	x	e	52.03			
9	x Bway	i	16.18.11			
		i	42			
	x B.Hill	i	21			
10	x Bway	eP	04.24.52		92 $\frac{1}{2}$ ^o	USCGS.H=04.11.40, 19 ^o S, 69 W. Chile-Bolivia border.
10	x Bway	iP	17.52.24		77 ^o	USCGS.H=17.40.47, 41 ^o N 63 ^o E. Kirghiz, USSR
11	x Bway	iP	12.10.11		43 $\frac{1}{2}$ ^o	USCGS.H=12.01.36, 36 ^o S 78 ^o E, Indian Ocean. M=6 $\frac{1}{2}$
	x B.Hill	iP	37		48 ^o	
11	x Bway	e	12.37.45			W.W.rand earth tremor
11	x Bway	iPKP	18.52.05		122 ^o	USCGS.H=18.23.00, 44 ^o N, 148 $\frac{1}{2}$ ^o E. Kuvib Is.
12	x B.Hill	iPKP	00.42.54		136 ^o	USCGS.H=00.24.22, 19 $\frac{1}{2}$ ^o S 177 $\frac{1}{2}$ ^o E. Fiji Is.
	x Bway	iPKP	55		131 ^o	h + 400 km. M = 6 $\frac{1}{2}$.
12	x Bway	e	02.03.11			Seismic, probably local.
*** 6	Bway	iP	09.34.53		86 ^o	USCGS H=09.23.27, 26 $\frac{1}{2}$ ^o S 61 $\frac{1}{2}$ ^o W. Chaco, Argentina M = 6 $\frac{3}{4}$; h + 600 km
		i	44.14			

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July, 1959 (continued)

DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
12	x B.Hill	iP _n	15.59.02		Δ ± 330 km	Local earthquake.
	>	iP ₁	11			
	>	i	35			
	x Bway	eP _n	16.00.07		Δ ± 750 km	
	>	e	01.27			
13	x Bway	i	04.48.52			USCGS.H=04.36.00, Sumbawa Is. Region
	> B.Hill	i	57			USCGS H=12.28.45, 52°N
13	x B.Hill	ePKP	12.48.12		141°	172½°W. Andreanof Is.
	x Bway	iPKP	21		147°	M = 6½.
13	> Bway	ePKP	15.45.27		127°	USCGS.H=15.24.44. 25½°S
	> B.Hill	iPKP	47		133½°	180°, Kermadec Is. h ± 500 km.
14	x Bway	e	00.19.43			
14	x Bway	i	07.58.31			W.W.rand earth tremor
	>	i	59.40			
	>	i	08.00.09			
	> B.Hill	i	07.59.48			
14	x B.Hill	traces	09.00.15			USCGS.H=08.40.48, 51½°N
	x Bway	iPKP ₁	00.24		146°	172°W, Fox Is.
14	> Bway	iPKP ₁	11.53.18		146°	USCGS.H=11.33.42, 56°N
	>					159°W. Alaska Peninsula
14	> Bway	ePKP	13.19.28		128°	USCGS.H=13.00.24, 16½°S
	>					173°E. New Hebrides Is. Region. h + 100 km.
14	x B.Hill	eP	22.44.29		92°	USCGS H=22.31.22, ½°N, 120°E, Near N.Coast of Celebes.
15	x Bway	traces	17.17.30			W.W.rand earth tremor.
15	> B.Hill	e	18.55.08			Seismic, probably local
	>	e	57			
16	x Bway	e	02.18.51			W.W.rand earth tremor
16	x Bway	traces	03.28.31			W.W.rand earth tremor
16	> Bway	iPKP ₁	07.19.31		149°	USCGS.H=07.00.05, 54°N
	>					161°W, South of Alaska Peninsula.
16	x Bway	e	08.38.15			W.W.rand earth tremor.
16	x Bway	ePKP ₁	15.37.01		147½°	USCGS.H=15.17.27, 50½°N
	>					177°W, Andreanof Is.region
17	> Bway	i	19.25.19			W.W.rand earth tremor
	>	i	26.22			
	>	i	26.55			
	> B.Hill	e	26.35			
	>	e	28.40			
17	x Bway	e	19.10.50			
	> B.Hill	e	11.17			
18	x Bway	traces	03.47.40			
18	x Bway	iPKP	07.21.14		129°	USCGS.H=07.00.36, 21½°S.
	x B.Hill	iPKP	32		135°	179°W, Fiji Is. region
	>					h = + 600 km.
18	> B.Hill	eP	09.29.19			about 300 km from station
	>	iS	59			
18	x Bway	traces	13.18.58			W.W.rand earth tremor.
18	> B.Hill	iP	20.08.13		97°	USCGS.H=19.54.45, 15½°N
	>	i	32			120½°E. Luzon. M=6¼
	> Bway	eP	08.18		97½°	
	>	i	22			
18	x B.Hill	eP	22.50.05			about 190 km from station
	>	eS	24			
19	x Bway	traces	00.17.52			W.W.rand earth tremor
19	> B.Hill	eP	02.23.47			about 230 km from station
	>	iS	24.10			
19	x Bway	iP	03.53.50		75°	USCGS.H=03.42.02, 6½°S
	>	iP	54		76½°	105°E, Sunda Strait.

July 1959 (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	C/ R	ARC DISTANCE	REMARKS.
19	x Bway	iP	15.19.06		94°	USCGS.H=15.06.10, 15°S 70½°W, Peru, h + 200 km M = 7.
		i	20.02			
		i	22.49			
	x B.Hill	iP	19.15		95°	
		i	37			
20	x B.Hill	i	02.18.33			
20	x Bway	iP	02.52.33		80½°	USCGS.H=02.40.13, 6°S 110°E, Java Sea.
		i	03.01.58			
	x B.Hill	iP	02.52.37		81½°	
20	x B.Hill	e	03.02.05			
20	x Bway	traces	09.38.30			W.W.rand earth tremor
20	x Bway	e	14.53.57			W.W.rand earth tremor
		i	55.03			
		i	55.34			
	B.Hill	e	55.13			
20	x B.Hill	iPKP	17.14.30		133°	USCGS.H=16.53.38, 23½°S 179°E. Fiji Is. h+600 km
21	x Bway	iPKP	08.02.27		141°	USCGS.H=07.43.13, 14½°N 167½°E. New Hebrides Is. M = 6¼.
22	x Bway	e	19.41.52			
		i	42.10			
22	x Bway	ePKP	23.21.17		109°	USCGS.H=23.02.27, 5°S 132½°E. New Britain. h + 60 km
23	x B.Hill	e	07.54.03			Seismic, probably local
		i	55.00			
23	x Bway	e	11.15.56			
23	x Bway	iPKP	15.15.54		128½°	USCGS.H=14.56.45, 24½°S 176°W. Tonga Is.
	x B.Hill	iPKP	16.02		135°	h + 60 km. M=5¾. about 250 km from station
23	x B.Hill	eP	16.45.14			
		iS	39			
23	x Bway	e	23.59.48			
24	x B.Hill	ePKP ₁	01.42.50		147½°	USCGS.H= 01.23.29, 41°N 125½° W. off the coast of N. California. M=5¾.
	x Bway	ePKP ₁	01.43.00		153°	Seismic, probably local
24	x B.Hill	e	04.14.38			
			15.42			
24	x Bway	e	08.47.27			W.W.rand earth tremor.
24	x B.Hill	iP	16.29.15		76°	USCGS.H=16.17.30, 24½°N
	x Bway	iP	29.31		78°	94½°E. India-Burma border.
24	x B.Hill	e	17.07.56			
24	x Bway	iP	23.12.38		56°	USCGS.H=23.03.08, 56½°S. 28½°W.
		i	13.06			
	x B.Hill	iP	13.12		60°	Sandwich Is.
		i	13.38			
25	x B.Hill	e	03.56.45			Seismic, probably local.
25	x Bway	e	12.09.36			
	x B.Hill	e	11.11			
26	x B.Hill	traces	03.55.04			Seismic, probably local
26	x B.Hill	e	11.28.14			Probably Central Africa
26	x Bway	traces	14.24.36			Seismic, probably local
26	x Bway	e	17.17.17			
27	x Bway	traces	14.11.00			W.W.rand earth tremor.
27	x B.Hill	eP	17.41.37			about 260 km from station
		iS	42.03			
27	x Bway	traces	20.55.00			W.W.rand earth tremor
27	x B.Hill	iP	21.19.44		Δ ±20 km	Local earthquake
		iS	46			
	x Bway	eP	21.00		Δ ±650 km	
		iS	22.05			

July, 1959 (continued)

<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u> <u>h. m. s.</u>	<u>C/</u> <u>R</u>	<u>ARC</u> <u>DISTANCE</u>	<u>REMARKS.</u>
28	x Bway	traces	09.36.00			W.W.rand earth tremor.
28	x Bway	i	11.04.58			
	x B.Hill	i	05.34			
29	x B.Hill	traces	00.48.00			
30	x B.Hill	e	04.48.07			Probably Central Africa
	x	e	53.37			
	x	e	57.19			
	(Bway	e	49.52			
30	✓ Bway	e	13.12.55			
31	x B.Hill	e	00.18.23			Seismic, probably local
31	x B.Hill	eP	03.37.18			about 330 km from station
		eS	51			

H.O. Oliver.
Mavis Scott.

11th December, 1959.

Kew.

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

AUG 1959

~~E APR 1959~~ ~~Replanted~~

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.

Station: BULAWAYO

Latitude: 20° 08.6' S.

Longitude: 28° 36.8' E.

Lithologic Foundation: Hornblende schists of the Bulawayan system

Height: 1341 meters.

Instrument: Vertical and horizontal Willmore S.P.

Seismo. Officer: Director, Federal Surveys.

Observer: Officer in Charge, Goetz Observatory.

Institution: 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.

AUGUST, 1959.

- 13 -

<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>
1	x Bway	e	02.42.53			
1	x Bway	i	10.13.55			
	x B.Hill	i	14.11			
1	y Bway	e	13.39.59			Seismic, probably local
		i	40.23			
2	x B.Hill	traces	02.46.00			Probably Central Africa
2	x Bway	e	20.24.21			
2	y B.Hill	e	20.57.47			Seismic, probably local
		e	58.28			
3	x B.Hill	e	12.50.08			Seismic, probably local
3	x Bway	ePP	15.47.16	46°		USCGS.H=15.36.37, 46 $\frac{1}{2}$ °S 59°E. Indian Ocean
3	x B.Hill	eP _c P	16.20.02	50°		USCGS.H=16.09.54, 46 $\frac{1}{2}$ °S 59° E. Indian Ocean.
	x Bway	ePP	20.34	46°		
3	x Bway	e	21.44.42			W.W.rand earth tremor.
4	x Bway	ePKP	08.20.15	135°		USCGS.H= 08.02.17, 20°S 178°W. Fiji Islands h = + 600 km.
	y	i	29			
		i	23.02			
5	x B.Hill	eP _n	02.29.06			Probably Central Africa
	x	iS _n	30.50			
		iS ₁	31.55			
	x Bway	e	02.30.23			
		i	33.05			
5	x B.Hill	traces	21.13.14			Seismic, probably local
6	x B.Hill	e	00.02.31			Seismic, probably local
	x	e	03.48			
6	✓ B.Hill	i	02.39.01			
	✓ Bway	i	59.01			
6	x Bway	traces	12.12.30			W.W.rand earth tremor
7	x B.Hill	eP _n	04.38.10			Probably Central Africa
	x	iS _n	39.30			
	y	i	40.10			
	x Bway	traces	41.20			
7	✓ Bway	iPKP ₁	11.03.06	149°		USCGS.H= 10.43.32, 56°N 154°W. Kodiak Is. M=5 $\frac{3}{4}$
7	x B.Hill	traces	22.04.40	143°		USCGS H= 21.45.26, 56 $\frac{1}{2}$ °N Kodiak Is. 154°W.
	✓ Bway	iPKP ₁	05.00	149°		
7	✓ Bway	e	22.37.57			W.W.rand earth tremor
7	x B.Hill	traces	22.41.22			
8	✓ B.Hill	iPKP	01.06.44	129°		USCGS.H=00.47.38, 55°N 162 $\frac{1}{2}$ ° E. Near coast of Kamchatka. M= 6 $\frac{1}{2}$.
	✓ Bway	ePKP	06.54	134°		about 310 km from station.
8	x B.Hill	iP	10.55.33			
		iS	56.04			
8	y Bway	e	15.07.54			W.W.rand earth tremor
9	x Bway	e	04.56.17			
9	x B.Hill	e	11.20.33			Probably Central Africa
	x Bway	i	21.36			
9	x B.Hill	e	18.53.34			Probably Nyasaland
	x	i	54.46			
		i	55.20			
	x Bway	e	53.35			
	y	i	54.53			
9	✓ Bway	e	21.22.04			Seismic, probably local
10	x B.Hill	e	23.20.41			" " "
11	x B.Hill	iP _n	00.19.24	Δ=440 km		Probably Livingstone (S.R.) area
		i	32			
	x	i	20.11			
	x Bway	iP _n	19.24	Δ=440 km		
		i	31			
	x	i	20.18			

/continued.....

August, 1959 (Continued)

- 15 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
13	x B.Hill	eP	12.36.33			
		iS	57			
13	x B.Hill	iP	15.09.29			
		iS	53			
12	x Bway	eP _n	18.32.28	Δ = 690 km		B.P.I. H= 18.30.56 26°S, 30°30'E. Carolina District, Trans- vaal. Felt at Ermelo, Bethal, Carolina
	x	i	32.55			
	x	iS _n	33.32			
	x	i	33.40			
	x	iS ₁	34.10			
	y B.Hill	iP _n ¹	33.44	Δ = 1300 km		
	y	i	35.52			
	x	iS ₁	37.10			
13	y Bway	i ¹	00.43.32			USCGS.H=00.32.55, Caspian Sea.
13	x B.Hill	e	18.03.50			Seismic, probably local
13	y B.Hill	ePKP ₂	19.26.36	147°		USCGS.H= 19.06.59, 43 ¹⁰ / ₂ °N 126 ¹⁰ / ₂ °W. Off coast of Oregon. about 250 km from station
13	x B.Hill	eP	19.13.16			
		iS	41			
13	x B.Hill	traces	20.06.31			Seismic, probably local
13	y B.Hill	eP	21.05.59			about 230 km from station
		eS	06.22			
14	x B.Hill	iP	00.28.37			about 230 km from station
		iS	29.00			
14	x B.Hill	iP	04.29.27			about 240 km from station
		iS	51			
14	x B.Hill	eP	04.40.00			about 230 km from station
		iS	23			
14	x Bway	eP	04.52.39	97°		USCGS.H=04.39.07, 0°, 125 ¹⁰ / ₂ °E, Molucca passage
	x B.Hill	eP	41	98°		Probably Central Africa
14	x B.Hill	traces	04.56.30			Seismic, probably local
14	x Bway	eP	12.53.26			
		iS	54.10			
14	y Bway	e	14.18.57			W.W.rand earth tremor
15	y Bway	i	03.38.30			
15	x Bway	i	06.42.55			
15	x B.Hill	iP	09.10.38	100°		USCGS.H=08.57.04, 23°N 121°E. Formosa. M=6 ³ / ₄
	y Bway	eP	46	101°		
15	x B.Hill	ePKP	13.33.55	140 ¹⁰ / ₂ °		USCGS.H=13.14.26, 21°S 174°W. Tonga Is.
15	x B.Hill	iP	15.30.48	Δ = 250 km		Probably same region as earthquake of 12th Aug. N. Rhodesia.
		iS	31.13			
	x Bway	eP _n	31.43			
		eS _n	32.46	Δ = 650 km		
		iS _n	33.15			
16	x B.Hill	eP ¹	06.18.57			about 230 km from station
		iS	19.21			
16	x Bway	eP _n	16.02.46	Δ = 650 km		Probably same region as earthquake of 12th Aug. N. Rhodesia.
		eP ₁	03.00			
		iS ₁	03.55			
16	x Bway	e	23.09.09			Seismic, probably local
17	x Bway	i	21.23.40			USCGS.H=21.04.40, 7 ¹⁰ / ₂ °S 156°E. Solomon Is. M=7 ¹ / ₄
	x B.Hill	i	46			
18	x Bway	i	00.43.02			
	x B.Hill	i	04			
18	x B.Hill	i	01.03.55			
18	x B.Hill	traces	03.15.53			Seismic, probably local
		i	16.15			
18	x B.Hill	ePKP ₂	05.33.10	147°		USCGS.H=05.13.30, 42°N 127°W, Off coast of Oregon

/continued.....

August, 1959 (continued) - 16 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
18	x B.Hill	iPKP	06.56.36	137°		USCGS.H=06.37.13, 44 $\frac{1}{2}$ °N 111°W. Yellowstone Park
		i	44			
18	y Bway	iPKP	56.43	143°		M = 7.1
18	x B.Hill	iPKP	15.45.29	137°		H.=15.26.06. Yellowstone
	x Bway	iPKP	33	143°		aftershock. M=6 $\frac{1}{2}$.
18	x B.Hill	eP	17.32.25			Probably n. Rhodesia
		iS	52			
	x Bway	e	34.09			
18	y B.Hill	e	21.17.00			
		i	54			
19	x B.Hill	i	01.50.05			Seismic, probably local
	x	i	51			
		i	51.06			
19	y B.Hill	e	05.20.07			Probably Central Africa
		i	22.29			
		i	23.44			
19	x B.Hill	iP	19.00.34			about 230 km from station
	x	iS	57			
19	x B.Hill	traces	19.54.00			Seismic, probably local
20	x Bway	iP	12.28.38			USCGS.H=12.20.08, 29°S
	y B.Hill	iP	29.05			78° E. Indian Ocean.
20	y B.Hill	e	18.36.54			Seismic probably local
			37.27			
20	x Bway	i	21.22.29			
20	y B.Hill	e	21.37.02			Probably Central Africa
		i	38.15			
		i	55			
	x Bway	traces	40.20			
21	x Bway	e	00.47.03			W.W.rand earth tremor
21	y Bway	iP	08.16.04	89°		USCGS.H=08.03.15, 50 $\frac{1}{2}$ °S
		i	18.24			139 $\frac{1}{2}$ °E. Indian Ocean.
						M = 5 $\frac{3}{4}$
21	x Bway	iP	09.50.39	89°		USCGS.H=09.37.49, 50 $\frac{1}{2}$ °S
	y B.Hill	iP	51.02	95°		140°E. Indian Ocean.
						South of Australia.
21	x B.Hill	eP	14.06.38			about 230 km from station
		iS	07.01			
21	x B.Hill	e	22.25.31			Seismic, probably local
22	x Bway	e	02.12.54			
22	x B.Hill	iP	03.34.09			about 240 km from station
		iS	33			
22	x B.Hill	e	16.35.35			Probably Central Africa
		i	37.03			
23	x Bway	i	07.09.51			
23	y B.Hill	iP	16.27.40			about 180 km from station
		iS	58			
23	x B.Hill	iP	22.31.28	60°		USCGS.H=22.21.30; 35 $\frac{1}{2}$ °N
	x Bway	iP	32.01	66°		3°W. Meditteranian Sea
24	x B.Hill	i	01.28.58			Central Africa
	x Bway	i	01.30.05			M= 6.1 (Lwiro)
	x	i	33.05			
	x	i	53			
24	x Bway	i	08.25.40			
24	x Bway	traces	09.25.49			Probably W.W.rand
	x	traces	09.31.33			earth tremors.
24	y Bway	ePn	20.0635	Δ =500 km		Probably Rhodesia-
		iP ₁	40			Mozambique border.
		iS ₁	07.25			
		iS _n	48			
24	x Bway...	ePKP	21.49.48	124°		USCGS.H=21.30.46, 10 $\frac{1}{2}$ °S
	y B.Hill	ePKP	49.55	127°		161°E. Solomon Islands.
						M = 7.
25	y Bway	e	02.59.37			W.W.rand earth tremor.

/continued

August, 1959 (continued)

- 17 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
25	x B.Hill	eP	05.48.07			about 220 km from station
		eS	29			
25	x B.Hill	iP	06.12.23			about 240 km from station
		iS	47			
25	✓ Bway	i	12.37.20			USCGS.H=12.24.18
	✓ B.Hill	i	34			Northern Chile.
25	x Bway	i	17.01.33			
25	y Bway	traces	20.24.30			W.W.rand earth tremor.
25	y Bway	traces	22.00.45			W.W.rand earth tremor.
25	x B.Hill	e	23.30.39			Seismic, probably loca.
		i	31.08			
	x Bway	traces	33.00			
26	✓ x B.Hill	iPKP	08.44.36	130°		USCGS.H=08.25.30, 18°N,
	✓ x Bway	iPKP	37	130°		94½°W. Vera Cruz, Mexico
						M= 6¾.
26	x B.Hill	iP	10.34.32			about 230 km from station.
		iS	55			
26	✓ x Bway	iPKP ₁	10.47.21	148°		USCGS.H=10.27.41, 51°N,
						132 W, S.of Queen Charlotte
						Island.
26	✓ Bway	i	11.01.19			
27	✓ Bway	iP	08.03.31	93°		USCGS.H=07.50.28, 0°,
						122°E. N.Celebes, h+200 km
27	x B.Hill	e	13.50.04			
27	x B.Hill	traces	20.53.55			
28	✓ B.Hill	iP	00.05.04	77°		USCGS.H=23.53.10, 25°N,
	✓ Bway	iP	20	79°		96°E, N. Burma.
28	✓ y Bway	i	12.27.02	140°		USCGS.H=12.07.44, 63½°N
						149°W, Central Alaska
28	✓ B.Hill	eP	13.46.58			about 230 km from station
		iS	47.21			
28	x Bway	e	15.44.03			W.W.rand earth tremor.
28	✓ B.Hill	e	16.38.50			Seismic, probably local
		i	39.25			
28	x B.Hill	iP	18.00.15			about 230 km from station
		iS	00.38			
28	x B.Hill	traces	18.15.42			
29	y B.Hill	traces	03.41.10			Probably Central Africa
29	x Bway	i	11.19.50			W.W.rand earth tremor
29	x B.Hill	traces	14.35.00			Probably local
29	✓ x B.Hill	iP	17.16.33	97°		USCGS.H=17.03.10, 52°N,
	✓ x Bway	iP	54	100°		106½°E. Lake Baika USSR.
						M= 6¾.
30	✓ x Bway	i	03.35.26			USCGS.H=03.24.54, 31½°N
						3°W. Med. Sea.
30	✓ x Bway=	iP	21.53.37	48°		USCGS.H=21.45.07, 36½°S
	✓ x B.Hill	iP	54.03	52°		78½°E. Indian Ocean.
30	✓ B.Hill	e	23.07.30			Lake Baikal aftershock
	✓ Bway	e	08.58			
31	x B.Hill	i	08.08.36			Seismic, probably local
		i	09.03			
31	x B.Hill	e	12.50.49			Seismic, probably local
		i	51.48			

H.O. Oliver.
Mavis Scott.

11th December, 1959.

SEPTEMBER, 1959

DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/R	REMARKS.
			h.	m.	s.			
1	✓ B.Hill	i	01.12.20					
1	✗ B.Hill	iP	11.14.59			250 km		N. Rhodesia.
	✓ Bway	iS	15.24					
	✓ Bway	eP	15.53					
	✓ Bway	i	16.57					
1	✓ B.Hill	iP	11.47.21			58½°		USCGS.H=11.37.42, 41½° N
	✓ Bway	iP	48.00			64½°		20°E. Albania.
1	✗ Bway	traces	14.47.00					W.W.rand earth tremor.
1	✗ B.Hill	e	15.18.58					Seismic, probably local
2	✗ B.Hill	eP	01.11.05					about 250 km from station
		iS	30					
2	✗ Bway	iP _n	11.35.00					W.W.rand earth tremor.
		i	24					
3	✗ Bway	iPP	06.40.43			63½°		USCGS.H=06.27.30, 4½°S,
		i	43.09					123°E. Ceibes Islands.
	✓ B.Hill	iPP	40.47			65°		
3	✓ Bway	traces	07.21.56					Seismic, probably local
3	✗ B.Hill	iP	13.24.19					about 210 km from station
		iS	40					
3	✗ B.Hill	e	14.43.35					
4	Bway	e	00.21.30					
	✗ B.Hill		21.38					
4	✗ B.Hill	e	13.51.37					
4.	✓ B.Hill	iP	18.36.04			57½°		USCGS.H=18.26.41, 1°S,
	✓ Bway	iP	36.12			55°		24°W. Atlantic Ocean.
4	✗ Bway	iP	23.35.31			76½°		USCGS.H=23.22.56, 47°S
	✗ B.Hill	iP	53			81½°		75°W. Near Coast of S.Chile
5	✗ B.Hill	iP	07.41.23					about 240 km from station.
		iS	47					
5	✗ B.Hill	eP	10.23.58					about 220 km from station
		iS	24.20					
5	✗ Bway	e	11.01.55					W.W.rand earth tremor.
5	✗ B.Hill	eP	13.37.00					about 230 km from station
		iS	23					
5	✓ Bway	i	16.38.13					
5	✗ B.Hill	iPKP	23.23.19			140½°		USCGS.H=23.05.00, 18°S,
		i	25.58					178½°W. Fiji Islands.
								h + 550 km
6	✓ Bway	eP	00.41.44			100½°		USCGS.H =00.27.59, 5½°N,
								126½°E. Phillipine Is.
6	✗ B.Hill	e	03.46.00					Seismic, probably local.
		i	47.05					
6	✗ B.Hill	i	11.34.35					Seismic, probably local.
6	✗ B.Hill	e	12.29.13					Seismic, probably local.
6	✗ Bway	i	19.07.59					USCGS.H=18.55.09. Peru-
								Bolivia border h+ 150 km.
7	✓ Bway	iP _n	03.33.41					W.W.rand earth tremor.
		i	35.03					
7	✓ B.Hill	iP	05.14.36			240 km		N. Rhodesia
		iS	15.00					{probably same region
	✓ Bway	iP	15.31			630 km		as earthquake of 12th
		i	16.36					Aug. 1959.)
		i	17.00					
7	✗ Bway	eP	13.34.24			1100 km		Probably Rhodesia -
		iS	35.16					Mozambique border
	✗ B.Hill	traces	36.00					
7	✗ B.Hill	eP	14.30.48					about 230 km from station
		iS	31.11					
7	✗ B.Hill	iP	16.42.53					about 200 km from station
		iS	43.13					

/continued.....

September, 1959 (continued) - 19 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
8	x Bway	e	02.55.59			W.W.rand earth tremor.
8	x B.Hill	iP	04.53.41			about 240 km from station
		iS	54.05			
	x Bway	e	55.51			
8	x Bway= x B.Hill	i	13.18.53			USCGS.H=13.12.04, about 700 miles S. of Bouvet Is. S. Atlantic.
		i	19.41			
8	✓ B.Hill	iP	19.30.41	120°		USCGS.H=19.19.39, 42½°N. 142½°E. Japan.
8	x B.Hill	iP	20.02.45			about 250 km from station
		iS	03.10			(N. Rhodesia)
	x Bway	traces	04.00			
8	x Bway	iP	20.28.07	62½°		USCGS.H=20.18.37, 58½°S
	x B.Hill	iP	42	64°		24½° W. Sandwich Islands.
8	x B.Hill	iS	22.19.16			Seismic, probably local
8	x B.Hill	traces	22.28.30			Seismic, probably local.
9	✓ Bway	i	05.55.27			USCGS.H=05.44.38, Hindu Kush, h + 200 km
9	x B.Hill	iP	09.44.34			about 200 km from station.
		iS	54			
9	x Bway	traces	11.33.00			W.W.rand earth tremor.
9	x B.Hill	eP _n	16.55.42			N. Rhodesia.
		iP ₁ _n	56.00			
		iS ₁ _n	57.05			
		iS ₁	57.52			
	x Bway	eP	56.58			
		i	59.14			
9	x B.Hill	iP	23.47.15			about 240 km from station.
		iS	39			
10	✓ Bway	iPKP	05.54.00	121½°		USCGS.H= 05.35.04, 6½°S. 154½° E. Solomon Is.
10	x B.Hill	iP	18.17.00			about 250 km from station.
		iS	25			
11	x B.Hill	iP	01.55.21			about 40 km from station.
		iS	25			
11	x B.Hill	iP	02.39.52			Probably N. Rhodesia.
		iS	40.43			
11	x Bway	traces	05.40.00			W.W.rand earth tremor.
11	✓ B.Hill	iP	13.59.43			about 230 km from station
	x	iS	14.00.06			
11	x B.Hill	e	22.02.53			Seismic, probably N. Rhodesia
12	x Bway	i	08.37.22			
12	x B.Hill	iP	16.19.54			about 230 km from station.
		iS	20.17			
12	✓ B.Hill	iP	21.30.20	66°		USCGS.H=21.19.57, 36°N, 71°E, Hindu Kush, h+ 200 km
		i	33			
	x Bway	iP	30.47	70°		
13	x B.Hill	e	17.40.46			
13	x B.Hill	iP	19.27.01	70½°		USCGS.H=19.15.52, 39½°N, 74½°E, Khirgiz.SSR.-China border.
14	x B.Hill	iP	00.51.56			Probably N. Rhodesia.
		iS _n	52.48			
		iS ₁	53.25			
	x Bway	e	54.07			
14	x B.Hill	iP	01.00.52			about 280 km from station.
		iS	01.20			
	x Bway	i	02.04			
		i	04.50.			
14	x B.Hill	i	01.42.46			
		i	56			
14	x B.Hill	traces	02.04.35			
14	x B.Hill	iP	03.36.29			about 240 km from station.
		iS	53			

/continued

September, 1959 (continued)

- 20 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
14	x Bway	e	13.35.02			
14	x Bway	i	14.28.45	127°		USCGS.H=14.09.39, 28 $\frac{1}{2}$ °S 177°W, Kermadec Is. M = 7 $\frac{3}{4}$
	x B.Hill	i	55	132 $\frac{1}{2}$ °		
	x	i	29.16			
	x	i	32.15			
14	✓ Bway	i	15.17.46			
	✓ B.Hill	i	56			
14	✓ Bway	iPKP	17.25.19	126 $\frac{1}{2}$ °		USCGS.H=17.06.15, 29°S, 176 $\frac{1}{2}$ °W, Kermadec after- shock. about 140 km from station.
	x B.Hill	iPKP	25.30	133°		
		i	28.34			
		iP	21.19.38			
14	✓ B.Hill	iS	52			
14	x Bway	iPKP	22.42.57	126 $\frac{1}{2}$ °		USCGS.H=22.23.53, 29°S, 177°W, Kermadec aftershock M=6 $\frac{1}{2}$.
	✓ B.Hill	iPKP	43.08	133°		
		i	17			
		iP	05.59.59			
15	x B.Hill	iP	06.00.57			Probably N. Rhodesia
15	✓ B.Hill	ePKP	06.18.50	132 $\frac{1}{2}$ °		USCGS.H=05.59.42, 28 $\frac{1}{2}$ °S. 177°W, Kermadec aftershock M=6 $\frac{3}{4}$
		e	21.17			
		i	22.21			
		i	08.19.28			
15	x Bway	i	08.19.28			
15	✓ Bway	e	11.23.26			
		i	41			
		i	26.10			
	x B.Hill	e	23.37			
		i	52			
		i	26.27			
15	✓ Bway	iPKP	14.05.21	126 $\frac{1}{2}$ °		USCGS.H=13.46.17, 29°S. 177°W, Kermadec Is.
16	x Bway	traces	02.54.40			W.W.rand earth tremor. N.Rhodesia.
16	x B.Hill	iP _n	20.15.39			
		iS _n	16.57			
		iS _l	17.39			
16	x B.Hill	iP ^l	23.27.47			about 270 km from station.
		iS	28.14			
	x Bway	traces	28.12			
17	B.Hill	iP =	03.30.15			about 270 km from station.
		iS	42			
	✓ Bway	traces	31.10			
17	✓ B.Hill	eP	07.28.55			about 240 km from station
		iS	29.19			
17	x B.Hill	iP	09.09.53			about 260 km from station
		iS	10.19			
17	x B.Hill	e	19.16.36			
17	✓ B.Hill	i	21.43.12			USCGS.H=21.24.30, 13 $\frac{1}{2}$ °N, 88 $\frac{1}{2}$ °W, El Salvador h + 100 km
		i	28			
	✓ Bway	i	43.13			
17	✓ Bway	ePKP	22.34.25	124°		USCGS.H=22.14.40, 30 $\frac{1}{2}$ °N, 114°W, Gulf of California M=5 $\frac{1}{4}$.
	✓ B.Hill	ePKP	20	121 $\frac{1}{2}$ °		
18	x B.Hill	e	03.49.52			Seismic, probably N. Rhodesia.
			50.38			
18	x Bway	iP	12.10.39	55°		USCGS.H=12.01.11, 57 $\frac{1}{2}$ °S 24°W, Sandwich Islands.
	✓ B.Hill	iP	11.13	60 $\frac{1}{2}$ °		
		i	24			
18	x Bway	traces	20.11.00			
19	* B.Hill	iP	23.59.29			about 260 km from station
		iS	55			
19	✓ B.Hill	e	00.42.35			Seismic, probably II. Rhodesia.
		i	43.03			
21	x B.Hill	iP	05.32.57			about 130 km from station.
		iS	33.10			
21	x Bway	iP	12.31.16	76°		USCGS.H=12.19.30, 40°N, 74 $\frac{1}{2}$ °E, Kirgluz-China border.

/continued.....

September, 1959 (continued) - 21 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
21	Bway	iP	13.22.31	89°		USCGS.H=13.09.36, 10°S, 120°E Zumba Is.
22	B.Hill	iP	06.17.53			Seismic, probably local.
	x Bway	i	18.20			
22	x Bway	e	08.05.40			USCGS.H=07.45.55, Fox Is.
22	x B.Hill	iP	09.51.30	280 km		H=09.50.50
		iS	58.58			Probably Kariba area,
	Bway	iP _n	51.46	390 km		N. Rhodesia.
		iP ₁	57			
		iS _n	52.28			
		iS ₁	52.27			
22	x B.Hill	iP	13.47.33	240 km		Probably N. Rhodesia.
		iS	59			
	x Bway	traces	48.00			
22	x B.Hill	e	19.59.04			
22	x B.Hill	iP	21.23.25	250 km		N. Rhodesia.
		iS	51			
	x Bway	traces	24.30			
x 23	B.Hill	e	01.44.29			Seismic, probably local.
x 25	Bway	iP	00.27.01	82°		USCGS.H=00.14.30, 9°S,
	B.Hill	iP	05	84°		113½°E. East coast of Java.
> 25	x B.Hill	iP	02.42.38	240 km		H=02.42.01. N. Rhodesia.
		iS	43.02			
		iP	45.03	650 km		
x 25	B.Hill	iP	02.50.26	101°		USCGS.H=02.36.48, 22°N,
	x Bway	iP	35	103		122°E, Near E. coast of Formosa.
x 25	x B.Hill	e	18.48.43			Seismic, probably local.
26	x B.Hill	e	00.48.53			Seismic, probably local.
x 26	B.Hill	iPKP ₁	08.40.33	148°		USCGS.H=08.20.51, 43½°N.
	Bway	iPKP ₁	44	155°		128½°W. Off coast of Oregon
x 26	Bway	iP	10.31.02	92°		USCGS.H=10.18.20, 22°S, 68½°
		i	34			W. Chile.
	B.Hill	iP	31.15	93½°		h + 150 km.
> 26	B.Hill	e	19.02.45			Probably Central Africa.
> 27	Bway	i	03.31.21			
> 27	Bway	e	10.44.12			W.W.rand earth tremor.
		i	45.00			
x 27	Bway	i	15.48.00			Seismic, probably local.
		i	33			
x 27	B.Hill	e	22.33.25			Seismic, probably local.
		i	34.23			
29	x Bway	iP _n	00.51.33			W.W.rand earth tremor.
		iS _n	52.40			
		iS ₁	53.08			
	B.Hill	iP _n	52.51			
		iS _n	54.54			
		iS ₁	56.08			
29	x Bway	iP	08.04.16			Probably Rhodesia-
		i	05.06			Mozambique Border.
	B.Hill	iP	04.50			
			06.06			
29	Bway	iPKP	15.51.02	126½°		USCGS.H=15.31.57, 29°S,
	B.Hill	iPKP	14	132½°		176½°W, Kermadec Is. M=6½
29	x Bway	traces	16.00.30			
29	x Bway	e	19.09.06			Probably local.
	B.Hill	traces	10.00			
29	B.Hill	iP	19.40.07			about 220 km from station
		iS	29			
29	x B.Hill	e	20.28.55			Seismic, probably local.
29	x B.Hill	iP	23.23.31			about 240 km from station.
		iS	55			

/continued.....

September, 1959 (continued) - 22 -

<u>DATE</u>	<u>STATION</u>	<u>PHASE</u>	<u>G. M. T.</u>			<u>ARC</u> <u>DISTANCE</u>	<u>C/</u> <u>R</u>	<u>REMARKS.</u>
			<u>h.</u>	<u>m.</u>	<u>s.</u>			
30	λ B.Hill	e	02	26	48			Probably Central Africa.
		i		27	28			
30	λ Bway	e	10	34	18			
30	γ B.Hill	e	11	40	55			Seismic, probably local.
30	γ Bway	iPKP	20	44	(03)	127°		USCGS.H=20.25.58, 18°S,
	λ B.Hill	iPKP		45	11	132°		168°E, New Hebrides.
								M= 6½.

H.O. Oliver.
Mavis Scott.

11th December, 1959.

AUGUST, 1959.

- 13 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	x Bway	e	02.42.53			
1	x Bway	i	10.13.55			
	x B.Hill	i	14.11			
1	x Bway	e	13.39.59			Seismic, probably local
		i	40.23			
2	x B.Hill	traces	02.46.00			Probably Central Africa
2	x Bway	e	20.24.21			
2	x B.Hill	e	20.57.47			Seismic, probably local
		e	58.28			
3	x B.Hill	e	12.50.08			Seismic, probably local
3	x Bway	ePP	15.47.16	46°		USCGS.H=15.36.37, 46 $\frac{1}{2}$ °S 59°E. Indian Ocean
3	x B.Hill	eP _c P	16.20.02	50°		USCGS.H=16.09.54, 46 $\frac{1}{2}$ °S 59° E. Indian Ocean.
	x Bway	ePP	20.34	46°		
3	x Bway	e	21.44.42			W.W. rand earth tremor.
4	x Bway	ePKP	08.20.15	135°		USCGS.H= 08.02.17, 20°S 178°W. Fiji Islands h = + 600 km.
	x	i	29			
		i	23.02			
5	x B.Hill	eP _n	02.29.06			Probably Central Africa
	x	iS _n	30.50			
		iS ₁	31.55			
	x Bway	e	02.30.23			
		i	33.05			
5	x B.Hill	traces	21.13.14			Seismic, probably local
6	x B.Hill	e	00.02.31			Seismic, probably local
	x	e	03.48			
6	x B.Hill	i	02.39.01			
	x Bway	i	59.01			
6	x Bway	traces	12.12.30			W.W.rand earth tremor
7	x B.Hill	eP _n	04.38.10			Probably Central Africa
	x	iS _n	39.30			
	x	i	40.10			
	x Bway	traces	41.20			
7	x Bway	iPKP ₁	11.03.06	149°		USCGS.H= 10.43.32, 56°N 154°W. Kodiak Is. M=5 $\frac{3}{4}$
7	x B.Hill	traces	22.04.40	143°		USCGS H= 21.45.26, 56 $\frac{1}{2}$ °N
	x Bway	iPKP ₁	05.00	149°		Kodiak Is. 154°W.
7	x Bway	e	22.37.57			W.W.rand earth tremor
7	x B.Hill	traces	22.41.22			
8	x B.Hill	iPKP	01.06.44	129°		USCGS.H=00.47.38, 55°N
	x Bway	ePKP	06.54	134°		162 $\frac{1}{2}$ ° E. Near coast of Kamchatka. M= 6 $\frac{1}{2}$. about 310 km from station.
8	x B.Hill	iP	10.55.33			
		iS	56.04			
8	x Bway	e	15.07.54			W.W.rand earth tremor
9	x Bway	e	04.56.17			
9	x B.Hill	e	11.20.33			Probably Central Africa
	x Bway	i	21.36			
9	x B.Hill	e	18.53.34			Probably Nyasaland
	x	i	54.46			
		i	55.20			
	x Bway	e	53.35			
	x	i	54.53			
9	x Bway	e	21.22.04			Seismic, probably local
10	x B.Hill	e	23.20.41			" " "
11	x B.Hill	iP _n	00.19.24	Δ=440 km		Probably Livingstone (S.R.) area
		i	32			
	x	i	20.11			
	x Bway	iP _n	19.24	Δ=440 km		
		i	31			
	x	i	20.18			

/continued.....

August, 1959 (continued) - 14 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
11	x B.Hill	e	08.27.33			Seismic, probably local
11	x Bway	e	21.42.23			
11	x B.Hill	e	19.42.15			Probably Central Africa
	x	i	43.32			
	x	i	44.24			
11	✓ Bway	iPKP	22.08.46	126°		USCGS.H= 21.49.42. 11°S 161°E. Solomon Islands Probably Central Africa
12	B.Hill	traces	01.38.00			USCGS.H= 04.05.20, 15°S 26°30' E. N. Rhodesia Felt over wide area. Slight damage reported. This and the following 31 shocks are probably aftershocks of earthquake of 12th Aug. at H=04.05.20 N. Rhodesia.
12	✓ B.Hill	iP	04.05.53	△=210 km		
12	✓ Bway	iP	06.45	△=630 km		
	x	i	07.50			
12	x B.Hill	iP	04.29.56			
*	*	iS	30.21			
12	x B.Hill	iP	04.47.02			
		iS	47.24			
12	x B.Hill	traces	04.59.00			
12	x B.Hill	eP	04.53.00			
	x	iS	53.22			
12	✓ B.Hill	eP	05.00.21			
	✓	iS	43			
12	x B.Hill	traces	05.08.30			
12	✓ B.Hill	eP	05.11.25			
	✓	iS	49			
12	x B.Hill	traces	05.08.30			
12	x B.Hill	traces	05.21.30			
12	✓ B.Hill	eP	05.48.13			
	✓	iS	36			
12	x B.Hill	eP	06.06.08			
	x	iS	32			
12	✓ B.Hill	iP	07.10.17			
	✓	iS	41			
12	x B.Hill	traces	08.24.00			
12	✓ B.Hill	iP	08.54.59			
	✓	iS	55.24			
12	x B.Hill	traces	09.12.00			
12	x B.Hill	traces	09.22.45			
12	x B.Hill	traces	09.36.35			
12	x B.Hill	iS	09.49.19			
12	✓ B.Hill	iP	10.08.03			
	✓	iS	26			
12	x B.Hill	iP	11.10.25			
		iS	47			
12	x B.Hill	iP	13.02.48			
		iS	03.10			
12	x B.Hill	iP	13.30.59			
		iS	31.20			
12	x B.Hill	iP	14.13.59			
		iS	14.24			
12	✓ B.Hill	iP	15.23.50			
		iS	24.14			
12	✓ B.Hill	eP	16.34.20			
		iS	43			
12	x B.Hill	iP	18.28.29			
		iS	52			
12	x B.Hill	iP	19.16.33			
		iS	57			
13	✓ B.Hill	eS	01.18.53			
13	✓ B.Hill	eP	01.19.17			
		eS	40			
13	x B.Hill	traces	11.44.20			
13	x B.Hill	traces	12.12.30			
* 12	x B.Hill	iP	04.42.21			/continued
		iS	42.44			

copy

OCT 1959

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' 8" 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.

October, 1959.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
* 12	Bway	iP _n	19.36.21			W.W.rand earth tremor.
14	Bway	traces	03.42.10.			W.W.rand earth tremor.
15	B.Hill	iP	06.28.43	88°		USCGS.H=06.15.52, 1/2°N, 120 1/2°E, Celebes. M=6 1/2.
15	Bway	e	14.03.29			
16	B.Hill	iP	01.27.08	89°		USCGS.H=01.15.08, 30 1/2°S 69°W, San Juan Province
	Bway	iP	28.35			Argentine, h + 100 km
	Bway	iP	27.43	87°		
	Bway	i	28.12			
16	Bway	iP	16.28.42	99°		USCGS.H=16.14.53, 6°N, 125°E, Near S. Coast of
	B.Hill	iP	44	100°		Mindanao, Phillipine Is. Seismic, probably local
16	B.Hill	traces	21.51.00			
17	Bway	i	02.52.34			
17	B.Hill	traces	20.46.50			
	Bway	traces	48.50			
18	B.Hill	iP	11.11.51			about 200 km from station
		iS	12.11			
18=	B.Hill	iP _n	13.03.10			Probably N.Northern Rhodesia
		iS _n	04.18			
		iS _n ¹	54			
	Bway	iP _n	04.20			
		iS _n	06.26			
		iS _n ¹	07.43			
18	B.Hill	iP	14.45.03			about 200 km from B.Hill
		iS	23			
	Bway	eP _n	45.38			
		iS _n	45.52			
		iS	46.37			
18	Bway	eP _n	15.37.38			W.W.rand earth tremor
18	B.Hill	iPKP	17.25.26	126°		USCGS.H=17.06.13, 50 1/2°N 156°E. Off coast of Kamchatka.
18	Bway	i	19.54.24			
18	Bway	iP	23.36.46	75°		USCGS.H=23.25.13, 6°S 105°E. Sunda Strait
	B.Hill	iP	49	77°		h + 150 km.
19	Bway	iPKP	01.44.32	124°		USCGS.H=01.25.36, 30°S, 178°W, Kermadec Is.
	B.Hill	iPKP	43	130°		h + 60 km.
19	Bway	i	03.05.50			
19	Bway	ePKP	08.46.26	128°		USCGS.H=08.27.21, 27 1/2°S 177°W, Kermadec Is. M=6 1/4
	B.Hill	ePKP	38	135°		
19	Bway	iPKP	14.13.16	132°		USCGS.H=13.52.40, 22°S, 179 1/2°W. Fiji Is. h+600 km
19	Bway	iP	16.04.59	57°		USCGS.H=15.55.30, 54 1/2°S, 29°W. Sandwich Is.
	B.Hill	iP	05.28.	62°		Seismic, probably local about 230 km from station
19	B.Hill	traces	19.09.50			
20	B.Hill	iP	14.37.59.			
		iS	38.22			
21	Bway	traces	13.26.30			W.W.rand earth tremor.
22	Bway	iPKP ₁	19.46.45	148°		USCGS.H=19.27.08, 52 1/2°N, 170 1/2°W. Fox Is. Aleutian Is.
		iPKP ₁	58	149°		
23	Bway	traces	01.53.59			Seismic, probably local
23	Bway	eP	04.02.12	121°		USCGS.H=03.43.32, 4°S, 154°E. New Ireland region h+ 150 km.
23	B.Hill	traces	17.15.43			Seismic, probably local
24	B.Hill	iP	23.51.36	69°		USCGS.H=23.40.34, 41 1/2°N 70°E, Kazakh S.S.R.
	Bway	iP	52.02	74°		
25	B.Hill	traces	12.21.00			Seismic, probably local

continued/.....

OCTOBER, 1959. (continued)

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DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/R	REMARKS.
			h.	m.	s.			
25	✓ B.Hill	i	12.	34.	13			Probably Central Africa
		i		36.	35			
	✗ Bway	e		35.	18			
		i		38.	57			
25	✓ B.Hill	traces	14.	32.	10			Seismic, probably local
25	✓ B.Hill	iP	16.	07.	25	56°		USCGS.H=15.57.51, 39°N
	✓ Bway	iP		08.	02	63°		42°E. E. Turkey.
25	✓ Bway	i	18.	45.	36			
26	B.Hill	traces	06.	33.	54			Seismic, probably loca.
26	✗ B.Hill	ePKP	07.	53.	58	119°		USCGS.H=07.35.12, 37½°N
		e		54.	07			142½°E. N.E. Coast of
	✗ Bway	iPKP		54.	00	122°		Honshu, Japan, h+ 60 km
				54.	30			M=6½.
26	✗ B.Hill	traces	11.	52.	10			Seismic, probably local
27	✗ B.Hill	iPKP ₂	06.	31.	58	149°		USCGS.H=06.12.17, 42½°N
								127°W. Off coast of Oregon
								M = 5.
27	✓ Bway	iP _n	07.	01.	14			W.W.rand earth tremor
	✗ B.Hill	traces		04.	30			
27	✓ B.Hill	iPKP	07.	11.	43	127°		USCGS.H=06.52.50. 45½°N
		i		13.	21			151°E, Kurile Is.
	✓ Bway	iPKP		11.	50	129°		h + 100 km, M=6¼.
		i		13.	45			
27	✗ Bway	iP _n	09.	51.	11			W.W.rand earth tremor
27	✗ Bway	traces	14.	58.	55			W.W.rand earth tremor.
29	✓ Bway	iPKP	14.	38.	57	126°		USCGS.H=14.19.51, 29°S.
	✗ B.Hill	iPKP		39.	07	132°		176½°W. Kermadec Is.
								h+ 60 km. M=5¾.
29	✗ Bway	ePKP	14.	48.	02	113°		USCGS.H=14.30.24, 43°N
								131°E. China-Korea border
								h+ 550 km. M=6¼.
29	✗ B.Hill	iP	20.	47.	40			about 140 km from station
		iS			54			
29	✓ Bway	traces	22.	48.	15			
30	✗ B.Hill	iP	00.	36.	11			about 140 km from station
		iS			25			
30	✗ B.Hill	e	02.	57.	26			Probably Rhodesia-Mozam-
		i		58.	41			bique border.
	✗ Bway	traces		57.	06			
		i		58.	09			
30	Bway	traces	07.	23.	20			
30	✓ B.Hill	iPKP	07.	26.	26	141°		USCGS.H=07.04.48, 19°S,
	✓ Bway	iPKP		26.	26	135°		177½°W, Fiji Is. h+ 450km
30	✗ Bway	i	11.	37.	09			USCGS.H=11.27.33, Sand-
	✗ B.Hill	i			47			wich Is. region.
30	✓ Bway	iPKP	04.	45.	33	136°		USCGS.H=04.27.12, 16½°S
		i			45			178°W, Fiji Is.
		i		48.	47			h + 450 km. M=6¾.
	✓ B.Hill	iPKP		45.	47	141°		

Mavis Scott.
H.O. Oliver.

22nd January, 1960.

OCTOBER, 1959.

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	✓ Bway	ePn	10.29.28			W.W.rand earth tremor.
1	✓ B.Hill	ePn	12.26.28			Seismic, probably local.
		eS ₁	53			
2	✓ B.Hill	iP _n	01.43.22			Seismic, probably N.Rhodesia
		i	44.27			
		iS ₁	45.02			
2	× Bway	e	15.35.02			
2	× Bway	e	19.35.06			
	× B.Hill	e	55			
2	✓ B.Hill	iP	20.54.17			about 360 km from station
		iS	53			
	× Bway	traces	55.00			
3	× B.Hill	iP	05.03.59			about 230 km from station
		iS	04.22			
3	✓ Bway	e	21.52.11			
4	× Bway	eP	11.05.59	88°		USCGS.H=10.53.27, 31°S 70°W. Argentine, h+ 150 km
4	× B.Hill	eP _n	12.09.31			Probably Central Africa
		iS _n	10.52			
		iS ₁	11.36			
5	× B.Hill	traces	01.02.15			Seismic, probably local.
5	× B.Hill	traces	10.34.25			Seismic, probably local.
5	× Bway	iPKP	11.53.39	143°		USCGS.H=11.33.14, 45°N. 111½°W, Yellowstone aftershock.
5	× B.Hill	e	15.05.09			Probably local.
5	× Bway	eP	20.44.24	62°		USCGS.H=20.34.04, 41°N, 20°E, Albania.
6	× B.Hill	eP	03.13.58			about 230 km from station
	×	iS	14.21			
7	× B.Hill	iP	08.40.21	56°		USCGS.H= 08.30.41, 41°N, 20°E, Albania.
	× Bway	iP	41.00	62°		
7	× Bway	traces	14.48.00			W.W.rand earth tremor
7	× B.Hill	eP _n	19.32.49			Seismic, probably N. Rhodesia
		iS _n	33.50			
		iS ₁	34.24			
	× Bway	traces	34.35			
8	× Bway	iPKP	00.22.33	127°		USCGS.H=00.03.28, 19°S, 169°E, New Hebrides Is.
8	× Bway	iPKP	02.54.59	140°		USCGS.H= 02.35.20, 52½°N, 171°W. Fox Is.
8	× Bway	i	12.16.24			
8	× B.Hill	iP	16.17.55			about 260 km from station
		iS	18.21			
8	× Bway	eP _n	21.04.39			W.W.rand earth tremor
9	× Bway	i	22.23.22			
	B.Hill	i	35			
10	× B.Hill	eP	00.26.05			about 220 km from station
		iS	27			
10	× B.Hill	traces	01.06.22			Seismic, probably loca.
10	× B.Hill	iP	11.20.20			about 320 km from station
		iS	21.02			
12	× Bway	e	00.00.37			W.W.rand earth tremor
12	× B.Hill	iP	03.33.13	71½°		USCGS.H=03.21.52, 2°N, 98½°E. Near coast of Sumatra
		iPcP	23			
	× Bway	iP	17			
		iPcP	28			
12	× Bway	eP	03.56.35	88°		USCGS.H=03.43.44, 19°S, 68½°W, Chile-Bolivia border. h+ 150 km.

continued/.....

copied

NOV 1959

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' 8" 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.

NOVEMBER, 1959.

- 26 -

DATE	STATION	PHASE	G. M. T.			ARC DISTANCE	C/R	REMARKS.
			h.	m.	s.			
1	x B.Hill	i	03.06.43					Probably Central Africa
			09.01					
1	x Bway	traces	03.10.31					Probably Central Africa.
1	x B.Hill	iP	09.04.07					240 Km from station
		iS						
1	x Bway	traces	15.18.31					W.W.rand earthtremor.
2	x B.Hill	ePKP	09.02.48			121°		USCGS.H=08.43.54, 22½°N
								144°E. Mariana Is.
								Region.
	x Bway	iPKP				122°		
2	x B.Hill	iP	13.27.00			75°		USCGS.H=13.15.40, 21½°N
								92½°E. Pakistan/Burma
								border. h+ 100 km.
2	x Bway	iPKP	20.22.17			120°		USCGS.H=20.03.32, 5½°S
	x B.Hill	ePKP				122°		151½°E. New Britain
								h=60km. M=6¼
3	x Bway	iP	09.52.13			71°		USCGS.H=09.40.05, 10½°S
		iP				73°		111°E. S. Java.
3	x B.Hill	ePn	22.46.41					Probably Central Africa.
		iSn	48.04					
		iS ₁						
		traces	22.47.30					
5	x Bway	traces	22.47.30					
	x B.Hill	e	11.07.20					USCGS.H=10.59.40,
								Chagos Archipelago.
5	x Bway	iPKP	12.09.16			125°		USCGS.H=11.50.17, 13°S
								166½°E. New Hebrides
								region h = 100 km.
5	x B.Hill	traces	13.30.30					Seismic Probably local.
5	x Bway	iP	14.15.48					140 km from station
		iS						
6	x Bway	e	01.26.30			123°		USCGS.H=01.11.36, 9°S
	x B.Hill					126°		157½°E. Solomon Is.
6	x Bway	ePKP	12.02.21			133°		USCGS.H=11.43.06, 24½°S
	x B.Hill	iPKP				138°		174½°W. Tonga Region
6	x Bway	traces	12.32.30					W.W.rand earthtremor.
6	x Bway	iP	16.26.50					W.W.rand earthtremor.
		iS						
6	x B.Hill	iPn	28.06					W.W.rand earth tremor.
6	x Bway	eP	16.53.23					
7	x B.Hill	eP	53.26					
7	x B.Hill	eP	02.41.52			57°		USCGS.H=02.32.07, 36½°N
	x Bway	eP _c P	42.26			63°		2½°E. Near Coast of Algeria
7	x B.Hill	i	15.25.40					distant
		i						
8	x B.Hill	iPKP	14.13.44			118°		USCGS.H=13.54.55, 44°N
	x Bway	iPKP				120°		140½°E, Near W. coast
								H okado Japan. M=6½.
								USCGS.H=22.16.15, 23½°S
8	x B.Hill	ePkp	22.35.42			138°		175½°W. Tonga Is. region
	x Bway	ePKP				133°		M = 6¼.
9	x Bway	traces	10.48.28					
9	x B.Hill	traces	21.30.00					
10	x Bway	eP	05.30.22					W.W.rand earth tremor.
10	x B.Hill	iP	21.08.04			77°		USCGS.H=20.56.12, 36°N
	x Bway	iP				81°		89°E. N. Tibet.
11	x Bway	i	01.45.10.					W.W.rand earth tremor.
	B.Hill	i						
11	x Bway	traces	12.31.30					
11.	x Bway	traces	14.02.51					W.W.rand earth tremor.
11	x B.Hill	traces	18.53.50					Probably Central Africa.

/continued.....

November, 1959. (continued) - 27 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
11	x B.Hill	traces	20.39.16			Probably Central Africa
11	x Bway	eP	20.06.28			W.W.rand earth tremor
		iS ₁	07.16			
12	x Bway	i	10.19.31			
		i	20.05			
12	x Bway	traces	13.17.31			W.W.rand earth tremor
13	y B.Hill	traces	09.24.58			
13	✓ Bway	iPn	09.33.56			W.W.rand earth tremor
		iS ₁	34.30			
13	x B.Hill	ePn	14.55.24			Probably Central Africa
			56.25			
			54			
14	x Bway	traces	11.23.00			W.W.rand earth tremor
15	x Bway	traces	10.06.07			Probably W.W.rand tremor
15	x B.Hill	iP	10.36.18	69°		USCGS.H=10.25.03, 38°N,
	x Bway	iP	43	73°		74½°E. Tadzhik S.S.R.
15	x B.Hill	iP	17.18.00	55°		USCGS.H=17.08.41, 37½°N
	x Bway	iP	40	61°		20½°E. Near W.Coast Greece
						M= 6½.
15	x Bway	iP	17.41.24			USCGS.H=17.31.25. Greece
						aftershock.
16	✓ Bway	iP	01.11.57	87°		USCGS.H=00.59.22, 35°S.
		i	12.27			70°W. Argentine Border
						h+ 100 km.
16	x B.Hill	iP _c P	10.31.03	42°		USCGS.H=10.21.17, 1°N
	x Bway	iP _c P	11	46°		26½°W. Mid Atlantic M=6¼
16	x B.Hill	eP	21.17.15			Probably Central Africa
16	x B.Hill	eP	23.50.45			260 km from station.
		iS	51.11			
17	x B.Hill	iP	02.39.50	39°		USCGS.H=02.32.37. 11°S
	x Bway	iP	51	39°		66½°E. Indian Ocean.
17	x B.Hill	iP	08.29.23			160 km from station
		iS	39			
18	y B.Hill	eP	00.06.58	80°		USCGS.H=23.55.01, 30½°N
	x Bway	eP	07.11	83°		94°E. Simaing Province
						China.
18	x B.Hill	eS	15.58.27			Probably Central Africa
18	x B.Hill	traces	23.20.26			Probably Central Africa
19	y Bway	iPKP	11.27.15	114°		USCGS.H=11.08.32. 5½°S
	x B.Hill	iPKP	18	116°		146°E. Near N. Coast,
						New Guinea. M=7.
20	x B.Hill	ePKP ₂	00.13.27	148°		USCGS.H=23.53.49, 42½°N
	x Bway	iPn	18.18.57			126½°W. off coast Oregon.
		iSn	19.07			Probably W.W.rand earth
		iS ₁	39			tremor
20	x B.Hill	eP _c P	19.39.22	44°		USCGS.H=19.29.38, 1°N.
	x Bway	eP _c P	31	46°		26½°W. Mid-Atlantic Ocean.
22	x B.Hill	traces	02.42.30			
22	x B.Hill	traces	12.57.00			Probably local.
22	x B.Hill	i	19.51.45	138°		USCGS.H=19.34.35, 21½°S
			52.45			178½°W, Fiji Is. Region
			51			h + 550 km
			53.00			
	x Bway	ePKP	52.35	133°		
			50			
			55.28			
** 23	✓ B.Hill	iP	22.29.20			Probably local.
		iSn	30.24			
		iS ₁	54			
23	x Bway	traces	22.32.20			
** 23	y Bway	traces	03.18.17			

continued/.....
W.W.rand earth tremor

November, 1959 (continued)

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
24	✓ Bway	traces	10.33.10			W.W.rand earth tremor
24	✓ B.Hill	eP	20.17.41	74°		USCGS.H = 20.06.35, 7 $\frac{1}{2}$ °N
	✓ Bway	eP	50	75°		37°W. Atlantic Ocean.
25	✓ Bway	traces	05.03.35			
25	✓ B.Hill	traces	12.48.31			Probably local.
25	✓ B.Hill	iS	13.51.30			Probably local.
25	✓ Bway	traces	20.42.36			W.W.rand earth tremor
		e	43.30			
25	✓ Bway	ePn	23.45.24			
	✓ B.Hill	iS	46.35			
		e	41			
26	✓ Bway	(e)	06.09.20			
	✓ B.Hill	i	54			
26	✓ Bway	iP	07.17.54	74°		USCGS.H=07.06.19, 5 $\frac{1}{2}$ °S
	✓ B.Hill	iP	55	74°		102 $\frac{1}{2}$ °E. Near Coast
						Sumutra. M= 6 $\frac{1}{2}$.
26	✓ Bway	iP	23.21.00	74°		USCGS.H= 23.09.23, 5 $\frac{1}{2}$ °S
	✓ B.Hill	iP	01	74°		103 $\frac{1}{2}$ °E. Near Coast Sumatra
						M= 6 $\frac{3}{4}$.
27	✓ Bway	e	00.03.45			distant
	✓ B.Hill	e	47			
27	✓ B.Hill	i	00.31.40			
	✓ Bway	i	32.20			
27	✓ Bway	ePn	08.53.20			W.W.rand earth tremor
		e	54.30			
27	✓ Bway	e	11.03.54			
	✓ B.Hill	e	04.09			
27	✓ Bway	e	19.03.03			
	✓ B.Hill	e	03			
28	✓ Bway	traces	07.43.39			
28	✓ Bway	iP	12.47.51	91°		USCGS.H=12.34.53, 28 $\frac{1}{2}$ °S
			48.00			71°W. Chile, M= 6 $\frac{1}{2}$.
	✓ B.Hill	iP	48.05	93°		
28	✓ Bway	iPKP	21.37.39	130°		USCGS.H=21.18.32, 14 $\frac{1}{2}$ °S
						168°E. New Hebrides Is.
28	✓ Bway	iPKP	22.58.20	130°		USCGS.H=22.39.13, 13°S,
						167 $\frac{1}{2}$ °E. New Hebrides Is.
29	✓ B.Hill	e	08.59.23			
30	✓ B.Hill	e	08.22.03			
30	✓ Bway	ePn	09.30.17			W.W.rand earth tremor.
30	✓ B.Hill	eP	11.24.42	77°		USCGS.H=11.12.43, 44 $\frac{1}{2}$ °N,
						80 $\frac{1}{2}$ °E, Sinkiang Province
						China.
30	✓ Bway	traces	21.34.22			

Mavis Scott.
H.O. Oliver.

19th February, 1960.

Accepted

DEC 1953

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° 02' 6" S.	14° 26' 46" S.
Longitude:	28° 36' 8" 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.

December, 1959 (continued) - 32 -

<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>
29	x Bway	iP	21.40.24	92°		USCGS.H=21.27.17; 8½°S 122°E. Flores Is.
	x B.Hill	iP	29	94°		
29	x B.Hill	e	23.55.37			Probably central Africa.
		i	57.21			
		i	58.23			
30	x Bway	i	14.07.25			USCGS.H=13.35.45; 6°S; 105°E; Sunda Strait h + 150 km W.W.rand earth tremor.
		i	24			
	x B.Hill		.28			
30	x Bway	traces	20.20.05			
31	x B.Hill	e	15.26.05			
31.	x B.Hill	e	17.11.50			
31	x B.Hill	iP	21.04.24	74°		Seismic, probably local USCGS.H=20.52.55, 37½°N, 25°W; Azores Is.
		i	33			
	x Bway	eP	46	80°		

M. Scott.

18th March, 1960.

DECEMBER, 1959.

- 29 -

DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
1	✓ Bway	iP	12.48.43	61°		USCGS.H=12.38.46; 38° N,
			49			21½° E. Near W.Coast Greece
1	✓ Bway	eP	13.01.55	61°		USCGS.H=12.51.58; 38° N
						21° E, Greece Aftershock.
1	✓ Bway	ePn	13.20.31			W.W.rand Earth tremor.
		iS ₁	22.08			
1	✓ Bway	e	15.12.37			
1	✓ Bway	iP	15.50.31	88°		USCGS.H=15.38.07. 31½° S
						67½° W. San Juan Prov.
						Argentina; h= + 200 km.
2	✗ Bway	i	00.24.23			distant
2	✗ B.Hill	iP	05.23.09			230 km from station
			32			
2	✓ B.Hill	eP	07.41.27	76°		USCGS.H= 07.30.05, 5° S,
		i	37			104° E. Near Coast Sumatra
						h + 150 km
2	✓ Bway	iP	09.47.23	95°		USCGS.H=09.34.00; 1° S
		i	33			123° E. Celebes;
						M=6½.
2	✓ B.Hill	iP	09.47.25	96°		W.W.rand earth tremor
	✓ Bway	iS ₁	21.02.38			W.W.rand earth tremor
4	✗ Bway	traces	22.44.21			W.W.rand earth tremor
5	✗ Bway	iS ₁	14.39.35			W.W.rand earth tremor
6	✗ Bway	iSn	06.05.43			W.W.rand earth tremor
6	✗ Bway	traces	12.15.33			W.W.rand earth tremor
6	✓ B.Hill	iP	20.33.58			370 km from station.
		iS	34.35			
	✓ Bway	i	36.21			
		i	37.07			
7	✗ B.Hill	traces	00.56.38			
7	✗ B.Hill	traces	18.14.44			
7	✗ B.Hill	e	18.53.59			
8	✓ Bway	iP	04.43.27	96°		USCGS.H= 04.30.06; 1° S,
		i	35			124° E, Celebes region.
	✓ B.Hill	iP	30	99°		
8	✓ Bway	i	13.00.42			USCGS.H=12.50.45, S.Iran.
8	✓ Bway	eP	13.44.23	66°		USCGS.H=13.33.59, 42° N,
						44½° E. Georgia S.S.R.
						Probably Central Africa
8	✗ B.Hill	i	22.34.41			
		i	52			
		i	35.45			
9	✗ Bway	iS ₁	05.19.40			W.W.rand earth tremor
9	✓ B.Hill	iS ₁	12.59.15			Probably local.
	✗ Bway	traces	13.00.00			
9	✓ Bway	iS ₁	15.10.48			W.W.rand earth tremor.
10	✗ B.Hill	e ¹	20.00.57			Probably local.
			01.23			
11	✗ B.Hill	eP	08.46.56			200 km from station.
		iS	47.16			
11	✗ B.Hill	e	13.16.37			
		i	17.28			
11	✗ Bway	iS ₁	14.04.28			W.W.rand earth tremor
11	✗ Bway	e	14.59.21			
	✓ B.Hill	i	15.00.04			
12	✗ B.Hill	eP	09.22.10			230 km from station
		iS	31			
12	✓ Bway	e	20.10.31			
13	✓ B.Hill	i	05.51.19			
13	✓ B.Hill	eP	06.31.01			640 km from station
		iS	32.08			Probably N. Rhodesia
	✓ Bway	iS ₁	.34.02			

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
13	✓ Bway	i	09.51.09			
		i	25			
13	✓ B.Hill	eP	21.29.29			620 km from station probably N. Rhodesia.
		iS	30.21			
14	✓ B.Hill	iP	16.09.56			240 km from station.
		iS	10.25			
	✗ Bway	traces	11.00			
14	✓ B.Hill	iP	18.11.54	101°		USCGS.H=17.58.33; 5½°N
	✓ Bway	iP	55	100°		125½°E. Off S.Coast Mindanao, h+ 100 km.
14	✓ Bway	iP	22.02.41	99°		USCGS.H=21.49.10; 1°N
	✓ B.Hill	iP	42	100°		125°E, Celebes.
14	✓ B.Hill	ePKP	22.20.15	141°		USCGS.H=22.00.50; 52½°N
	✓ Bway	iPKP ₂	32	148°		168°W. Fox Is. M=6.
	✓	i	41			
	✓	i	48			
14	✗ Bway	i	23.31.34			USCGS.H=23.21.56; 59½°S
	✓ B.Hill	i	32.08			31°W; Sandwich Is. M=7.
**15	✗ B.Hill	traces	00.01.25			
15	✗ B.Hill	e	10.58.16			USCGS.H=10.47.42, 37°N,
	✓ Bway	e	40			70°E, Hindukush
**15	✗ Bway	i	05.32.44			
15	✓ Bway	iP	12.25.28	55°		USCGS.H=12.15.45; 59°S,
	✓ B.Hill	iP	26.00			24°W, Sandwich Is.
15	✓ Bway	i	19.48.38			
			45			
	✗ B.Hill	e	49.31			
17	✓ Bway	iP	06.05.24	75°		USCGS.H=05.53.46, 5½°S
	✓ B.Hill	eP	24	76°		102½°E, off S.Coast Sumatra
17	✓ B.Hill	e	18.08.10			Probably Central Africa
	✗	i	10.28			
	✓	i	11.57			
18	✗ B.Hill	e	00.59.22			Seismic Probably local.
18	✗ B.Hill	e	08.51.39			
18	✓ B.Hill	ePKP	16.44.14	140°		USCGS.H=16.24.50, 53°N
	✓ Bway	iPKP ₂	30	147°		168°W, Fox Is. M=6½.
			48			
20	✗ Bway	e	12.47.24			
21	✗ Bway	i	07.25.10			
21	✗ B.Hill	traces	07.33.08			
21	✓ Bway	ePKP	10.39.43	128°		USCGS.H=10.20.33, 27½°S,
						176°W. Kermadec Is. Region
						M=6.
21	✓ B.Hill	iP	11.26.22	38°		USCGS.H=11.19.14, 14°N,
	✓ Bway	iP	58	42°		52°E, Gulf of Aden, M=6½.
			27.08			
21	✓ Bway	ePKP	11.33.20	128°		USCGS.H=11.14.17, 27½°S.
						176°W, Kermadec Is. region
						M=6.
21	✗ Bway	e	14.01.11			
		i	18			
21	✗ Bway	traces	14.13.42			W.W.rand earth tremor.
22	✗ B.Hill	i	00.16.45			
		i	17.21			
			29			
22	✓ Bway	i	11.40.22			
	✓ B.Hill	i	55			
23	✓ Bway	i	02.50.03			Seismic Probably local.
		i	34			
	✓ B.Hill	e	55			
23	✓ B.Hill	ePKP	04.08.20	141°		USCGS.H=03.49.00, 56½°N,
	✓ Bway	iPKP ₂	34	148°		158°W. Alaska Peninsula

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DATE	STATION	PHASE	G. M. T. h. m. s.	ARC DISTANCE	C/ R	REMARKS.
23	✓ Bway	eP	09.39.01	67°		USCGS.H=09.28.06; 38°N, 14½°E; Near N. Coast Sicily.
23	✓ Bway	ePn	13.58.50			W.W.rand earth tremor.
		iS ₁	59.18			
24	✓ Bway	e	02.32.17			
24	✓ Bway	e	07.24.57			
	✓ B.Hill	e	25.23			
24	✓ Bway	iS ₁	12.25.59			W.W.rand earth tremor.
			26.18			
25	✓ Bway	ePKP	04.08.06	128°		USCGS.H=03.48.58; 27½°S
	✓ B.Hill	ePKP	15	134°		176°W. Kermadec Is.region.
25	✓ Bway	iPcP	10.31.32	89°		USCGS.H=10.18.35; 25½°S
	✓ B.Hill	iP	45	91°		67°W. Chile-Argentina border. M= 6½.
25	✓ Bway	i	16.07.51			
	✓ B.Hill	e	54			
25	✓ B.Hill	i	17.25.47			Seismic, probably local.
		i	26.31			
26	✓ Bway	traces	11.45.08			W.W.rand earth tremor.
26	✓ Bway	i	12.21.48			
		i	52			
	✓ B.Hill	e	22.15			
		i	20			
26	✓ B.Hill	traces	18.41.00			
26	✓ Bway	iS	21.07.29			W.W.rand earth tremor.
26	✓ B.Hill	ePKP	22.21.40	128°		USCGS.H=22.02.35; 53°N, 160°E.Kamchatka foreshock
27	✓ B.Hill	e	05.06.52			
27	✓ Bway	iP	05.32.14	58°		USCGS.H=05.22.39; 35½°N, 26°E; Near E.Coast Crete
27	✓ B.Hill	i	12.13.56			
27	✓ Bway	iP	12.50.33	86°		USCGS.H=12.39.09; 28°S, 63°W; Santiago del Estro province of Argentina.
	✓ B.Hill	iP	45	88°		h + 600
27	✓ B.Hill	iPKP	16.11.58	127°		USCGS.H=15.52.55; 56°N, 162½°E.Kamchatka.
	✓ Bway	iPKP	12.09	129°		
27	✓ Bway	iS	19.52.29			
28	✓ B.Hill	iP	03.31.16			200 km from station
		iS	36			
28	✓ B.Hill	ePKP	07.39.38	130°		USCGS.H=07.20.32; 52½°N, 160°E; Near E.coast Kamchatka. M= 6½.
	✓ Bway	ePKP	47	133°		
28	✓ Bway	iP	10.15.58	90°		USCGS.H=10.03.08; 22½°S 67½°W; Chile-Bolivia border h+ 100 km.
		i	16.10			
		i	27			
28	✓ B.Hill	ePKP	13.23.36	130°		USCGS.H=13.04.30; 52½°N 160°E. Near S.E.coast Kamchatka; M=6.
	✓ Bway	ePKP	45	133°		
28	✓ B.Hill	traces	21.13.25			
28	✓ Bway	iS ₁	17.19.55			W.W.rand earth tremor.
29	✓ Bway	traces	17.26.00			Seismic probably local.
29.	✓ B.Hill	i	18.50.43			Probably Central Africa
		e	52.25			
		i	53.25			
29	✓ Bway	iPKP	20.53.23	122°		USCGS.H=20.35.08; 18°N, 145°E; Mariana Is. h+350 km. M= 6¼.

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