Southern Rhodesia

Copied RS.

Jan – June 1963

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

January, 1963.

Date	Station	Phase	G. M. T. h. m. s.	Arc. Dist.	C/R	Remarks.
1	Bul	ePKP	12 36 15	120		USCGS H= 12 17 38.6 6.8S, 155.9E
		e	50			h± 165Km Solomon Is.
	Bha	ePKP	12 36 19	123		
		e	55			
1	Bha	e	13 24 15			
1	Bha	e	14 43 14			
1	Bul	Traces	15 07 59			Probably W.W.R. Tremor
1	Bul	e	16 46 43			
1	Chl	e	19 37 10			USCGS H= 19 35 55.1 40.2S, 81.3E
1	Bul	eP	19 44 36	48		h± 33Km Indian Ocean
	Bha	eP	19 45 02	53		
		i	11			
1	Bha	iPKP	23 58 15	140		USCGS H= 23 39 05.6 56.6N, 157.7W
		i	27			Alaska Peninsular h± 50Km Mag 6½ (Pas)
	Chl	ePKP	23 58 17	139		
		i	28			
	Bul	iPKP	23 58 36	146	C	
2	Bha	iP	12 16 46			Seismic, Probably local
		iS	17 06			± 200 Km from Stn.
	Chl	Traces	18 00			
2	Bha	eP	15 56 40			Seismic, Probably local
		iS	57 03			+ 200 Km from Stn.
2	Bha	iP	15 58 28			Probably Kariba Area
		iS	54			
2	Chl	Traces	19 01 07			Probably Central Africa
	Bha	e	19 02 08			
2	Bha	Traces	19 12 00			
2	Bul	Traces	19 41 00			
2	Chl	iP	20 07 57			Probably Port Herald Area
		iS	23			± 230 Km from station.
3	Chl	Traces	00 13 08			
3	Bha	e	01 24 03			
		i	25 18			
		i	26 06			
	Bul	Traces	01 28 06			
3	Chl	Traces	09 58 30			USCGS H= 09 39 46.8 5.3S, 151.5E
	Bha	ePKP	09 58 32	121		New Britain h± 74Km
		i	47			
3	Bha	e	10 12 04			
4	Bha	eP	00 33 43	59		USCGS H= 00 23 55.1 1.2N, 27.7W
	Bul	iP	00 33 53	61		South Cape Verde Is. h± 33 Km
4	Bha	eP	01 53 09			
		iS	35			
4	Chl	iP	17 05 35			Seismic, Probably local
		iS	49			± 120 Km from station
4	Bha	i	17 08 06			
4	Bha	e	22 50 58			Probably Cantral Africa
		e	52 30			
		i	53 16			
	Chl	Traces	30			
5	Chl	iP	13 29 26	86		
	Bul	iP	51	91	C	USCGS H= 13 16 4310 10.0S, 124.0E
	Bha	eP	55	93		Tumor h± 33Km
5	Bul	iS	17 15 20			Probably W.W.R. Tremor
5	Bul	iP	17 56 10	99	R	USCGS H= 17 43 35.1 7.0S, 72.1W
						h± 544Km Western Brazil
5	Chl	e	18 38 31			
		e	39 57			
		e	40 51			
	Bul	Traces	18 42 40			
6	Bha	eP	00 20 01			Probably Kariba
		iS	28			
6	Bha	eP	02 46 05			Probably Kariba
		iS	31			
6	Bha	Traces	05 05 10			
6	Bha	i	17 48 12		R	
	Bul	i	17 48 30		C	

January 1963(Cont)

Date	Station	Phase	G. M. T. h. m. s.	Arc Dist.	C/R	Remarks
6	Chl	iP	19 59 44	87		USCGS H= 19 46 58.8 8.9S, 123.8E
	Bul	eP	20 00 08	92		Near Flores h± 33Km
	Bha	iP	20 00 13	94		
6	Bha	ePKP	21 39 58	127		USCGS H= 21 20 56.5 47.4N, 155.9E Kurile Is h± 33Km
7	Bha	Traces	03 41 13			
7	Bul	Traces	04 59 36			
7	Bha	ePKP	06 43 39	124		USCGS H= 06 24 49.2 6.4S, 154.7E Solomon Is. region h± 80Km
7	Chl	eP	12 00 31	95		USCGS H= 11 48 22.7 0.6N, 126.7E
	Bha	eP	12 01 54	98		Halmehera Region h± 42Km Mag $5\frac{1}{2}$ - $5\frac{3}{4}$
	Bul	eP	12 01 54	98		
7	Bul	ePKP	19 38 37	125		USCGS H= 19 19 34.1 17.5S, 167.7E New Hebrides Is. h± 19 Km
9	Bul	ePKP	02 21 33	125	R	USCGS H= 02 02 38.5 28.9S, 177.4W
	Bha	ePKP	02 21 44	130		Kermadec Is h± 71Km
9	Bul	Traces	11 22 30			
9	Chl	eP	18 17 41			Seismic Probably Local
		iS	18 07			
9	Bha	iP	18 25 01	12		USCGS H= 18 22 33.4 3.3S, 29.4E
		iS	26 55			Republic of the Congo h± 33Km
	Chl	iP	18 25 36	14		
		i	28 16			
		i	44			
		i	29 29			
	Bul	iP	18 26 17	18		
		i	29 24			
		i	30 59			
9	Bha	e	20 37 51			
9	Bha	Traces	22 25 58			
			26 11			
			58			
10	Chl	Traces	02 42 43			Republic of the Congo
	Bha	iP	02 43 06			
		iS	44 11			
10	Chl	Traces	07 11 00			
10	Bha	iS	07 13 31			Probably Republic of the Congo
10	Bul	Traces	07 16 08			
10	Bha	e	12 17 52			
		e	19 17			
10	Bha	iP	20 24 31	75		USCGS H= 20 13 05.9 4.2S, 104.6E h± 211Km Sumatra
10	Bha	e	23 56 38			
11	Bha	eP	01 20 21	87		USCGS H= 01 07 28.0 37.7N, 101.6E h± 33Km Tsinghai Province, China
11	Bul	iP	12 24 56	87		USCGS H= 12 12 16.2 45.0S 75.7W
	Bha	eP	12 25 15	91		Near coast of Southern Chile, h± 33Km
	Chl	e	12 25(32)			
11	Bul	Traces	13 49 44			
11	Bha	Traces	14 06 53			
11	Bha	Traces	14 14 00			
11	Bul	e PKP	16 29 32	128		USCGS H= 16 09 37 24.3S, 176.1W h± 55Km Tonga Is. region
11	Bul	i	17 24 16		C	
	Chl	e	17 24 18			
	Bha	e	17 24 25			
11	Bha	i	17 27 25		R	
12	Bha	eP	02 54 38			Seismic, Probably local
		iS	55 07			
12	Chl	iP	06 30 19	60	R	USCGS H= 06 20 14 36.1N, 69.6E h± 97Km Hindu Kush
12	Bul	e	10 43 28			
		Traces	10 44 28			
		i	45 10			

Date	Station	Phase	G. M. T. h. m. s.	Arc Dist.	C/R	Remarks.
12	Bha	e	11 24 17			
12	Bha	iP	11 30 22	320Km		B.P.I. H= 11 29 36 12 S, 27 E
		iS	55			Border Northern Rhodesia and Republic
	Bul	eP_n	31 33	900Km		of the Congo
		iS_n	33 01			
		iS_l	53			
	Chl	eP_n	31 36	920Km		
		eS_n	33(11)			
		iS_l	34 07			
12	Bha	e	14 38 53			
12	Chl	iP	17 45 52			± 160Km from station
		iS	46 08			
12	Bha	e	20 09 44			
12	Bha	i	22 45 22			
13	Bha	e	14 04 15			
		i	23			
13	Bha	i P	17 33 04	89		USCGS H= 17 20 23 31.8S, 68.2W
						h± 142Km San Juan Province, Argentina
13	Bul	Traces	19 34 00			
13	Bul	e	19 44 50			Probably W.W.R. Tremor
		e	46 00			
		i	26			
	Bha	Traces	46 00			
	Chl	Traces	49 00			
14	Bha	eP	18 31 03			Probably Republic of the Congo
		e	32 58			
		i	34 03			
	Chl	eP	31 37			
		i	35 20			
	Bul	eP	32 21			
		e	37 01			
14	Bha	i P	18 43 20	60		USCGS H= 18 33 25 45.7N, 26.6E
	Bul	i P	57	66		h± 132 Km Romania
15	Bha	e PKP	02 51 27	122		USCGS H= 02 32 39 13.4N, 145.3E
	Bul	e PKP	28	122		h± 38Km Marian Is.
15	Bul	Traces	12 13 55			
15	Bha	Traces	12 59 24			
	Bul	e	37			
		i	13 01 14			
15	Bul	i P	15 13 46	57		USCGS H= 15 04 15 36.0N, 23.9E
						h± 81 Mediteranean Sea
15	Bha	e	18 56 57			Seismic probably local
		e	57 09			
	Bul	e	01			
		i	38			
15	Bul	e PKP	19 44 32	131		USCGS H= 19 26 34 20.5S, 177.9W
		i	50			h± 496 Km Fiji Is
	Bha	e PKP	46	137		
	Chl	i PKP	50	132		
15	Bul	Traces	19 56 44			
15	Bul	i	21 27 55			
15	Bul	iP	22 25 17	40		USCGS H= 22 17 51 31.3S 13.4W
	Bha	e P	40	42		h± 33Km South Atlantic Ocean
	Chl	i P	26 18	48		
16	Bha	i P	05 00 11	70		USCGS H= 04 49 12 9.7N 93.9E
						h± 70 NicobarIs
16	Bul	e	11 19 28			
16	Bha	Traces	11 26 43			
16	Chl	e	12 20 15			
	Bha	Traces	49			
16	Bha	e	13 08 29			
16	Bul	Traces	13 27 04			
16	Chl	iP	19 51 15			Port Herald Area
		iS	40			
	Bha	e	52 11			
		e	18			
		e	42			
	Bul	e	45			

Date	Station	Phase	T. h. m. s.	Arc Dist.	C/R	Remarks.
16	Bul	iP	21 20 39	79		USCGS H= 21 08 39 11.1S 111.6E
	Bha	Traces	44	82		h± 94Km South of Java.
17	Bha	Traces	02 09 37			
17	Bha	e	12 52 55			
		e	54 19			
		i	58			
	Chl	i	20			
17	Bul	e	12 56 03			
17	Bha	i	13 09 12			
17	Bul	e	13 22 32			
17	Bul	e	14 14 05			W.W.R. Tremor
		i	15 11			
		i	41			
	Bha	e	16			
	Chl	Traces	18 51			
17	Chl	Traces	14 44 24			
	Bul	e	46 24			
17	Chl	eP	15 02 48			Seismic local
		iS	03 21			
17	Bha	Traces	15 08 05			
17	Bha	e	20 52 43			
18	Bha	e	01 43 30			
18	Bha	Traces	03 38 22			
18	Bha	e	16 27 45			
		e	28 42			
		i	29 13			
	Chl	Traces	31 00			
19	Bha	Traces	03 15 00			
19	Chl	iP	06 06 00	80Km		B.P.I.H= 06 05 48 15.30S 34.40E
	Bha	eP	07 27	750Km		Blantyre Area
		eS_n	08 38			
		iS_n	09 14			
	Bul	eP_1	07 37	840Km		
		eS_n	09 05			
		eS_{n_1}	46			
19	Bha	e	10 13 04			Seismic, probably local
		i	35			
19	Bul	i	11 31 56			
19	Bha	Traces	17 50 17			
19	Chl	iP	19 15 12			36Km from Station
		iS	16			
19	Bha	Traces	20 15 16			
20	Bul	i PKP_1	09 15 39	146	C	USCGS H= 08 56 06 51.9N 173.2W h± 30Km Andreanof Is Aleutian Is.
20	Chl	iP	14 54 36			± 18 Km from Station
		iS	38			
20	Bul	i PKP	22 56 20	127		USCGS H= 22 37 29 15.4S, 167.7E h± 107 Km New Hebrides
21	Bha	i	01 36 41		C	
	Bul	e	46			
21	Bha	i	01 46 11		C	
21	Bul	i P	04 28 12	87	C	USCGS H= 04 15 50 34.3S 69.7W h± 183Km Argentina
21	Bul	Traces	04 35 37			Probably W.W.R. Tremor
21	Bul	iP	07 10 16	57		USCGS H= 07 00 45 60.5S, 27.2W h± 33Km Sandwich Is. region
21	Bha	eP	12 53.13			Probably Kariba area
		eS	39			
21	Bha	eP	17 45 14			Seismic, probably local
		eS	44			
21	Chl	eP	22 13 32			Seismic, probably local
		iS	14 04			
21	Bul	i	22 16 04			Probably W.W.R. Tremor
22	Bul	eP	05 07 13	77		USCGS H= 04 55 16 31.5N, 89.3E h± 33Km Tibet
23	Bul	Traces	14 54 14			
23	Bha	e	18 29 33			
		i	30 19			
23	Bha	Traces	18 44 40			
23	Bha	Traces	20 51 00			

Date	Station	Phase	G. M. T. h. m. s.	Arc Dist.	C/R	Remarks
24	Bha	eP	03 05 11	93		USCGS H= 02 52 09 8.4N 60.8W h± 66Km Near Coast of Venezuela
24	Bha	e	04 01 14			
		e	53			
24	Bul	iP	09 49 44	82	R	USCGS H= 09 29 12 6.0S 112.6E
	Bha	ePn	47	83	R	h± 493Km Java Sea
24	Chl	iP	11 02 45			± 120Km from Station
		i	03 00			
24	Bha	e PKP	12 28 31	143		USCGS H= 12 09 01 15.2S, 173.6W h± 33Km Tonga Is region
24	Bha	Traces	18 58 42			
25	Bul	i PKP	00 34 50	124	C	USCGS H= 00 16 06 20.3S 169.6E h± 135Km Loyalty Is region
25	Chl	i	01 30 14			± 40Km from Station
		i	18			
25	Chl	e	03 2 10			
	Bha	i	28			
	Bul	Traces	21 41			
25	Bha	ePKP	13 08 08	120		USCGS H= 12 49 42 21.8N, 143.8E
	Bul	iPKP	10	121	C	h± 190Km Mariana Is region
26	Bha	e	09 08 00			Probably Kariba area
		iS	27			
26	Bha	iP	22 29 54	240Km		B.P.I. H= 27 29 20 16.3S, 29.0E
	Bul	iS	30 26	460Km		Kariba area
		iP_n	33			
		iP_1	41			
		iS_n	31 12			
		iS_1	28			
	Chl	iP_n	30 49	660Km		
		iS_n	31 52			
		iS_1	32 25			
27	Bul	i	07 16 05			
		i	36			
	Bha	Traces	18 21			
27	Bha	e	12 17 18			
		i	57			
27	Bha	Traces	14 46 49			
27	Bha	e	17 53 06			
27	Chl	iP	19 45 05	58		USCGS H= 19 35 14 41.2N, 49.8E
	Bha	iP	09	59	R	h± 33Km Caspian Sea near Azerbaijan S.S.R
	Bul	iP	45	65	R	Mag 5½ - 5¾
		i	46 01			
28	Bul	Traces	01 05 36			Probably M.W.R. Tremor
	Bha	Traces	07 47			
28	Bul	i	01 30 16			
	Bha	i	27			
28	Bha	Traces	05 54 56			
28	Bul	Traces	10 45 30			Probably M.W.R. Tremor
28	Bul	iPKP	12 31 09	117		USCGS H= 12 12 20 2.6S, 149.9E
	Bha	ePKP	12	119		h± 33Km New Britain Mag 6½
28	Chl	ePKP	13 20 04	138		USCGS H= 13 00 51 54.7N, 161.6E
		i	17			h± 33Km Alaska Peninsular Mag 6 - 6½
	Bha	ePKP	08	140		
	Bul	iPKP	22	129	C	
28	Bha	e	16 26 24			USCGS H= 16 07 19 31.2S, 177.7W h± 33Km Kermadec Is
28	Bha	Traces	16 50 30			
28	Bha	Traces	19 39 54			
29	Bha	e	04 14 33			Probably Central Africa
		i	16 29			
		i	17 25			
	Chl	e	15 05			
		i	17 32			
		i	18 51			
29	Chl	e	07 33 28			
	Bha	e	34 24			
29	Bul	e	08 34 23			

January, 1963 (Cont)

Date	Station	Phase	G. M. T. h. m. s.	Arc Dist.	C/R	Remarks
29	Chl	i PKP	09 39 55	122		USCGS H= 09 21 14 49.7N 154.9E
	Bul	traces	55			h± 126Km Kurile Is
	Bha	i PKP	40 01	126		
29	Bha	Traces	12 41 22			
29	Bul	i	20 16 23			
29	Bha	Traces	20 40 55			
29	Bul	e P	20 46 21	90		USCGS H=20 33 27 21.5S, 68.6W
	Bha	e P	34	91		Chile - Bolivia border h± 73Km
30	Bul	i	01 53 33		C	
	Bha	e	54 09		C	
30	Bul	i PKP_1	04 59 30	146	C	USCGS H= 04 39 56 54.8N, 161.6W Alaska Peninsular h± 33Km
30	Bha	e P	06 21 49	95		USCGS H= 06 08 25 00.2N, 123.4E h± 33Km N. Celebes
30	Bul	i P	10 19 32	56	R	USCGS H= 10 10 04 55.6S, 28.3W
	Bha	i P	20 06	61	R	Sandwich Is region h± 33Km Mag 6½
	Chl	iP	24	64		
		i	34			
30	Chl	i	10 55 34			
30	Bha	Traces	14 05 57			
30	Bul	e	15 47 02			
		e	34			
30	Bul	e	16 27 22			
30	Bul	Traces	16 45 25			
31	Bha	i	00 49 16			Probably Central Africa
31	Bha	e	00 58 16			
		e	47			
31	Chl	e P	05 20 19	100		USCGS H= 05 06 46 27.9N, 126.3E
	Bha	e P	43	105		Ryukya Is h± 33Km
	Bul	e P	54	107		
31	Chl	Traces	07 07 10			
31	Bha	Traces	09 35 10			
31	Bul	i	09 45 17			
	Chl	Traces	46 08			
31	Chl	e	11 30 53			
		i	31 46			
	Bul	Traces	32 07			
31	Bul	i PKP_1	11 47 04	146	C	USCGS H= 11 27 31 54.7N, 161.7W Alaska Peninsular h± 33Km
31	Bul	i	12 38 52		C	
31	Bha	Traces	13 10 03			
31	Chl	e	15 49 41			
		i	50 34			
	Bha	e	31			
		i	51 54			
		i	52 32			
	Bul	e	51 11			
		i	52 05			
		i	33			
31	Bha	e	16 53 47			
31	Chl	i P	17 15 54	57		USCGS H= 17 06 04 41.4N, 50.2E
	Bul	e P	16 33	65		h±33Km Turkmen S.S.R.
31	Bul	e PKP_1	19 03 34	147		USCGS H= 18 44 00 52.7N, 168.7W Fox Is Aleutian Is h± 33
31	Bul	e	20 04 01			
	Bha	Traces	29			

H.O. Oliver
H.R. Roberts

Department of Federal Surveys,
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SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

Date	Station	Phase	h. m. s. G. M. T.	Arc Dist.	c/R	Remarks
1	Bul	e	01 16 25			
1	Bul	e	03 58 11			
1	Bha	iS	16 39 01			
2	Bha	Traces	05 21 30			
2	Bul	i	13 25 00			
2	Bha	e	13 26 55			
2	Bul	e	13 51 11			
2	Bha	ePeS	21 08 02 28			Probably Kariba area
3	Clk	iPiS	01 09 11 25			± 120 Km. from station
3	Bha	e	02 25 40			
3	Bha	Traces	14 06 00			
4	Clk	Traces	00 32 20			
4	Bul	Traces	00 33 10			
4	Bha	ePKP	01 35 49	118	R	USCGS H = 01 17 03 6.3S 149.1E h± 36 Km. 27.3N 54.2E New Britain
4	Clk	eP	05 22 58	45		USCGS H = 05 14 26 27.3N 54.2E h± 34 Km. S. Iran
4	Bha	Traces	12 38 11			
4	Bha	Traces	12 53 06			
4	Clk	ePKP	23 39 56	121		USCGS H = 23 21 09 48.5N 154.9E h± 85 Km. Kurile Is.
	Bha	ePKP	40 02	125		
	Bul	Traces	06	129		
5	Bha	Traces	00 11 45			
5	Bha	iP iS	08 39 59 40 26	245km		BPI H = 08 39 22 Kariba dam area
	Bul	iP_1 iS_1	40 31 41 16	420km		
	Clk	iP_n iS_n	01 15	760km		
5	Bha	i	08 53 39			
5	Bha	Traces	09 28 00			
5	Bul	$iPKP_1$	12 27 55	146	C	USCGS H = 12 08 21 53.7N 165.4W h± 33 Km. Fos Is. Aleutian Is.
5	Clk	Traces	13 02 20			
	Bul	i	03 20			
	Bha	Traces	04 44			
5	Clk	ei	16 16 15 30			± 120 km. from station
6	Bul	iP	20 52 03	88	C	USCGS H = 20 39 22
	Bha	iP	21	91	C	38.4S 73.2W h± 41 Km.
	Clk	eP	41	96		Nr. Coast of Central Chile Mag. $6\frac{1}{4}$-$6\frac{1}{2}$
6	Bul	iP	01 34 09	88		USCGS H = 01 21 29 38.4S
	Bha	iP	29	91	C	73.6W h± 33 Km. Nr. Coast of
	Clk	eP	46	96		Central Chile Mag. $5\frac{1}{4}$-$5\frac{1}{2}$
6	Clk	iP	02 07 54	82		USCGS H = 01 55 59 7.9S
	Bul	iP	08 20	87	C	119.9E h± 306 Km.
	Bha	iP	25	89		Flores Sea.
6	Bul	i	05 12 22			
6	Bha	i	12 45 22			
6	Clk	ei	13 42 51 43 19			
	Bha	e	26			
6	Bha	e	15 58 06			
6	Bul	eP	20 56 06	56		USCGS H = 20 46 51 56.7S
	Bha	eP	40	61		28.8W h± 33 Km. Sandwich Is region.
6	Bha	eP	21 56 33	89		USCGS H = 21 43 16 28.2S 67.4W h± 19 Km. La Ruoja Prov. Argentina.
7	Bha	Traces	03 05 00			
7	Bha	i	05 25 21			
7	Bha	Traces	06 04 00			

Contd. /....

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
7	Clk	i	10	04	43			± 120 Km. from station
		i			57			
8	Clk	i		04	35 47			
	Bul	e			37 26			
		e			36			
8	Clk	e		09	52 14			
8	Bha	i	12	08	36			
	Clk	Traces		09	00			
8	Bha	eP_n	13	29	06			Probably Kariba area
		iP_1			33			
		eS_n		30	14			
		iS_1		31	00			
8	Clk	Traces	22	26	00			
9	Bha	iP	01	02	04			Probably Kariba area.
		iS			30			
9	Bha	iP	06	37	55			Probably Kariba area.
		iS		38	23			
9	Clk	Traces	06	40	00			
9	Bha	iP	07	31	24			Probably Kariba area.
		iS			49			
9	Bha	iPKP	08	55	23	130		USCGS H = 08 36 25 15.0S 167.4E h± 127 Km. New Hebrides Is.
9	Bul	iS_1	10	54	49			Probably Witwatersrand Tremor
9	Clk	Traces	21	41	00			
	Bha	i		42	04			
10	Clk	eP	02	24	18			Probably Port Herald area.
		iS			44			± 220 Km. from station.
10	Bha	Traces	02	26	45			
10	Bha	e	03	32	28			Probably Central Africa.
		i		33	26			
10	Clk	Traces	12	41	00			
	Bha	Traces		42	00			
10	Clk	Traces	14	20	00			
10	Clk	Traces	15	54	00			
	Bha	e		55	45			
		i		56	57			
		i		57	12			
~~10~~	Bha	Traces	21	40	00			
11	Bha	eP	03	14	45			Probably Kariba area.
		iS		15	14			
	Clk	Traces		16	39			
11	Bha	Traces	03	45	40			
11	Bha	i	06	27	18			
11	Clk	Traces	23	40	00			
12	Bha	Traces	02	48	20			
12	Bha	iP	13	25	59	245km		BPI H = 13 25 27
		iS		26	27			Kariba Area.
	Bul	e			21	380km		
		iP_1			31			
		iS_1		27	15			
		eP			03			
*INSERT		iS		28	16			* See Insert p. 217
~~14~~	Bha	Traces	12	(19	00)	60		USCGS H = 12 09 11 00.9N
	Bul	iP		19	27	62	C	30.0W h± 33 Km. Mid-Atlantic Ocean
14	Bul	Traces	13	15	30			
~~14~~	Bul	i	22	26	24	113		USCGS H = 22 07 54 5.0S 144.6E h± 80 Km. Eastern New Guinea. Mag 6½
14	Bul	e	23	46	23			
15	Bha	ePKP	01	07	48	126		USCGS H = 00 48 52 33.2S 179.2W h± 42 Km. Kermadec Is.
15	Bha	iP	16	40	26	70		USCGS H = 16 29 19 4.3N 96.3E h ± 33 Km. Sumatra.

Contd. /.....

Date	Station	Phase	h. m. s. G. M. T.	Arc Dist	C/R	Remarks.
16	Bha	Traces	08 44 00			
	Bul	e	59			
16	Bul	iP	10 58 07	85	R	USCGS H = 10 46 22 7.0S
	Bha	iP	09	87		117.3E h± 561 Km. Flores Sea
16	Bha	e	12 29 44			
	Bul	i	30 13		R	
16	Bha	e	15 43 05			
17	Bul	iP	05 49 03	71		USCGS H = 05 38 17 36.9N 71.3E h± 174 km. Hindu Kush region.
17	Clk	e	07 03 59			
17	Clk	e	07 50 03			
17	Clk	i	08 45 11			
	Bha	i	25			
	Bul	i	53			
17	Bha	iP	14 57 02			Approx. 100 Km. from station.
		iS	13			
	Clk	Traces	58 11			
	Bul	Traces	59 00			
17	Bha	i	19 47 28			
17	Bha	Traces	19 57 00			
17	Bul	Traces	20 35 00			
18	Clk	iP	04 51 38			Approx. 110 Km. from station.
		iS	51			
18	Bha	iP	14 35 33	66	C	USCGS H = 14 25 19 36.4N
	Bul	iP	36 02	70	C	70.9E h± 225 Km. Hindu Kush
18	Bul	iP	15 53 35	97	R	USCGS H = 15 40 08 1.5N
	Bha	eP	37	98		125.8E h± 41 Km. Celebes reg.
18	Bha	e	20 16 10			
18	Bul	e	20 27 40			
18	Bha	i	21 05 36		C	
18	Bul	e	21 57 53			
19	Bha	Traces	13 45 00			
19	Bul	Traces	15 07 30			
19	Bul	iP	16 48 46	55		USCGS H = 16 39 15 55.3S
	Bha	Traces	49 00	61		28.8W h± 33 Km. Sandwich Is.reg
19	Bul	e	17 58 17			Probably Witwatersrand tremor
		i	59 34			
20	Bul	e	03 24 56			
21	Bul	i	15 29 46			
21	Bul	iP	17 23 50	55		USCGS H = 17 14 36 32.7N 20.9E h± 33 Km. Near coast of Libya.
21	Bul	iP	20 04 18	77		USCGS H = 19 52 27 6.3S 106.7E h± 33 Km. Java.
21	Bul	iP	20 35 59	55		USCGS H = 20 26 44 32.6N 21.0E h± 33 Km. Nr. coast of Libya.
22	Bul	i	01 44 03			
22	Clk	i	08 19 52	134	C	USCGS H = 07 58 37 17.8S
	Bul	i	53	132		178.8W h± 550 Km. Fiji Is. reg.
	Bha	i	20 07	139		
22	Clk	Traces	08 36 00			
22	Bul	iP	09 50 39	91		USCGS H = 09 37 52 21.1S 68.1W Peru-Chile border reg.
22	Clk	iP	10 49 20			Prob. S. Nyasaland.
		iS	37			
	Bul	eP	52 02			
		iS	43			
22	Bha	iP	12 06 20	245Km		BPI H = 12 05 43
		iS	45			Kariba area
	Bul	iP_1	40	380Km		
		iS_n	07 17			
		iS_1	28			
	Clk	Traces	08 00			
22	Clk	i	12 17 14			
			17			
22	Bul	Traces	13 53 00			
22	Clk	eP	14 22 42	52		USCGS H = 14 12 54 40.6N 20.5E h± 33 Km. Albania-Greece

(Contd.)

Date	Station	Phase	h. m. s. G. M. T.	Arc Dist	C/R	Remarks.
23	Bul	e	14 06 52			
23	Bul	Traces	17 53 30			
24	Bul	iP	05 51 32	96	C	USCGS H = 05 38 21 15.1S 72.5W h± 105 Km. Nr. coast of S. Peru.
24	Bul	iS_1	09 30 13			Witwatersrand tremor.
24	Bul	iS_1	09 37 48			" "
24	Clk	iP_1	11 29 32			Seismic, local.
		iS	38			
24	Bul	e	13 40 18			
24	Bha	iPKP	13 52 57	122	C	USCGS H = 13 34 16 14.6N
	Bul	iPKP	58	124	C	91.4W h± 135 Km. Central
	Clk	iPKP	53 10	129		Guatemala.
24	Bha	eP	22 47 21	82		USCGS H = 22 35 00 26.4N 44.5W North Atlantic Ocean.
25	Bul	eP	02 50 49	81		USCGS H = 02 38 19 7.6S 112.3E h± 33 Km. Nr. S. Coast of Java.
25	Bul	iP	08 20 51	86	C	USCGS H = 08 08 20 28.1S
	Bha	eP	21 05	88		65.4W h± 32 Km. San Luis
	Clk	iP	30	94		Province. Argentina.
25	Clk	iP	11 19 02			Seismic, local.
		iS	25			
26	Bha	Traces	02 12 10			
26	Clk	iP	20 28 11	109	R	USCGS H = 20 14 09 7.5S
		iPP	32 16			146.2E h±171Km Mag. $7\frac{1}{4}$-$7\frac{1}{2}$
	Bul	iP	28 32	113	R	Eastern New Guinea.
		iPP	32 26			
	Bha	iP	28 40	116	R	
		iPP	32 31			
		i	33 19			
27	Bul	i	02 38 41		C	
27	Bha	Traces	03 33 00			
27	Bha	iPKP	04 48 46	119	R	USCGS H = 04 30 01 6.0S 149.4E h± 52 Km. New Britain region.
27	Bul	iS_1	12 49 02			Probably Witwatersrand tremor
27	Bul	Traces	16 34 40			
27	Bul	iPKP	20 43 17	118		USCGS H = 20 28 35 4.6S 152.9E h± 100 Km. New Britain
27	Bha	iP	23 47 22			Probably Kariba area.
		iS	49			
	Bul	Traces	50			
27	Bul	i	23 55 24		C	
28	Clk	iP	01 37 16	30		USCGS H = 01 31 13 16.3S
	Bul	iP	36	35	C	66.0E h± 33 Km. Indian Ocean
	Bha	iP	38 12	38	C	
28	Bul	Traces	15 18 00			

The following should be inserted at * on Page 215 :-

12	Bul	eP	23 25 26	132		USCGS H = 23 07 29 17.8S
	Bha	iP	40	138		178.6W h± 583 Km. Fiji Is.
13	Bul	i	00 16 21		R	
	Bha	i	54		R	
13	Clk	iP	01 41 44	37		USCGS H = 01 34 40 13.0N
	Bha	eP	42 13	42		57.9E h± 33 Km. Arabian Sea
	Bul	iP	44	45		
13	Bul	e	02 41 16			
13	Clk	iP	09 03 19	93		USCGS H = 08 50 02 24.5N
	Bha	iP	40	99		121.8E h± 33 Km. Northern
	Bul	iP	52	101		Formosa Mag. $7\frac{1}{4}$
13	Bha	e	09 20 10			
13	Bha	Traces	14 42 09			
13	Bul	iPKP	18 32 54	124		USCGS H = 18 13 55 9.9S
	Bha	ePKP	58	128		160.8E h± 29 Km. Mag. $6\frac{1}{2}$ Solomon Is.

(Contd.) .....

Date	Station	Phase	G. M. T.	Dist	C/R	Remarks
13	Clk	iP	20 02 33	34		USCGS H = 19 55 36.0 11.6N
	Bha	eP	03 03	39		57.7E h± 33 Km. Socotra Reg.
	Bul	iP	33	43		
13	Clk	Traces	22 01 30			
13	Clk	iP	00 30 37			Approx. 40 Km. from station
		iS	42			
14	Bha	Traces	06 14 30			
14	Clk	iP	07 17 27	91	C	USCGS H = 07 04 41 7.2S
		i	34			128.2E h± 197 Km. Banda sea
	Bul	iP	50	96	C	Mag. 6½
		i	57			
	Bha	eP	55	98		
14	Bha	e	07 34 33			

H.O. Oliver)
H.R. Roberts)

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
1	Bul	ePKP$_1$	00	45	44	151		USCGS H = 00 25 57 34.8 N 119.3 W h ± 16 km. California Mag. 5
1	Bha	iP	19	10	35			Probably Kariba
		iS		11	02			
	Bul	traces			50			
1	Bha	iP	19	12	05			Kariba area
		iS			33			BPI H = 19 11 28
	Bul	iP$_n$			23			
		iP$_1$			32			
		iS$_1$		13	16			
	Clk	eP$_1$			04			
		iS$_n$		14	13			
		iS$_1$			42			
1	Bha	eP	19	24	13	59		USCGS H = 19 14 13 h ± 33 km. 1.4 N 29.6 W Atlantic Ocean
1	Bha	e	20	23	04			
		i			33			
		i			46			
2	Bha	e	02	56	09	72		USCGS H = 02 45 37 23.8 N 92.2 E h ± 36 km. East Pakistan-India border region
2	Clk	iP	06	36	31			± 200 km. from station
		iS			52			
2	Bul	iP	10	35	43			
		iS			44			
2	Bul	traces	15	13	00			
2	Bha	e	16	43	21			
2	Bul	traces	16	45	00			
3	Bha	traces	08	15	00			
3	Bha	e	16	22	07			
3	Bul	eP	17	15	57	69		USCGS H = 17 05 03 36.4 N 71.3 E h ± 156 km. Hindu Kush
3	Bha	eP	18	44	05	43		USCGS H = 18 36 14
	Bul	iP			22	44	C	0.3 N 67.1 E h ± 33 km. Maldive Is. region
4	Bul	e	14	49	00			Probably Witwatersrand tremor
		e		50	09			
		e			41			
4	Clk	iP	15	19	20	51		USCGS H = 15 10 19
	Bul	iP			47	56		35.2 N 25.4 E h ± 42 km. Crete
4	Bha	e	16	01	31			
4	Bul	traces	20	40	00			
4	Clk	traces	20	41	10			
5	Bul	traces	12	52	00			
5	Bha	iP	17	29	02			Probably Kariba area
	Bul	traces		30	00			
5	Bha	traces	21	26	00			
5	Bha	e	21	35	19			
		e			46			
		i		36	19			
6	Bul	traces	03	04	00			
6	Bul	i	14	49	49			
6	Bul	traces	17	21	20			
6	Clk	iP	18	06	48			± 100 km. from station
		iS			59			
6	Bul	iP	18	08	42	127		USCGS H = 17 53 26 11.4 S 166.5 E h ± 195 km. Santa Cruz Is.
6	Bul	i	18	12	11		R	
6	Bha	i	23	35	38		C	
		i		38	36			
		i		39	18			
	Clk	e		35	55			
		i		39	42			
		i		40	25			
	Bul	i		36	54			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
7	Bha	iP	01	46	21	280 km.		BPI H = 01 45 38
		iS			52			16° S 30° 30' E
	Clk	eP_n			50	530 km.		S. Rhod./Moz. border
		eS_n		47	43			
		eS_1		48	04			
	Bul	iS_n		47	43	530 km.		
		iS_1		48	06			
7	Bha	e	04	53	34			Probably same as preceding
		e		54	04			shock from S. Rhod./Moz. border
7	Bul	traces	07	50	13			Probably Witwatersrand tremor
7	Bul	i	08	58	31			
7	Bha	e	09	17	08			
7	Bul	iP	12	29	05	86		USCGS H = 12 16 28
		i			07			44.3 S 75.3 W h ± 45 km.
	Bha	eP			24	90		Near coast of S. Chile
		i			35			
	Clk	iP			44	95		
7	Bul	e	13	01	45			
		i		02	00			
7	Bha	traces	13	09	00			
7	Bul	traces	20	03	00			
7	Clk	iP	21	59	38	62	C	USCGS H = 21 49 33
	Bha	iP			54	66		36.1 N 71.2 E h ± 202 km.
	Bul	iP	22	00	22	70	C	Hindu Kush
8	Bha	traces	00	54	00			
8	Bha	iP	15	16	05	59		USCGS H = 15 06 05
	Bul	eP			15	63		1.1 N 29.9 W h ± 33 km.
	Clk	eP			49	67		Mid-Atlantic Ocean
8	Bul	eP_n	16	58	08			Witwatersrand tremor
		iS_1		59	47			
8	Clk	traces	17	02	50			
9	Clk	iP	02	25	59	44		USCGS H = 02 17 39
	Bha	iP		26	22	48	C	21.9 N 62.0 E h ± 33 km.
	Bul	iP			53	52	C	Arabian Sea
9	Bha	iP	14	12	16			Probably Kariba area
		iS			38			
10	Clk	iPKP	01	28	21	124		USCGS H = 01 19 38
								15.2 S 167.2 E h ± 142 km.
								New Hebrides Is.
10	Bha	i	01	41	45			
10	Bha	iPKP	01	45	23	138		USCGS H = 01 26 04
	Bul	iPKP			35	145	C	56.2 N 153.8 W h ± 33 km.
								Kodiak Is. Alaska
10	Bha	i	01	47	34			
10	Bul	iP	11	04	36	89		USCGS H = 10 51 48
	Bha	iP			49	92		29.9 S 71.2 W h ± 70 km.
								Near coast of Central Chile
11	Bha	iP	01	10	02			BPI H = 01 09 25
		iS			29			Kariba area
	Bul	eP_1			19			
		iS_n			28			
		iS_1		11	00			
	Clk	iP		10	56			
		iS_n		12	04			
		iS_1			37			
11	Bha	iP	07	36	31	53		USCGS H = 07 27 22
								38.1 N 29.3 E h ± 33 km.
								Turkey
11	Bul	traces	15	20	30			
11	Bul	i	18	52	37			
	Bha	e		53	23			
12	Bul	iP_n	01	07	08			Probably Witwatersrand tremor
		iS_n			59			
		iS_1		08	25			
12	Bha	e	02	07	01			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R.	Remarks
12	Bul	traces	02	17	20			Probably Witwatersrand tremor
12	Bul	traces	05	11	20			Probably Witwatersrand tremor
12	Bul	traces	18	36	26			
12	Bha	traces	20	47	30			
12	Bul	iPKP	20	58	58	120		USCGS H = 20 40 13 7.1 S 156.0 E h ± 97 km. Solomon Is.
14	Bul	i	01	03	04		R	
	Bha	e			50			
14	Clk	iP	08	13	14	90		USCGS H = 08 00 16
	Bha	iP			38	96		19.0 N 120.4 E h ± 51 km.
	Bul	iP			46	97		Off coast of N. Luzon Philippine Is.
14	Bul	i	10	43	05		C	
14	Bha	i	11	23	18			
14	Bha	iP	12	53	17	390 km.	R	BPI H = 12 52 22
		iS			56			11° 30' S 30° E
	Clk	iP_n			57			Near Lake Rangweulu
		iS_n		55	00	700 km.		N. Rhodesia
		iS_1			25			
	Bul	iP_n		54	26	950 km.		
		iS_n		55	50			
		iS_1		56	38			
14	Bul	e	13	37	58			
		i		38	25			
14	Bul	i	17	12	36		R	
	Bha	i			54			
14	Bul	$iPKP_1$	18	33	05	147		USCGS H = 18 13 19 53.0 N 164.9 W h ± 33 km. Fox Is., Aleutian Is.
14	Bha	iP	22	17	09			Probably Kariba
		iS			35			
15	Bha	iP	00	17	09			USCGS H = 00 04 01
	Bul	traces		18	00			5.0 S 129.6 E h ± 295 km.
15	Bul	i	00	29	35			Banda Sea
15	Bha	eP	05	58	47	81		USCGS H = 05 46 33 21.7 N 45.4 W h ± 33 km. North Atlantic Ocean
15	Bul	e	10	03	03			
15	Bul	e	10	28	59			Probably Witwatersrand tremor
15	Bul	traces	14	08	00			
15	Clk	iP	17	24	29			Approx. 30 km. from station
		iS			32			
15	Bul	traces	22	47	00			
16	Clk	iP	03	46	30	69	R	USCGS H = 03 35 22
	Bha	iP			57	74		26.1 N 92.8 E h ± 48 km.
	Bul	iP		47	14	77		Assam, India
16	Bha	e	05	17	54			
				18	38			
16	Clk	eP	09	00	14	121		USCGS H = 08 44 48
		iPKP		03	41			46.5 N 154.7 E
	Bha	iPKP			48	126		
	Bul	iPKP		05	56	129°		Kurile Is. region
16	Bha	e	11	12	09			
16	Bul	traces	12	50	00			
16	Bha	traces	15	27	00			
16	Bha	traces	21	42	00			
16	Bul	iP	22	40	12	72		USCGS H = 22 28 57
								38.9 N 71.8 E h ± 73 km.
17	Bul	iS_1	08	24	03			Tadshik, SSR
18	Bha	iP	10	10	09			Witwatersrand tremor
						45		USCGS H = 10 02 01
								24.1 N 5.0 E
18	Bha	e	13	27	04			Southern Algeria

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
18	Bha	i	18	09	55			Probably Republic of the Congo
		i		11	07			
		i			48			
	Clk	i		10	25			
		i		11	57			
		i		12	57			
	Bul	i		11	09			
		i		13	15			
		i		14	40			
20	Bul	i	11	15	10			Witwatersrand tremor
20	Bul	iP	14	53	02	70		USCGS H = 14 41 48 11.9 N 93.1 E h ± 33 km. Andaman Is. region
21	Bul	iP	02	31	48			Probably Kariba area
		iS		32	29			
21	Bul	iPKP	04	18	57	119	R	USCGS H = 04 00 11 36.5 N 141. E h ± 50 km. NE coast of Honshu, Japan
21	Bha	eP	12	12	03			Probably Kariba area
		eS			29			
21	Bul	traces	13	15	00			
21	Bha	i	13	35	01			
21	Bul	traces	18	41	00			
22	Bul	traces	07	34	00			Witwatersrand tremor
22	Bha	traces	19	01	00			
22	Bul	i	23	47	05			
23	Bha	i	01	31	33			
23	Bul	i	03	59	53			
23	Bul	iS_1	04	27	12			Witwatersrand tremor
23	Bul	iS_1	12	12	14			Witwatersrand tremor
23	Bha	eP	15	15	08			Approx. 300 km. from station
		iS			40			
	Bul	traces			38			
23	Bul	traces	15	47	00			
24	Clk	iP	02	19	39	82		USCGS H = 02 07 13
	Bul	iP		20	07	87	C	9.7 S 120.4 E h ± 33 km.
	Bha	iP			10	89	C	Sumba Is. region
24	Bha	traces	02	38	00			
24	Bul	i	02	44	20		C	
24	Bha	eP	03	00	45			Probably Kariba area
		iS		01	10			
24	Bha	eP	03	57	25			Probably Kariba area
		iS			50			
24	Bha	i	05	27	16		C	
24	Clk	iP	12	53	07	50		USCGS H = 12 44 03
	Bha	iP			12	52		34.4 N 47.9 E h ± 33 km.
	Bul	iP			51	58		Western Iran
24	Clk	iPKP	21	54	20	135		USCGS H = 21 35 24
	Bha	iPKP		54	32	138		51.8 N 178.1 W h ± 57 km.
		i			43			Andreanof Is., Aleutian Is.
	Bul	iPKP			48	143		
25	Bul	traces	13	06	00			
25	Bha	e	13	48	53			Probably Republic of the Congo
				49	46			
25	Bul	e	18	53	18			
25	Bul	eP	20	29	51	89		USCGS H = 20 17 04
	Bha	iP		30	14	95		56.3 S 149.9 E h ± 39 km. Macquarie Is. region
25	Clk	iP	22	56	41	64		USCGS H = 22 46 16
	Bha	eP		57	20	70	R	0.7 N 96.5 E h ± 30 km.
	Bul	eP			25	70	R	Off SW coast of Sumatra
25	Bha	traces	23	26	00			
26	Bul	iPKP	10	07	15	123	C	USCGS H = 09 48 20
	Clk	iPKP			16	125	C	29.7 S 177.8 W h ± 45 km.
	Bha	ePKP			18	129		Kermadec Is. Mag. 6 3/4 - 7
26	Bul	e	12	04	58			
26	Bul	e	13	10	33			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
26	Bul	iPKP	13	43	58	123		USCGS H = 13 25 02
	Clk	iPKP			59	125		29.8 S 177.9 W h ± 42 km.
	Bha	iPKP		44	08	129		Kermadec Is. Mag. 7 1/4
26	Clk	iP	15	08	47			± 260 km. from station
		iS		09	14			
26	Bul	iS_1	15	11	30			Probably Witwatersrand tremor
26	Bul	e	15	29	11			
26	Bul	i	20	06	34			
26	Bul	e	21	53	22			
	Clk	e			26			
26	Bul	e	22	04	04			
26	Bul	e	23	40	04			
27	Bul	traces	07	02	00			
28	Bha	eP	00	28	42	88		USCGS H = 00 15 47
	Bul	iP		29	08	94		66.3 N 19.6 W h ± 15 km.
								Mag. 7 N. Iceland
28	Bha	e	04	14	55			
28	Bul	iPKP	11	31	26	123	C	USCGS H = 11 12 31
	Clk	ePKP			27	125		30.2 S 177.8 W h ± 38 km.
	Bha	ePKP			34	129		Kermadec Is.
28	Bul	iPKP	23	48	09	123		USCGS H = 23 29 15
	Bha	ePKP			19	129		29.6 S 177.5 W h ± 54 km.
								Kermadec Is.
29	Bha	eP	01	26	54			Probably Kariba
		eS		27	20			
29	Bul	traces	14	21	00			
29	Bul	iPKP	21	35	36	123	C	USCGS H = 21 16 44
	Bha	ePKP			47	129		30.2 S 177.7 W h ± 60 km.
								Kermadec Is.
29	Clk	iP	23	35	18			Approx. 180 km. from station
		iS			27			
30	Bha	traces	00	51	00			
30	Clk	iPKP	02	22	09	124		USCGS H = 01 53 29
	Bul	iPKP			11	124		19.1 S 169.1 E h ± 160 km.
	Bha	iPKP			20	130		New Hebrides Is.
30	Bha	e	04	21	15			
		i			53			
30	Clk	i	17	10	40			
	Bha	e			48		C	
	Bul	i			53		C	
30	Bha	i	17	20	52		C	
30	Bha	ePKP	21	33	05	133		USCGS H = 21 13 54
								8.7 S 109 W h ± 33 km.
								± 2000 km. SW of Galapagos Is.
31	Bul	iPKP	05	49	44	123	C	USCGS H = 05 30 49
	Clk	iPKP			45	125	C	29.9 S 177.7 W h ± 48 km.
	Bha	iPKP			55	129		Kermadec Is. Mag. 6 1/4
31	Bul	i	07	26	15			
31	Bul	iPKP	09	26	13	123		USCGS H = 09 07 20
	Clk	ePKP			15	125		30.1 S 177.7 W h ± 48 km.
	Bha	iPKP			24	129		Kermadec Is.
31	Bha	i	11	57	24			
31	Bha	i	12	30	23			
31	Bha	eP	15	08	25	60		USCGS H = 14 58 02
								35.1 N 9.3 W h ± 33 km.
								Off coast Morocco.
31	Bul	i	15	53	00			
31	Bul	i	16	53	13		R	
	Bha	i			24			
31	Clk	iP	17	39	17	62		USCGS H = 17 28 53
	Bha	iP			51	69	R	0.8 N 96.6 E h ± 33 km.
	Bul	iP		40	00	69		Nicobar Is. region
31	Bha	i	17	46	25			
31	Bul	i	17	51	27			
31	Bul	iPKP	19	41	46	123		USCGS H = 19 22 53
	Clk	iPKP			48	125	R	30.0 S 178.0 W h ± 50 km.
	Bha	iPKP			58	129	R	Kermadec Is. Mag. 6 1/4
31	Bha	i	21	27	18			

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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.

Passed to RRL.

H.O. OLIVER
Seismological Officer.

Address.

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

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
1	Bul	iPKP	02	38	34	116		USCGS H = 02 19 57 6.0 S 149.0 E h ± 64 km. New Britain
1	Clk	ePKP	04	46	52	113		USCGS H = 04 28 44
		i		47	06		C	44.8 N 141.1 E h ± 255 km. Off W. Coast of Hokkaido, Japan
1	Clk	iP	09	32	55	60		USCGS H = 09 22 52
	Bha	traces		33	00			35.4 N 69.8 E h ± 100 km. Hindu Kush
1	Bha	traces	10	37	00			
1	Bha	iP	15	18	50			Probably Central Africa
		i		20	28			
		i		21	31			
1	Clk	traces		19	30			
1	Bha	e	23	25	54			
2	Bha	iP	01	27	32			± 320 km. from station
		iS		28	04			
2	Bha	traces	06	41	00			
2	Clk	iP	04	52	13			± 260 km. from station
		iS			39			
2	Clk	ePKP	16	37	52	137		USCGS H = 16 18 56
		i		41	21			53.2 N 171.7 W h ± 142 km.
	Bha	i		38	01			Andreanof Is. Aleutian Is.
				41	25		R	Mag. = 6½
	Bul	iPKP$_1$		38	10	146	R	
2	Bha	iP	21	22	03			Probably Kariba area
		iS			31			
	Bul	traces		23	00			
3	Bha	eP	01	25	24	80		USCGS H = 01 13 15.5 17.0 N 46.5 W h ± 33 km. North Atlantic Ocean
3	Bul	i	01	47	01			
	Bha	e			07			
3	Bha	eP	02	21	47	82		USCGS H = 02 09 37 16.7 N 46.6 W h ± 33 km. Atlantic Ocean
3	Bha	e	06	28	49			
3	Bul	traces	11	40	30			
3	Bul	iP	14	47	01			± 10 km. from station
		iS			02			
3	Bha	ePP	19	15	14	140		USCGS H = 18 54 07 15.2 S 179.5 W h ± 409 km. Fiji Is.
3	Bha	traces	20	11	30			
3	Bha	traces	21	10	00			
4	Bul	e	03	48	47			
4	Clk	iP	05	22	17			Probably near Chileka
	Bha	iS$_1$		25	15			
	Bul	iS$_1$			54			
4	Clk	i	09	48	06			Probably Central Africa
	Bha	iS$_1$			31			
4	Bha	iP	21	22	37			Probably Kariba area
		iS		23	04			
	Clk	i			03			
4	Clk	ePKP	22	19	59	125		USCGS H = 22 01 03 30.3 S 177.8 W h ± 36 km. Kermadec Is. region
5	Bul	iPKP	02	45	06	123		USCGS H = 02 26 11 30.2 S 177.7 W h ± 33 km. Kermadec Is. region
5	Bul	traces	03	17	00			
5	Bul	e	20	10	52			
6	Bha	i	07	02	29			Probably Central Africa
6	Clk	iPP	07	24	00	134		USCGS H = 07 03 06
	Bul	iPP			03	134		17.5 S 178.9 W h ± 526 km.
	Bha	iPP			17	139		Fiji Is. region

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
6	Bha	i	09	34	26			
6	Bha	eP	09	41	47			Probably Kariba area
		eS		42	13			
	Bul	traces		42	00			
	Bha	ePKP	11	38	32	133		
		e		41	56			
6	Bul	ePKP		38	41	139		USCGS H = 11 19 23.3 63.4 N 149.5 W h ± 39 km. Central Alaska
6	Bul	e	12	23	27			
6	Clk	iP	17	59	45	66		USCGS H = 17 48 53
	Bha	iP	18	00	06	71		33.6 N 82.8 E h ± 33 km. Tibet
6	Bul	iPKP	18	21	06	121		USCGS H = 18 02 31
	Bha	iPKP			17	126		32.1 S 178.1 E h ± 197 km. Kermadec Is. region
6	Bha	iS	21	41	21			Probably Kariba
6	Bul	eP_n			11			
		iP_1			18			
		iS_1			59			
	Clk	traces		43	00			
6	Bha	e	21	54	07			
6	Clk	i	22	46	57			
6	Clk	e	23	14	29			
7	Bha	traces	01	59	00			
7	Bha	i	03	40	09			
7	Bul	iPKP	04	16	28	128		USCGS H = 03 57 32
	Bha	iPKP			38	134		24.5 S 177.0 W h ± 114 km. Tonga Is. region
7	Bul	traces	15	38	00			
7	Bul	iPKP	15	47	11	145		USCGS H = 15 28 02
	Bha	iPKP		50	23	139		53.7 N 170.1 W h ± 202 km. Fox Is. Aleutian Is.
7	Bul	i	21	54	50			
7	Bha	i	22	47	33			
	Bul	i			34			
8	Bha	iP	01	25	14			± 40 km. from station
		iS			19			
	Bul	traces		27	00			
	Clk	traces		28	00			
8	Bha	iP	01	30	09			± 50 km. from station
		iS			15			
8	Bha	e	14	50	44			
8	Clk	i	21	04	08			
		i		05	16			
9	Bul	iPKP	02	20	29	133		
		i			42			
	Bha	iPKP			40	139	C	USCGS H = 02 02 25
	Clk	ePKP			41	134		17.7 S 178.7 W h ± 538 km. Fiji Is. region
9	Clk	i	07	18	19			
	Bul	traces		20	00			
9	Bul	e	08	46	12			
9	Bul	e	10	57	17			
9	Clk	i	12	43	45			
	Bha	iS		45	37			
	Bul	traces		47	00			
9	Bha	iP	13	10	26			Probably Kariba
		iS			52			
9	Clk	iP	15	00	14			Seismic, probably local
		iS			32			
9	Bha	iP	17	05	29			± 40 km. from station
		iS			34			
9	Clk	iP	18	19	00			± 40 km. from station
		iS			04			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
9	Bha	i	19	37	23			
9	Bha	traces	19	57	30			
9	Bul	iPKP	23	16	48	126		USCGS H = 22 57 48 11.6 S 166.1 E h ± 64 km. Santa Cruz Is. region
10	Clk	iP	08	03	18	88		USCGS H = 07 50 30
	Bha	iP			47	95		9.2 S 125.0 E h ± 33 km. Lima Mag. = 5.2
10	Bha	e	16	55	09			
10	Bha	iS_1	23	28	56			Probably Kariba
11	Bha	e	00	52	17			
11	Bul	$iPKP_1$	13	22	05	146		USCGS H = 13 02 30 53.8 N 164.8 W h ± 33 km. Fox Is. Aleutian Is.
11	Bul	iP	16	54	32	53	C	USCGS H = 16 45 25 60.2 S 18.7 W h ± 33 km. Sandwich Is. region
11	Bha	traces	17	12	00			
11	Bul	traces	20	09	00			
12	Bul	iP	00	52	42	71	R	USCGS H = 00 41 28 31.9 N 78.8 E h ± 33 km. Northern India
12	Bul	e	02	23	46			
12	Bul	iPKP	13	57	34	145	R	USCGS H = 13 38 03 51.6 N 175.0 W h ± 33 km. Andreanof Is. Aleutian Is.
12	Clk	traces	18	54	00			
12	Bha	i	20	29	56			
12	Bha	$ePKP_1$	21	07	43	141		USCGS H = 20 48 17 16.7 S 173.7 W h ± 33 km. Tonga Is. region
	Bul	traces		08	00			
12	Bha	eP	22	45	16			Probably Kariba area
		iS			43			
13	Clk	e	00	46	02			
		e			38			
13	Bul	e	00	48	26			
13	Bul	iP	02	34	40	104	R	USCGS H = 02 20 58
	Bha	eP			44	104	R	6.2 S 76.5 W h ± 125 km.
	Clk	traces		35	00			Central Peru Mag. = 6 3/4
13	Clk	iP	04	22	46			Seismic, local
		iS		23	07			
13	Bul	traces	17	35	00			
13	Bha	e	19	57	16			Probably Central Africa
		i	20	00	54			
	Clk	traces			00			
13	Bul	traces	21	00	00			
13	Bul	traces	22	48	00			
14	Bha	e	00	58	39			
14	Bul	iPKP	05	51	27	122		USCGS H = 05 32 34 31.4 S 177.8 W h ± 33 km. Kermadec Is.
14	Clk	iP	08	21	25			Seismic, local
		iS			46			About 200 km. from station
14	Bha	eP	14	53	15			Probably Kariba area
		iS			39			
14	Bha	e	15	01	09			Probably Kariba area
14	Bul	i	15	05	11		R	
	Bha	e			44			
14	Bul	eP	15	17	56			Seismic, local
		eS		18	23			
14	Bul	iS_1	15	20	09			Probably Witwatersrand tremor
14	Clk	eP	15	17	56			Seismic, local
		eS		18	23			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
15	Bha	iP	12	32	47			Probably Kariba area
		iS		33	13			
15	Bul	iS_1	20	40	42			Witwatersrand tremor
15	Bul	i	23	58	47			
16	Clk	iP	01	42	33	93		USCGS H = 01 29 19
	Bul	iP			58	98		0.8 S 128.0 E
	Bha	iP		43	01	99	R	h ± 33 km. Mag. = 7
								Halmahera region
16	Bul	i	02	08	25			
					47			
16	Clk	e			25			
16	Bha	i	02	19	57			
		i		20	16			
16	Clk	iP	04	14	21			± 150 km. from station
		iS			36			
16	Bha	i	05	46	08			Probably Central Africa
		i		47	27			
		i		48	02			
	Bul	traces		50	00			
16	Clk	eP	12	16	51	93		USCGS H = 12 03 42
	Bul	iP		17	16	98		1.0 S 127.6 E
	Bha	eP		17	19	99		h ± 33 km.
								Halmahera region
16	Bul	traces	15	25	00			
16	Clk	i	16	36	30			
		i			39			
16	Clk	e	17	26	50			
		e		27	42			
16	Bha	i	17	53	07			
	Clk	traces		54	00			
	Bul	traces		55	00			
16	Bul	iP	18	56	54	59		USCGS H = 18 47 09
								35.4 N 44.3 E
								h ± 104 km. Iraq
16	Bha	eP	22	48	23			Probably Kariba
		eS			46			
17	Bul	iPKP	02	30	37	131		USCGS H = 02 11 26
	Bha	ePKP			46	137		19.6 S 178.6 E
								h ± 33 km. Mag. = 6½
								Fiji Is.
17	Bha	iPKP	08	42	50	142	R	USCGS H = 08 23 34
								15.7 S 174.1 W
								h ± 124 km.
								Samoa Is. region
17	Bha	traces	10	56	00			
17	Bul	i	18	07	00			
17	Bha	eP	18	34	32	60		USCGS H = 18 24 28
								54.9 S 28.2 W
								h ± 26 km.
								Sandwich Is.
18	Bul	iPKP	02	10	11	132		USCGS H = 01 51 55
								20.3 S 178.0 W
								h ± 530 km.
								Fiji Is. region
18	Bul	i	20	59	52			
18	Bha	i	23	45	19			
19	Bul	traces	04	00	00			
19	Bul	iP	07	39	46	56	C	USCGS H = 07 30 19
								35.3 N 25.2 E
								h ± 47 km. Crete
19	Clk	iP	07	47	18	79		USCGS H = 07 35 24
	Bha	iP			41	84		35.8 N 96.9 E
	Bul	iP			57	87	C	h ± 33 km. Mag. = 7
								Tsinghai Province
19	Bul	i	12	26	59			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
19	Bul	i	13	17	12			Probably Central Africa
		i		20	59			
19	Bul	iP	16	27	14	55	C	USCGS H = 16 17 55
	Bha	iP			49	60	R	58.8 S 26.0 W
								h ± 99 km.
								Sandwich Is. region
19	Bul	i	20	15	32			
19	Bul	iPKP	23	03	12	123	R	USCGS H = 22 44 17
								29.9 S 177.7 W
								h ± 41 km.
								Kermadec Is.
20	Bul	i	03	28	12		R	
20	Bul	eP	05	59	56	89		USCGS H = 05 46 59
								27.5 S 70.2 W
								h ± 33 km. N. Chile
20	Bha	i	06	43	08		R	Republic of the Congo
		i		44	29			
		i		45	02			
	Clk	i	06	43	08			
		i		44	29			
		i		45	04			
	Bul	i	06	44	13			
		i		46	25			
		i		47	42			
21	Bul	e	04	39	32			
21	Clk	iP	09	28	56			± 130 km. from station
		iS		29	10			
21	Bha	i	11	37	12			Probably Central Africa
		i		39	35			
		i		40	57			
	Clk	e		37	26			
		e		41	15			
	Bul	e		38	35			
		e		41	46			
		e		43	47			
21	Bha	i	17	05	06			Probably Witwatersrand
		i			37			tremor
		iS_1			52			
21	Bha	e	20	20	15			
21	Bha	traces	22	53	30			
23	Bul	iP	07	29	14	55	R	USCGS H = 07 19 45
								60.7 S 24.7 W
								h ± 33 km.
								Sandwich Is.
23	Bul	eP	10	07	29	82		USCGS H = 09 55 07
								25.7 N 99.5 E
								h ± 33 km.
			14?					Yunan Province, China
23	Bha	eP	24	04	46			Probably Kariba
		iS		05	13			No!
	Bul	i			56			
23	Bul	i	22	24	07			
23	Bul	iS	23	22	44			Probably Witwatersrand
								tremor
24	Bha	e	01	51	42			
24	Bul	eP	06	05	18	99		USCGS H = 05 51 44
								1.1 S 127.2 E
								h ± 33 km.
								Halmahera region
24	Bul	iP	09	34	40	86	C	USCGS H = 09 22 09
								31.1 S 66.8 N
								h ± 110 km.
								La Rioja Province, Argentina
24	Bha	i	10	35	15			Probably Republic of the
		i		36	13			Congo

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
24	Bha	traces	11	43	00			
24	Bul	iP	20	42	04	69	C	USCGS H = 20 31 09 36.3 N 71.4 E h ± 125 km. Hindu Kush region
24	Bha	ePKP	22	00	40	136		USCGS H = 21 42 49 20.8 S 179.1 W h ± 603 km. Fiji Is. region
		iPP		03	38			
	Bul	iPKP		00	53	130		
		iPP		03	23			
24	Bha	iP	23	17	05			Probably Kariba
		iS			30			
		iS_1		18	00			
	Bul	iS_1		18	13			
24	Bul	iS_1	23	18	39			
25	Bha	iP	01	02	18			Probably Kariba
		iS			44			
	Bul	iS_1		03	26			
25	Bha	e	04	40	30			
	Bul	i			51		C	
25	Bul	iP	08	25	17	94	R	USCGS H = 08 12 57 4.7 N 122.4 E h ± 610 km. Celebes Sea
25	Bul	i	09	34	41		C	
25	Bul	i	11	17	13		C	
25	Bul	iP	16	49	36	99		USCGS H = 16 35 56 1.3 S 129.0 E h ± 33 km. Halmahera region
25	Bul	iPKP	18	08	52	130		USCGS H = 17 50 25.3 21.6 S 178.0 W h ± 380 km. Fiji Is. region
25	Bha	iP	21	20	48			Probably Kariba area
		iS		21	19			
25	Bha	iP	23	47	29			BPI H = 51 23 56
		iS			57			Kariba area
	Bul	eP_n			48			
		iP_1			56			
		iS_n		48	26			
		iS_1			39			
26	Bul	traces	01	32	00			
26	Bul	iS_1	07	27	36			Witwatersrand tremor
26	Bul	iS_1	09	01	57			
	Clk	traces		02	00			
26	Bha	iP	12	52	10			± 10 km. from station
		iS			11			
26	Bul	iP	16	57	05	91	C	USCGS H = 16 44 12
	Bha	eP			12	93		18.1 S 69.0 W h ± 110 km. Peru-Chile border
26	Bha	i	21	03	06			
26	Bul	e	21	04	21			
27	Bul	iP	19	42	32	89		USCGS H = 19 29 44
	Bha	eP			45	91		30.3 S 70.3 W h ± 59 km. Central Chile
27	Bul	iP	01	06	18			± 180 km. from station
		iS			36			
28	Bul	iP	01	16	50			± 180 km. from station
		iS		17	07			
28	Bul	eP	02	18	00	89		USCGS H = 02 05 16 24.0 S 67.9 W h ± 120 km. Chile-Argentina border

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
28	Bha	i	10	51	25			BPI H = 08 50 47
	Bul	iP_n			43			Kariba area
		iP_1			51			
		iS_n		52	18			
		iS_1			32			
	Clk	i		53	29			
		i		54	03			
28	Bha	eP	10	45	37			Probably Kariba
		iS		46	06			
28	Bha	eP_n	13	13	57	470 km.		Republic of the Congo
		iS_n		14	42			
		iS_1		15	02			
	Clk	iP_n		14	18	970 km.		
		iS_n		16	32			
		iS_1		17	23			
28	Bha	eP_n	14	01	38	470 km.		Republic of the Congo
		iS_n		02	23			
		iS_1			41			
	Clk	iP_n			38			
		iS_n		04	12	970 km.		
		iS_1		05	04			
28	Bha	i	18	37	12			
28	Bha	iP	20	00	36	65	C	USCGS H = 19 50 11
	Bul	iP		01	04	69	C	36.1 N 71.3 E
								h ± 150 km. Hindu Kush
29	Bha	iP	00	34	16			Probably Kariba
		iS			43			
	Bul	traces		35	00			
29	Bul	traces	09	28	00			
29	Bul	traces	13	05	40			
29	Bul	traces	13	16	00			
29	Bha	i	15	05	05			
29	Bul	iP_n	18	58	26			Witwatersrand tremor
		iS_n		59	34			
		iS_1	19	00	03			
	Bha	i	18	59	42			
	Clk	iS_1	19	03	09			
29	Bul	iP_n	20	10	13			Witwatersrand tremor
		iS_n		11	22			
		iS_1			50			
	Bha	i			30			
	Clk	iS_1		14	50			
29	Clk	iPKP	22	03	32	133		USCGS H = 21 44 17
		iPKS		06	58			51.4 N 178.6 E
	Bha	iPKP		03	35	137		h ± 60 km. Mag. = 6.0
	Bul	iPKP			39	141		Andreanof Is., Aleutian Is.
30	Clk	iP	01	11	49	94		USCGS H = 00 58 18
	Bul	iP		12	00	99		0.7 S 129.0 E
	Bha	iP			05	101		h ± 33 km. Mag. = 6 3/4
								Halmahera region
30	Bha	i	10	03	22			
30	Bha	iP	10	32	02	68		USCGS H = 10 20 54
								10.6 N 94.4 E
								h ± 33 km.
								Andaman Is. region
30	Bha	eP	18	15	54			Probably Kariba
		iS		16	21			
30	Bha	i	22	41	55			

H. O. Oliver

Hazel Roberts

Department of Federal Surveys,
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SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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University of the Witwatersrand,
Johannesburg,
South Africa.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
1	BHA	i	00	33	19			
1	Clk	i	02	32	46			
	BHA	e		33	33			
	Bul	i			47			
1	BHA	iP	03	30	20			BPI H = 03 29 44
		iS			45			Kariba area
	Bul	iP_1	03	30	43			
		iS_1		31	27			
1	BHA	iPKP	10	12	01			
1	Clk	iPKP	10	22	01	125		USCGS H = 10 03 20
	Bul	iPKP			05	125	R	19.0 S, 169.0 E
	BHA	i			14	131		h ± 140 km. Mag.= 7
1	Bul	iS_1	19	58	55			New Hebrides Is.
2	BHA	i	19	26	24			Witwatersrand tremor
	Clk	i			36			
3	BHA	iP	08	23	20			Probably Kariba
		iS			46			
3	Clk	iP	08	28	45			
		iS		29	36			
	BHA	i	08	29	10			
		i		30	15			
		e			51			
4	Bul	i	19	11	09	55	R	USCGS H = 19 01 41
	BHA	i			41	59		56.1 S, 27.1 W
								h ± 33 km.
								Sandwich Is.
4	Bul	i	20	07	58			
	Bha	traces		08	00			
4	Bul	i	21	33	15			Witwatersrand tremor
5	BHA	traces	02	20	10			
5	BHA	iP	03	42	43			Kariba area
		iS		43	12			
	Bul	eP_1	03	43	07			
		iS_1			48			
5	BHA	iP	04	30	59			Kariba area
		iS		31	25			
	Bul	iP_1	04	31	22			
		iS_1		32	05			
5	Bul	i	15	29	53	90		USCGS H = 15 17 02
	BHA	i		30	07	92		24.7 S, 69.5 W
								h ± 50 km. N. Chile
5	BHA	iP	15	33	55			Kariba
		iS			24			
	Bul	iP_1		34	18			
		iS_1		35	01			
5	Clk	e	15	46	17			
5	BHA	eP	16	41	50			Kariba
		eS		42	17			
	Bul	iS_1			57			
5	BHA	eP	16	44	23			Kariba
		eS			49			
5	BHA	eP	19	19	41			Kariba
		eS			07			
6	Clk	i	08	50	10	74		USCGS H = 08 38 33
	Bul	i			41	80	R	9.1 S, 112.5 E
	BHA	i			45	81	R	h ± 84 km.
								Near S. coast of Java
6	Bul	i	13	31	29			
6	Bul	iP	14	05	24			10 km. from station
		iS			25			
	BHA	traces			47			
6	BHA	eP	16	47	30			Probably Kariba
		eS			57			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
6	Bul	iS_1	22	07	22			Witwatersrand tremor
	BHA	traces	22	10	00			
6	BHA	i	22	44	33			
7	Clk	iP	00	04	03			± 160 km. from Clk
		i			19			
	Bul	traces		06	00			
7	BHA	i	02	29	07	71		USCGS H = 02 17 37.4
	Bul	i			29	70	C	36.7 N, 83.1 E
								h ± 33 km.
								Sinkiang Prov., China
7	Bul	i	03	27	23	70		USCGS H = 03 16 41
								36.6 N, 70.8 E
								h ± 230 Hindu Kush
7	Clk	i	11	20	09			Probably Central Africa
		i		22	10			
		i		23	11			
	BHA	i			11			
7	BHA	traces	13	43	00			
	Clk	i			28			
		i		44	31			
7	Clk	i	14	30	42			± 130 km. from station
		i			56			
7	Bul	i	16	35	55	90	C	USCGS H = 16 23 11
	BHA	e		36	07	91		h ± 110 km.
								22.0 S, 68.6 W
								N. Chile
8	Clk	i	07	48	10			± 130 km. from station
		i			24			
8	Bul	i	09	10	21	154		USCGS H = 08 50 56
				13	39		C	54.9 N, 163.9 W
								h ± 89 km.
								Unimak Is., Aleutian Is. region
8	Clk	i	10	40	37	110		USCGS H = 10 22 11
	BHA	e			51	116		36.6 N, 141.0 E
		i		41	56			h ± 53 km.
	Bul	i		40	55	118		Honshu, Japan
8	Clk	e	11	13	59			
8	Bul	i	14	07	58	79		USCGS H = 13 56 27
	BHA	e		08	28	79		58.6 S, 61.5 W
								h ± 33 km. Mag.= 5.8
								Drake Passage
8	BHA	iP	22	33	57			Probably Kariba
		iS		34	23			
9	Bul	traces	14	51	30			
9	Bul	traces	17	07	00			
9	Bul	i	19	34	22	31	C	USCGS H = 19 28 02
	Clk	i		35	06	38		52.3 S, 27.5 E
	BHA	i			12	38	C	h ± 33 km.
								1000 km. SW of Prince Edward Is.
9	Bul	i	21	04	47	146	R	USCGS H = 20 45 14
								53.9 N, 165.2 W
								h ± 33 km.
								Fox Is., Aleutian Is.
10	Bul	traces	01	54	00			
10	Bul	iS_1	02	38	09			Witwatersrand tremor
10	Bul	i	04	47	38	122	R	USCGS H = 04 28 42
	BHA	i			47	127	R	20.0 S, 168.1 E
								h ± 33 km.
								Loyalty Is.
10	Clk	eP	09	35	52			± 90 km. from station
		iS		36	01			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
10	Bul	i	11	02	26			
10	BHA	e	11	17	12	38		USCGS H = 11 09 42 8.4 S, 67.6 E h ± 33 km. Indian Ocean
10	BHA	iS	12	22	04			
10	BHA	iS	12	31	14			
10	BHA	iP_n	14	16	53			Probably Republic of the Congo
		iS_n		17	49			
		iS_1		18	10			
	Clk	i		19	50			
10	BHA	i	17	42	31			
10	BHA	eP_n	18	56	01			Probably Republic of the Congo
		iS_n			56			
		iS_1		57	18			
10	BHA	iS_n	21	40	31			Probably Republic of the Congo
		iS_1			53			
10	Bul	traces	22	36	40			
10	Clk	e	22	41	50			
11	BHA	iP_n	00	25	06			Probably Republic of the Congo
		iS_n		26	02			
	Clk	e		27	18			
		e		28	05			
	Bul	e			15			
11	BHA	iP_n	02	33	33			Probably Republic of the Congo
		iS_n		34	39			
		iS_1		35	01			
	Clk	eP_n		34	28			
		eS_n		35	54			
				36	40			
	Bul	traces		36	00			
11	BHA	iS_1	03	41	09			Probably Republic of the Congo
11	BHA	iS_1	03	43	12			Probably Republic of the Congo
11	BHA	i	05	02	59	139		USCGS H = 04 44 19.4 15.4 S, 177.1 W h ± 400 km. Fiji Is. region
11	BHA	traces	08	56	19			
11	Bul	e	18	21	09			
		i		22	27			
	BHA	traces			59			
11	BHA	e	19	31	00			
11	Bul	traces	23	20	00			
11	Clk	iP	23	51	42			± 140 km. from station
		iS			57			
12	BHA	iP_n	01	39	56			BPI H = 01 38 44 Republic of the Congo
		iP_1		40	12			
		iS_n			52			
		iS_1		41	14			
	Clk	i		40	41			
		i		42	07			
		i			53			
	Bul	e		41	(10)			
		e		43	(06)			
		e		44	10			
12	BHA	traces	03	19	00			
12	Clk	i	09	56	12	95		USCGS H = 09 42 58 57.5 S, 159.4 E h ± 44 km. Macquarie Is. region Probably Witwatersrand tremor
12	Bul	iS_1	14	29	11			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
12	BHA	e	17	58	29			Probably Republic of
		i		59	25			the Congo
		i			46			
	Bul	eP_n	17	59	45			
		iS_n	18	01	38			
		iS_1		02	44			
	Clk	iS_n		00	39			
		iS_1		01	28			
12	BHA	eP_n	18	08	50			Probably Republic of
		iS_n		09	46			the Congo
		iS_1		10	07			
	Clk	traces		10	59			
12	BHA	e	19	58	34			
	Clk	e		59	54			
12	Bul	traces	20	03	00			
12	BHA	e	20	27	48	138		USCGS H = 20 08 43
	Clk	i			59	138		57.4 N, 153.9 W
	Bul	i		28	06	149	C	h ± 80 km.
12	BHA	traces	20	47	29			Kodiak Is., Alaska
12	Clk	i	20	56	09	123	R	USCGS H = 20 37 12.9
	BHA	i			15	126		55.9 N, 163.1 E
								h ± 33 km.
								Near E. coast of
								Kamchatka
13	BHA	i	01	16	49			
13	BHA	e	02	14	08			
13	BHA	traces	10	56	29			
13	BHA	e	11	58	00			Probably Kariba
		e			27			
13	Bul	i	13	02	54			
	BHA	i			55		C	
	Clk	i		03	05			
13	BHA	e	14	23	46	129	R	USCGS H = 14 07 47
								19.5 S, 169.3 E
								h ± 163 km.
								New Hebrides Is.
13	Bul	iS_1	15	55	35			Witwatersrand tremor
13	BHA	eP_n	16	09	46			Probably Republic of
		iS_n		10	25			the Congo
		iS_1			47			
13	Clk	traces	16	11	29			
13	Clk	iP	16	33	57			
		iS		34	29			
13	BHA	eP	20	14	41			Kariba
		iS		15	07			
13	BHA	eP	20	17	31			Kariba
		iS			57			
13	BHA	e	22	29	02			
	Clk	e			55			
		e		32	22			
13	Bul	traces	22	32	59			
14	BHA	eP	18	50	53			Kariba
		iS		51	18			
14	BHA	iP	20	32	45			Kariba
		iS		33	09			
14	Bul	traces	20	34	39			
14	Bul	traces	22	55	09			
14	Bul	i	23	33	33			
15	BHA	iP	04	28	08			Kariba
		iS			34			
15	Clk	iP	11	31	37			± 50 km. from station
		iS			42			
15	Bul	i	15	11	44			
15	BHA	e	18	28	49			
15	Clk	traces	22	08	59			
15	BHA	traces	22	11	00			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
16	BHA	eP_n	01	19	30			Probably Central Africa
		iS_n		21	06			
		iS_1		22	05			
	Clk	iP_n		20	01			
		iS_n		22	03			
		iS_1		23	18			
16	BHA	i	01	34	52			
16	BHA	i	05	48	47			Probably Kariba
16	Bul	iS_1	11	58	34			Probably Witwatersrand tremor
17	BHA	e	00	01	12			
		e			47			
17	BHA	traces	01	46	20			
17	BHA	iP_n	02	02	57	430 km.		BPI H = 02 01 56
		iP_1		03	08			12° S, 31° 30' E
		iS_n			40			N. Rhodesia
		iS_1			55			
	Clk	iP_n			03	500 km.		
		iP_1			15			
		iS_n			52			
		iS_1		04	10			
	Bul	e		05	20			
		e		06	09			
17	BHA	i	04	25	32	122		USCGS H = 04 06 36
	Bul	i			37	126	C	45.3 N, 150.8 E
								h ± 33 km.
								Kurile Is. region
17	BHA	i	06	22	36	95	C	USCGS H = 06 09 18.2
	Bul	i			41	96	R	15.7 N, 120.1 E
								h ± 80 km.
								Nr. W coast of Luzon, Philippine Is.
17	Bul	i	14	24	27	98		USCGS H = 14 11 01
								14.1 S, 74.2 W
								h ± 51
								Southern Peru
17	Bul	i	17	29	01			
17	Bul	i	22	59	06	131		USCGS H = 22 40 07
	BHA	e			14	136		24.4 S, 177.2 W
								h ± 70 km.
								Tonga Is. region
17	BHA	traces	23	34	01			
18	Bul	i	02	46	14			
18	BHA	i	04	13	27	87		USCGS H = 04 04 24
								29.6 S, 68.3 W
								h ± 30 km.
								La Rioja Prov., Argentina
18	BHA	e	05	43	56	87		USCGS H = 05 33 25
		e		44	52			29.6 S, 68.5 W
	Bul	i		46	07			h ± 29
								La Rioja Province, Argentina
18	Clk	i	12	32	32	77		USCGS H = 12 20 32
	Bul	i		33	02	82		8.2 S, 115.6 E
	BHA	i			06	84		h ± 39
								Bali
18	Clk	i	13	15	33	77		USCGS H = 13 03 36
	Bul	i		16	04	82		8.2 S, 115.7 E
	BHA	i			07		C	h ± 68 km.
								Bali
18	BHA	e	13	42	22			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
19	Bul	i	01	15	34	85		USCGS H = 01 03 04
	BHA	i			57	89		46.5 S, 75.1 W
	Clk	i		16	13	94		h ± 33 km. Mag.= 6 3/4
								Coast of S. Chile
19	Bul	i	11	55	25		R	
19	BHA	e	21	48	10	81		USCGS H = 21 35 49.6
	Bul	i			25	84		23.8 N, 45.9 W
	Clk	i			42	86		h ± 33 km. Mag.= 6 ½
								North Atlantic Ocean
19	Bul	i	23	44	16	92		USCGS H = 23 31 26
								17.8 S, 69.4 W
								h ± 148 km. Peru-
								Bolivia-Chile border
								region
20	Bul	i	00	10	55			
20	BHA	i	06	02	12			
		i			32			
20	Bul	traces	06	04	00			
20	Clk	i	11	56	55	125	R	USCGS H = 11 38 01
	Bul	i			56	123	R	30.7 S, 178.3 W
	BHA	i		57	07	128		h ± 34 Mag. = 7
								Kermadec Islands
20	Bul	iP	14	30	12			± 60 km. from station
		iS			19			
20	Bul	iS1	17	04	16			Witwatersrand tremor
20	Bul	iP	20	53	15			± 180 km. from station
		iS			34			
20	BHA	eP	22	28	08			Probably Kariba
		eS			32			
20	BHA		22	59	16			Probably Kariba
					43			
21	Bul	i	17	49	15	123		USCGS H = 17 30 15
	BHA	i			22	127	R	11.1 S, 163.3 E
								h ± 33 km. Solomon Is.
								region
21	BHA	e	18	38	30	129		USCGS H = 18 10 12
								29.5 S,178.1 W
								h ± 82
								Kermadec Is. region
22	BHA	e	00	25	47			
		i		26	12			
22	BHA	i	02	17	18			
		i			44			
22	Clk	i	14	10	35			
22	BHA	e	14	15	43	123		USCGS H = 13 56 43
		i			50		C	48.6 N, 154.7 E
								h ± 22 km. Mag.= 6½
								Kurile Is. region
22	Bul	i	15	56	29	96	C	USCGS H = 15 42 49
	BHA	i			30	98		4.3 N, 127.9 E
								h ± 58
								Molucca Passage
22	BHA	e	16	44	58	141		USCGS H = 16 25 36.8
	Bul	i		45	15	147		52.2 N, 165.3 W
								h ± 33 km. Fox Is.,
								Aleutian Is.
22	Clk	iP	17	20	24			± 130 km. from station
		iS			37			
22	Clk	iP	18	03	17			± 130 km. from station
		iS			30			
22	BHA	i	18	06	08			
	Bul	traces		07	00			
22	Bul	i	20	05	21			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
22	Clk	i	22	05	03	78		USCGS H = 21 53 02.5
	Bul	i			34	83		8.2 S, 115.7 E
	BHA	i			39	84		h ± 33 km.
								Java Sea
23	Bul	iS_1	00	00	48			Probably Witwatersrand tremor
23	Bul	traces	03	01	00			
23	Bul	e	03	52	03	136		USCGS H = 03 33 19
		i			16			15.0 S, 176.7 W
	BHA	i			20	141	C	h ± 279 km.
23	BHA	e	08	23	10			Fiji Is. region
		i			36			
23	Bul	e	15	25	33	99		USCGS 15 12 06
								h ± 88 km.
								6.0 N, 126.1 E
								Near E. coast of Mindanao, Philippines
23	Bul	i	16	46	45	126		USCGS H = 16 27 42
								46.6 N, 152.3 E
								h ± 52 km.
								Kurile Is. region
23	Clk	traces	16	50	00			
	BHA	i			31			
23	Bul	traces	16	53	00			
24	BHA	eP	09	35	15			Probably Kariba
		iS			41			
24	BHA	eP	19	20	15			Probably Kariba
		iS			40			
24	BHA	eP	23	56	37			Probably Kariba
		iS		57	04			
	Bul	traces			00			
25	Bul	i	00	14	34			Probably Witwaters-rand tremor
25	BHA	iP	03	35	36			Probably Kariba
		iS		36	03			
	Bul	iS_1			45			
25	Bul	i	16	17	18	54		USCGS H = 16 08 01
	BHA	e			53	59		56.8 S, 25.0 W
	Clk	traces		18	08			h ± 29 km.
25	Bul	i	18	18	24			Sandwich Is. region
	BHA	i			50		R	
25	BHA	iP_n	22	37	05			16°S, 30°30' E
		iP_1			09			S. Rhodesia, Moz. border
		iS_1			42			
	Bul	eP_n			25			
		iS_n		38	12			
		iS_1			30			
	Clk	iP_n		37	25			
		iS_n		38	13			
		iS_1			32			
26	BHA	i	02	07	34			± 100 km. from station
		i			45			
26	BHA	eP	03	37	02			Probably Kariba
		iS			28			
26	Clk	iP	12	32	35			
		iS			54			
	BHA	e		34	19			
	Bul	traces		35	00			
26	BHA	eP	14	37	26			Probably Kariba
		eS			51			
	Bul	traces		38	00			
26	Clk	traces	17	24	00			
	BHA	traces		25	50			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
26	Clk	iP	19	24	55			Probably Nyasaland/Moz.
	BHA	iP		26	13			border
	Bul	iP			36			
		i		28	00			
26	Clk	iP	19	38	13			± 120 km. from station
		iS			25			
26	Clk	iP	20	38	42			± 120 km. from station
		iS			53			
26	BHA	traces	21	01	00			
26	BHA	e	23	25	52	127		USCGS H = 23 06 55
	Bul	e		26	00	131		55.2 N, 159.9 E
								h ± 47 km.
								Near E. coast of
								Kamchatka
27	BHA	i	02	46	26			Kariba area
		i			56			
		i		47	00			
		i			47			
		i		48	11			
27	BHA	iP	02	03	58			Kariba area
		iS		04	25			
		iP_n			15			
		iP_1			23			
		iS_n			55			
		iS_1		05	08			
27	Bul	e	04	17	52	123		USCGS H = 03 58 48
								55.3 N, 160.1 E
								h ± 54 km. Near E. coast
								of Kamchatka
27	BHA	iP	07	35	48			Kariba
		iS		36	14			
27	BHA	iP	08	40	35			
		iS		41	17			
27	BHA	i	19	18	38			
27	BHA	i	21	59	45			
		i	24	00	12			
29	BHA	i	00	56	27	47		USCGS H = 00 47 51
	Bul	i		57	05	52		28.3 N, 52.2 E
								h ± 45 km. W. Iran
29	BHA	e	08	43	27			Probably Central Africa
		e		47	15			
	Clk	i		43	41			
29	BHA	traces	21	02	30			
30	Bul	i	17	59	11	138	C	USCGS H = 17 39 43
								52.4 N, 169.5 W
								h ± 60 km. Fox Is.,
								Aleutian Is.
30	Bul	i	19	07	27			
	BHA	e		08	01			
30	BHA	i	21	22	20			Probably Central Africa
				23	23			
31	Clk	i	04	16	19			Seismic, local
31	BHA	e	06	23	08			
31	Clk	i	11	51	45			± 100 km. from station
		i			56			
31	BHA	iP	13	13	32			Kariba area
		iS			57			
31	Bul	i	14	26	54	122		USCGS H = 14 08 03
								30.1 S, 178.1 W
								h ± 60 km.
								Kermadec Is.
31	BHA	iP	18	50	35			Kariba area
		iS		51	04			
	Bul	iS_1			44			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	REMARKS
31	Bul	traces	19	11	30			
31	BHA	iP	19	20	24			Kariba area
		iS			51			
31	Clk	i	19	41	43			
		i		42	52			
31	Clk	i	22	16	15			

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Lithologic Foundation:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Observer:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

June, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
1	BHA	e	00	28	22		R	Republic of the Congo
1	BHA	i	01	02	29			Probably Republic of
		i		03	48			the Congo
	CLK	i			32			
		i		06	00			
	BUL	i		03	33		C	
1	BUL	e	03	34	48			Witwatersrand tremor
		i		36	10			
1	CLK	iP_n	07	41	32	500 km.		USCGS H = 07 40 30
		iS_n		42	23			10° 30' S, 34° E
		iS_1			47			Lake Nyasa
	BHA	iP_n		42	05	750 km.		
		iS_n		43	18			
		iS_1			50			
	BUL	ePn		42	56	1170 km.		
		iS_n		44	46			
		iS_1		45	48			
1	CLK	iP	08	49	51			± 120 km. from station
		iS_n		50	05			
		iS_1			07			
1	CLK	iP	09	03	23			± 120 km. from station
		iS_n			37			
		iS_1			41			
1	CLK	iP	11	00	08 K	63 km.	R	Hindu Kush
	BHA	iP			25 A	68	C	USCGS H = 10 49 54.8
	BUL	iP			54	72		36.4 N, 71.5 E
1	BHA	i	11	27	29			h = ± 70
								Seismic local
1	BHA	e	12	50	28			
1	BHA	i	21	33	23 K		R	
2	BUL	iPKP	10	18	49	119		USCGS H = 10 00 00
	BHA	iPKP			53	123	R	6.1 S, 154.4 E
								h ± 49 Solomon Is.
2	BHA	T	13	34	30			
	CLK				33			
2	BUL	$iPKP_1$	18	17	44	146		USCGS H = 17 58 09
								53.8 N, 163.7 W
								h ± 36 Alaska Penin-
								sular region
2	BUL	iP	21	13	11 K	52	R	USCGS H = 21 04 24
	BHA	iP			48	58		58.5 S, 15.6 W
	CLK	iP		14	02	61		h ± 50 Sandwich Is.
2	BUL	iPKP	21	25	29	121		USCGS H = 21 07 14
								32.8 S, 179.0 W
								h ± 56 Kermadec Is.

June, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
2	BHA	ePKP	22	40	48	122		USCGS H = 22 22 00
	CLK	iPKP		41	01	128		13.8 N, 90.8 W
								h ± 68
								Nr. coast of Guatemala
2	CLK	Traces	23	34	33			
3	CLK	Traces	13	33	03			
3	BUL	i	15	01	21			
	BHA	i		02	08			
3	BHA	i	17	28	32			Probably Central Africa
		i		29	48			
	CLK	e		29	02			
		e		30	29			
3	BHA	i	18	40	38			Probably Witwatersrand
		i		41	09			tremor
	BUL	e		51	06			
		i		52	01			
		i			25			
3	BUL	iP	21	39	45	56		USCGS H = 21 30 13
	BHA	eP		40	19	61		59.5 S, 27.7 W
								h ± 45 Sandwich Is.
4	CLK	i	17	09	02			
	BHA	e		09	(37)			
		i		10	11			
	BUL	i		09	(58)			
		i		10	18			
4	BUL	iPKP	19	40	39	119		USCGS 19 21 57
								18.9 N, 146.2 E
								h ± 110
								Mariana Islands.
4	BUL	iP	21	18	17	97		USCGS H = 21 04 42
	BHA	iP			19	99		1.2 S, 127.3 E
								h = ± 31
								Halmahera Is. region
4	BHA	iP	23	24	01			Kariba
		iS			28			
4	BHA	e	23	40	27			
5	BUL	i	00	03	24			
5	BHA	i	00	03	49			Indian Ocean
5	BUL	e	00	17	57			
5	BUL	i	00	34	54			
		i			57			
5	BHA	e	00	35	23			
5	BUL	iP	05	40	13	41		USCGS H = 05 32 09
		i			17			34.6 S, 81.5 E
	BHA	iP	05	40	38	46		h ± 33 Indian Ocean
5	BUL	eP_n	21	30	11			Witwatersrand Tremor
		iS_1		31	48			
5	BHA	eP	23	07	26	90		USCGS H = 22 54 29
								3.0S, 119.5 E
								h ± 75 Celebes

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
6	CLK	iP	05	31	58 K	91	R	USCGS H = 05 18 55
	BHA	iP		32	23	93		19.9 N, 120.2 E
	BUL	iP			30	98		h ± 33
								Luzon, Philippines
6	BHA	e	12	12	03			USCGS H = 12 04 14
	CLK	eP			19	44		37.8 S, 77.9 E
	BUL	iP			36	45		h ± 33 1500 km. NE
		i			40			of Kerguelen Is.
7	BUL	iP	00	33	17	86		USCGS H = 00 20 54
								23.9 S, 66.6 W
								h ± 206 Jujuy Prov.,
								Argentine
7	BUL	iS_1	02	50	52			Witwatersrand tremor
7	BHA	iP	18	58	06			Kariba
		iS			32			
	BUL	eP_1			32			
		eS_1		59	16			
7	BHA	ePKP	22	51	25	145		USCGS H = 22 31 55
								15.2 S, 173.1 W
								h ± 33
								Samoa Is. region
7	BUL	iPKP	22	56	54	138		USCGS H = 22 37 30
	BHA	iPKP		57	00	144		15.3 S, 173.2 W
								h ± 33 Samoa Is. region
8	BHA	$iPKP_1$	01	21	23	145	R	USCGS H = 01 01 51.9
								15.1 S, 173.0 W
								h ± 33 Samoa Is. region
8	BHA	iP	03	36	26			± 150 km. from station
		iS			41			
8	BUL	iP	04	30	16	40		USCGS H = 04 22 53
								22.7 S, 13.7 W
								h ± 33
								S. Atlantic Ocean
8	BUL	Traces	21	34	31			
8	BUL	Traces	22	34	31			
9	CLK	i	16	49	02			
9	BUL	Traces	17	44	01			
9	BUL	Traces	19	31	00			
9	BHA	iP	20	49	25	74		USCGS H = 20 37 51.6
	BUL	iP			35	77		10.7 N, 41.9 W
								h ± 33
								Mid-Atlantic Ocean
10	BUL	iP	04	29	28	86		USCGS H = 04 16 38
	CLK	eP			31	88		55.4 S, 146.4 E
	BHA	iP			51	92		h ± 33
								800 km. W. of
								Macquarie Is.
								Mg. 6¼
10	BUL	iP	06	51	55	86	C	USCGS H = 06 39 04
	CLK	iP			58	88	R	55.3 S, 146.1 E
	BHA	iP		52	19	92	C	h ± 18 Mag. 6¼
10	BUL		12	42	30			800 km. W. of
10	BUL	Traces	14	29	01			Macquarie Is.
10	BUL	i	14	50	23			Seismic local

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
10	BUL	iPKP	19	00	43	118		USCGS H = 18 42 06 5.1 S, 151.7 E h ± 112 New Britain
10	BHA	iP	23	49	15			Republic of the Congo
		iS		50	25			
	BUL	i			20			
11	BUL	i	00	17	29		R	
11	BHA	iP	02	41	09			Seismic, Central Africa
		iS			19			
	BUL	i		42	14			
11	CLK	iP	03	35	59	61		USCGS H = 03 25 40.7
	BHA	iP		36	16	64	R	37.1 N, 70.3 E
	BUL	iP			44	69		h ± 38
11	BHA	i	06	17	52			Hindu Kush
11	BHA	iP	13	21	09			Kariba area
		iS			36			
11	BUL	e	15	43	22			
11	BHA	e	17	34	03			
		e			27			
11	CLK	iP	18	18	26	67		USCGS H = 18 07 24.1
	BHA	eP	18	18	51	72		30.7 N, 86.9 E
	BUL	eP	18	19	09	75		h ± 33 Tibet
11	BUL	iS_1	18	53	09			Witwatersrand tremor
11	BHA	i	19	05	09			Probably Central Africa
		ii		06	09			
	CLK	e	19	08	10			
11	BUL	e	19	06	26			Seismic
12	BUL	iP	15	21	27	54	C	USCGS H = 15 11 59.2
	BHA	iP		22	02	59	R	55.8 S, 27.8 W
12	CLK	e	19	19	22			Local
		i			44			
12	BUL	i	21	48	48			
13	CLK	i	01	51	34			Seismic local
		i			37			
13	BHA	iP	04	06	24			
		i			32			
		i		08	04			
		i		09	07			
	CLK	iP	04	07	50		R	Central Africa
		i		09	16			
		i		10	30			
	BUL	iP	04	07	39			
		i		10	22			
		i		12	06			
13	BUL	i	11	14	?			
		iS		16	25			
13	BHA	Traces	13	52	00			
13	BUL	iP	17	11	51	88		USCGS H = 16 59 10
	BHA	eP		12	06	91		33.3 S, 71.3 W
								h ± 94
								Nr. coast of Chile

June, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
13	BUL	i	17	42	41		C	
	BHA	i	17	42	41			
13	BUL	i	17	45	28			
	BHA	i	17	45	31			
13	BHA	iP	18	39	59			Central Africa
		i		41	40			
		i		42	43			
	CLK	iP		40	20			
		i		42	22			
		i		43	30			
	BUL	iP		41	12			
		i		43	54			
		i		45	36			
13	BUL	e	19	54	13		R	
13	BHA	eP	21	35	24			Probably Cariba
		eS			51			
13	BHA	eP	22	30	31	36		USCGS H = 22 23 24
	BUL	eP			32	35		11.7 S, 65.0 E h ± 33 SW of Chagos Archipelago. Indian Ocean
14	BHA	iP	01	51	30			Probably double Kariba shock
		iP			46			
	CLK	i		52	44			
		i		54	11			
14	BHA	i	03	08	57			
14	CLK	e	05	03	04			
				04	40			
15	CLK	Traces	01	14	01			
	BHA	Traces		15	29			
		i			46			
15	BUL	iPKP$_1$	02	38	54	148	C	USCGS H = 02 20 11 53.2 N, 167.0 W Fox Islands
15	BHA	eP	07	28	00			
		iS			27			
15	CLK	e	15	33	30			
	BHA	Traces		34	00			
15	BHA	iP	20	49	56			
	CLK	iP		50	33	200 km.		B.P.I. H = 20 49 28
		iS$_n$		51	40	500 km.		Luangwa Valley
	BUL	iP		50	50			
		iS$_n$		51	38	600 km.		
15	BUL	i	21	56	37			
15	BUL	Traces	22	09	(01)			Seismic local
16	BHA	iP	09	15	54			
	BUL	Traces		17	00			
	CLK	eP		17	20			
		i		18	24			
		i			53			
16	BUL	i	12	19	46			

Date	Station	Phase	h. G	m. M.	s. T.	Arc Dist.	C/R	Remarks
16	CLK	iP	15	11	19			Seismic
17	BHA	iP	02	10	39			± 180 km. from station
		iS			58			
17	CLK	e	18	51	32			
17	CLK	iP	23	12	53	67	C	USCGS H = 23 02 06
	BHA	iP		13	31	74	R	4.1 S, 102.2 E
	BUL	iP			31	73	R	h ± 73
								Sumatra
18	BHA	e	01	05	31		R	
18	BHA	e	03	20	40			
18	BUL	iP	03	50	48		C	
	BHA	e		51	37		R	
18	BHA	iP	13	28	52			Kariba
		iS		29	17			
18	BHA	e	13	30	58			Probably Kariba
		e		31	23			
18	BUL	i	16	53	14			Witwatersrand tremor
		i		54	06			
		i			53			
	BHA	e traces		53	30			
19	CLK	i	09	22	08		R	
	BHA	i			36			
	BUL	i			37		C	
19	BHA	eP	09	52	22			± 130 km. from station
		iS			36			
19	BHA	i	10	39	32			± 150 km. from station
		i			49			
19	CLK	iP	10	58	26	73	R	USCGA H = 10 47 25
	BHA	iP			54	74		25.0 N, 92.1 E
	BUL	iP		59	11	77		h ± 51
								Assam, India
19	BUL	iPKP	12	17	50	123	C	USCGS H = 11 58 55
								9.3 S, 158.8 E
								h ± 33 Solomon Is.
19	BUL	Traces	14	50	00			
19	BUL	iPKP	18	40	30	119	R	USCGS H = 18 22 10
	BHA	iPKP			33	123	R	3.5 S, 153.4 E
								h ± 279 km.
								New Ireland region
19	BUL	iS_1	13	23	25			
20	BHA	iP	15	33	32			± 240 km. from station
		iS		34	(02)			Kariba
	CLK	Traces	15	24	00			
	BUL	Traces		42	01			
	BHA			03	29			
20	BHA	i	19	04	48			USCGS H = 19 47 41
20	BUL	iP		58	06	65	C	35.8 N, 3.6 W
								h ± 54 W. Medit.
20	BUL	iPKP	23	05	18	126	R	USCGS H = 22 46 18
	CLK	ePKP			19	127		27.9 S, 176.6 W
	BHA	ePKP			28	132		h ± 41 Kermadec Is.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
20	BUL	$iPKP_1$	23	35	07	145	C	USCGS H = 23 15 33 52.9 N, 168.6 W h ± 33 Fox Is., Aleutian Is.
21	BUL	ie	00	27	21			
21	BHA	iP	06	51	40			Central Africa
		i		53	25			
		i		54	23			
	CLK	i	06	54	12			
	BUL	e	06	52	53			
		e		55	32			
21	BUL	iP	12	30	47	88	C	USCGS H = 12 18 26 23.7 S, 66.6 W h ± 221 Jujuy Prov., Argentina
	BHA	iP			58	90		
	CLK	eP		31	22	96		
21	BUL	i	15	09	17			Noise or seismic local
21	CLK	iP	15	37	31	69	C	USCGS H = 15 26 31 h ± 56 25.2 N, 92.2 E E. India
	BHA	iP			58	75	C	
	BUL	iP		38	15	77	C	
21	BUL	Traces	22	12	01			120 km. from station
	BHA	iP		42	48			
		iS		43	01			
22	BUL	i	04	56	09			
22	CLK	i P	16	23	07	75		USCGS H = 16 12 14 6.0 S, 113.1 E h ± 595 Java
	BUL	i P		33	54	80	R	
	BHA	i P	16	23	41	82	R	
22	BUL	iP	16	33	54	84		USCGS H = 16 21 41 30.4 S, 67.8 W h ± 202 San Juan, Argentina
22	BUL	i	20	59	06			
23	BUL	iS_1	03	01	22			
23	BUL	iPKP	04	08	28	124		USCGS H = 03 49 34 29.6 S, 177.9 W h ± 55 Kermadec Is. region
	CLK	ePKP			28	121		
	BHA	iPKP			38	130	R	
23	CLK	i	09	52	10			Seismic local
					29			
					32			
23	CLK	iP	10	09	23			Seismic Local
		iS			36			
24	CLK	ePKP	04	45	(54)			USCGS H = 04 26 37 59.5 N, 151.7 W h ± 52 Mag. $6\frac{3}{4}$ Cook Inlet
	BHA	ePKP			56			
	BUL	iPKP			59	142		
24	CLK	iP	06	04	13			Seismic

June, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
24	BUL	iS_1	14	05	52			Tremor
24	BUL	iP_n	15	28	48			Witwatersrand tremor
		i		29	56			
		iS		30	22			
	BHA	i		33	22			
24	BHA	iPKP	16	36	32	138		USCGS H = 16 17 15 52.3 N, 171.2 W h ± 33 Fox Is., Aleutian Is.
	BUL	iPKP			48	144		
24	BHA	iP	19	55	09			80 km. from station
		iS			18			
24	BUL	iP_n	20	20	48			Tremor
				21	55			
		iS_1		22	22			
24	CLK	traces	20	09	00			
24	CLK	traces	22	33	57			
24	BHA	i	23	06	33			
		i		07	38			
		i		08	07			
24	BHA	traces	23	36	00			
24	BHA	e	23	45	23			
25	BHA	eP	06	04	55			Kariba
		eS		05	22			
25	BUL	traces	16	04	28			
25	CLK	iP	19	09	22			Seismic local
	BHA	i traces		12	00			
25	BUL	traces	20	46	00			
26	CLK	i	04	25	19			Seismic local
26	BUL	eP	09	55	09	98		USCGS H = 09 41 31 4.6 N, 126.3 E h ± 33 Off coast of Mindanao
26	CLK	i	14	19	50		C	USCGS H = 14 09 13 36.4 N, 76.9 E h ± 33 Sinkiang Prov., China
	BUL	i		20	36			
26	BHA	iP	17	33	36	72	C	USCGS H = 17 21 57 24.2 N, 95.2 E h ± 80 N. Burma
27	BUL	iP	11	58	51	81	R	USCGS H = 11 46 58 8.3 S, 111.2 E h ± 180 Nr. coast of Java
27	CLK	i	15	43	30		C	
	BHA	i		44	05		R	
27	BUL	iPKP	12	40	19	119		USCGS H = 12 21 25 30.1 S, 177.7 W h ± 44 Kermadec Is.
27	BUL	iP	15	44	16	73	R	USCGS H = 15 32 53 14.4 N, 93.7 E h ± 33 Andaman Is. region

June, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
27	BHA	eP	17	51	53			Kariba
	BUL	traces		53	00			
27	BHA	e	19	56	21			Probably Central Africa
		i		58	17			
27	BHA	traces	20	04	30			
27	BHA	e	21	20	26			Probably Central Africa
		i			44			
		i		21	47			
	BUL	traces		21	47			
	CLK	i	21	20	47			
		i		22	25			
27	BUL	traces	22	30	00			
28	BHA	iP	02	01	24			Kariba
		iS			53			
	BUL	traces		02	00			
28	CLK	iP	02	35	07	30		
	BUL	iP		35	31	33		
	BHA	iP		36	01	36	R	USCGS H = 02 28 52 27.5 S, 66.1 E h ± 33 Indian Ocean
28	BHA	e	02	43	06		R	
28	BHA	iP	03	47	05			
	BUL	iS			31			
	BUL	e	03	48	(15)			
		i			(02)			
	CLK	traces		49	00			Kariba
28	CLK	i	10	26	31			Central Africa
	BHA	e			56			
28	BHA	iP	13	07	57			Kariba
		iS		08	26			
	BUL	eP_1		08	22			
		i			54			
				09	(05)			
28	CLK	e P	13	58	15	63		USCGS H = 13 47 48 1.3 N, 97.4 E h ± 50 Near coast of Sumatra
	BHA	i P			55	70	R	
	BUL	e P		59	00	69		
28	BUL	i	15	01	17			Seismic local
	CLK	i		11	08			
		i			23			
28	BUL	i	15	58	58			
28	BHA	eP	19	38	24			
		iS			50			
	BUL	traces		39	30			
28	CLK	e PKP	22	14	29	120		USCGS H = 21 56 39 46.5 N, 153.2 E h ± 33 Kurile Is.
	BHA	i PKP			37	125		
	BUL	i PKP			44	129	R	

June, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
28	BUL	e PKP	23	16	12	129		USCGS H = 22 57 03 46.4 N, 153.4 E h ± 33 Kurile Is. region
29	CLK	e PKP	00	12	47	120		USCGS H = 23 53 56 46.4 N, 153.5 E h ± 33 Kurile Is.
	BHA	i PKP			54	125		
	BUL	i PKP		13	02	129		
29	BHA	i	04	15	13			Central Africa
		i			25			
		i		16	03			
	CLK	i	04	15	40			
		i		17	07			
					54			
	BUL	i	04	16	26			
		i		18	30			
		i		19	49			
29	BUL	e PKP	13	02	31	116		USCGS H = 12 43 48 11.6 N, 142.7 E h ± 30 Mariana Is. region
30	BHA	iP	01	06	04			Kariba
		iS			31			
	BUL	e		07	16			
30	CLK	e P	06	56	19	58		USCGS H = 06 45 35 2.5 S, 102.4 E h ± 160 Sumatra
	BHA	i P			57	64		
	BUL	i P			58	64		
30	BUL	e	07	50	50			
30	CLK	e PKP	22	23	42	120		USCGS H = 24 04 53 46.5 N, 153.3 E h ± 33 Kurile Is.
	BHA	e PKP			51	125	R	
	BUL	e PKP			58	129		
30	BHA	eP	22	34	02			Kariba
		iS			29			

H. O. Oliver

Winifred Wagner

Southern Rhodesia
July - Dec.
1963

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- JUL 1963
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Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Lithologic Foundation:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Observer:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
1	BHA	traces	00	59	00			
		i			55			
1	BHA	iP	20	31	11	74		USCGS H = 20 19 41
	BUL	iP			11	74		4.7 S, 103.7 E
								h ± 91 km. Off south coast of Sumatra
1	CLK	traces	21	22	22	77		USCGS H = 21 10 28
	BHA	eP			45	83		37.0 N, 96.1 E
	BUL	iP		23	05	86		h ± 33
								Tsinghai Prov. China
2	BHA	iP	00	27	18	79		USCGS H = 00 15 22
								43.9 N, 85.2 E
								h ± 39
								Sinkiang Prov. China
2	BUL	iP	09	58	27	77	C	USCGS H = 09 46 36
								7.8 S, 109.0 E
								h ± 117 Java
2	BHA	i	10	22	33			
2	CLK	i	12	53	43			
		i		54	19			
2	BUL	iS	14	27	59			Tremor
2	CLK	i	16	00	00			
		i		27	00			
2	CLK	traces	19	22	00			
	BHA	traces	19	23	00			
3	BUL	eP_n	11	28	30			
		eP_l			39			B.P.I. H = 11 27 35
		iS_l		29	09			Kariba area
	BHA	iP_n		28	13			
		iS			41			
	CLK	i		29	09			
		i		30	18			
		i			(48)			
3	CLK	i	12	08	32			
	BHA	iP			03			Kariba
		iS			29			Kariba
	BUL	traces	12	08	59			
3	BUL	traces	13	47	59			Kariba
3	BUL	eP_n	16	00	53			
		iS_n		02	26			
	CLK	traces		04	02			Tremor
3	CLK	iP	21	31	06			
		iS			20			± 140 km. from station
4	BUL	i	10	19	01			Seismic local
4	BUL	i	11	16	00	127	R	
	CLK	iPKP		17	00	129	C	USCGS H = 10 58 13
	BHA	iPKP			09	133		26.3 S, 177.7 W
								h ± 158 Mag. 6 3/4
4	BUL	traces	17	37	29			Tonga Is. region

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
4	BHA	eP	23	03	48	39		USCGS H = 22 56 16
	CLK	eP		04	33	46		18.5 S, 12.6 W
	BUL	i		09	38			h ± 33
								St. Helena Is. region
5	BUL	i	15	32	01			Probably tremor
5	BHA	iP	04	46	46			180 km. from station
		iS		47	05			
6	BUL	eP_n	13	43	28			Tremor
		iS_n		45	04			
6	BHA	iP	17	07	54			Kariba
		iS		08	20			
	BUL	traces			59			
6	BHA	iP	18	58	26	245 km.		B.P.I. H = 18 57 48
		i			53			Kariba
	BUL	i		58	43	380		
		i			52			
	CLK	iP_n		59	20	690		
		i_n	19	01	06			
6	CLK	traces	19	08	04			
6	BUL	traces	19	06	00			Kariba
	BHA	iP			20			
		iS			47			
6	BHA	traces	20	07	30			Kariba
6	BHA	i	20	41	41			
		i		43	01			
		i			49			
6	CLK	iP	22	33	42	4		USCGS H = 22 32 32
		i		34	(44)			16.3 S, 39.7 E
		i		55	19			h ± 33
	BHA	iP	22	35	08	11		Mr. coast of Mozambique
				37	19			
				38	18			
	BUL	iP	22	35	13	10		
6	CLK	i	23	12	23			
		i		13	24			
		i			48			
6	CLK	i	23	19	08			
		i			47			
		i		20	11			
6	CLK	traces	23	30	04			
7	CLK	iP	00	08	56	47		USCGS H = 00 01 13
		i		09	02			42.2 S, 84.4 E
	BUL	iP		10	18	49		h ± 33
		i		(12	45)			Indian Ocean
	BHA	eP		10	27	54		
		i		12	26			
		i		13	(33)			
7	CLK	traces	00	32	44			
7	BHA	eP	01	54	00			Probably Kariba area
		eS			26			
	BUL	traces		55	00			

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
7	CLK	i	02	04	56			
		i		06	20			
7	CLK		04	04	13			Probably Kariba
	BHA	eP		24	12			
		eS			30			
	BUL	traces		25	30			
7	CLK	iP	07	27	51			Probably Mozambique channel
		i			53			
		i		28	46			
		i		29	09			
	BHA	traces		32	00			
7	CLK	e	12	13	04			Probably Central Africa
	BHA	e	12	12	53			
	BUL	traces		16	00			
7	BHA	eP	13	46	18			Kariba
		iS			46			
	BUL	iS_1		47	27			
7	BUL	e	14	39	19			
7	CLK	e	15	14	16			Probably Mozambique channel
		i		16	14			
7	CLK	traces	21	27	34			
7	BHA	iP	22	36	19			Kariba
		iS			47			
	BUL	e		36	46			
		iS_1		37	(16)			
7	BHA	eP	23	18	40			Kariba
		eS		19	07			
8	BHA	eP	01	18	20			Probably Central Africa
		i		02	16			
		i		21	32			
8	BHA	eP	01	56	52			Kariba
		iS		57	19			
	BUL	eP_n		57	09			
		iS_1		58	(00)			
	CLK	traces		59	04			
				59	29			
8	BHA	eP	05	10	13			Kariba
		eS			40			
8	BUL	i	10	14	15			
		i		16	(25)			
	BHA	traces	10	15	01			
	CLK	i			55			
8	BHA	e	11	02	47			
8	BHA	iP	11	13	49	48		USCGS H = 11 05 07
	BUL	eP			55	51	C	0.3 N, 17.8 W
								h ± 33
								Middle Atlantic Ocean
8	CLK	i	12	14	08			Seismic local
		i			19			
8	CLK	eP	16	11	40	52		USCGS H = 16 02 26
	BUL	iP		12	09	57		36.6 N, 28.0 S
								h ± 30 Mag. 4.7
								S. coast of Turkey

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
8	CLK	eP_n	17	30	40			Seismic local
		iS^n			46			
8	CLK	i	23	27	26			Seismic local
					31			
9	BHA	iP	01	57	55			± 200 km. from Broken
		iS		58	17			Hill
	BUL	eS_n		59	19			
		iS^n_1			40			
	CLK	traces		59	35			
9	BUL	traces	04	40	00			Seismic
9	BUL	i	12	37	(13)			
		i		38	12			
	BHA	i			13			
	CLK	iS			55			
9	BUL	iP_n	19	06	50	560 km.		B.P.I. H = 19 05 33
		iP^n_1		07	08			18.0 S, 23.3 E
		iS^n_1		(08	06)			
	BHA	iP_n		07	11	740 km.		
		iS_n		08	17			
		iS^n_1		09	(03)			
	CLK	iP_n		08	16	1250 km.		
		IS_n		10	14			
		iS^n_1		11	32			
10	BHA	iP	02	22	36	65		USCGS H = 02 11 56
	BUL	iP		23	03	70	R	36.5 N, 71.8 E
								± 33 Hindu Kush
10	BHA	traces	03	20	30			
10	BHA	eP	05	09	10			Kariba
		iS			36			
	BUL	traces			30			
10	BHA	ePKP	05	41	56	125		USCGS H = 05 22 57
	BUL	iPKP		42	04	128		46.3 N, 152.9 E
								h ± 33 Kurile Is. region
10	BHA	i	10	01	27			
10	BHA	eP	16	38	45			Kariba
		eS		39	12			
11	BHA	e	10	(01	13)			Seismic, probably local
		i		02	19			
11	BHA	iP	16	49	24			± 70 km. from station
		iS			32			
	BUL	traces		51	30			
	CLK	traces		53	04			
11	BHA	i	19	50	24		C	
12	BUL	i	00	30	12			
		i		(32	24)			
		i		(33	34)			
	BHA	traces	19	31	10			
	CLK	traces		36	04			
12	BHA	eP	01	56	27			Kariba area
		iS			54			
12	BHA	eP	02	16	07			Kariba area
		iS			33			

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
12	BUL	iP	05	49	45	75	C	USCGS H = 05 38 11 6.1 S, 106.2 E h ± 133 Java
12	BUL	iS_1	10	51	02			Tremor
12	BUL	i	14	23	12			
12	BHA	ePKP	15	47	07	125		USCGS H = 15 28 08 46.8 N, 153.6 E h ± 33 Kurile Is. region
12	BUL	iP	18	06	58	85		USCGS H = 17 54 21 35.9 S, 71.9 W h ± 62 Central Chile
	BHA	traces		13	00	88		
12	BHA	i	23	18	42			Seismic, local
		i		19	08			
	BUL	traces			50			
13	BHA	iP	08	33	08	49	R	USCGS H = 08 24 25 29.6 N, 51.0 E h ± 44
		iP			45	50	R	
13	BHA	traces	10	16	00			
13	BHA	e	11	08	(51)			
13	BHA	iP	15	34	23			Kariba area
		iS			49			
13	CLK	iP_n	16	58	05	290 km.		I.P.I. H = 16 57 22 Port Herald Area, S. Nyasaland
		iS_n			36			
		iS_1			42			
	BUL	iS_1	17	00	32	700 km.		
	BHA	eP_n	16	59	09	800 km.		
		iS_n	17	00	30			
		iS_1		01	14			
13	BHA	traces	23	10	12			Probably Central Africa
				12	13			
				13	21			
	CLK	traces			34			
	BUL	traces		14	30			
14	CLK	iP	00	21	11			Seismic local
		i			19			
	BUL	iPKP		21	18	123		USCGS H = 00 02 23 h ± 33 30.5 S, 177.5 W Kermadec Is. region
14	BHA	iP	05	55	01	95		USCGS H = 05 41 43 10.4 N, 62.6 W h ± 24 km. Off coast of Northern Venezuela
14	CLK	i	22	34	17			
15	CLK	eP	01	33	31			
		iS			45			
15	BUL	iP_n	06	15	16	560 km.		B.P.I. H = 06 13 58 20.0 S, 23.3 E Ngamiland, Bechuanaland
		iP_1			31			
	BHA	eP_n		15	47	830 km.		
		iS_n		17	04			
		iS_1			50			
	CLK	eP		16	48	1300 km.		
		iS_1		18	53			

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
16	BHA	e	01	32	13			
16	BHA	traces	12	34	00			
16	BHA	e	18	37	13		C	
	CLK	i		37	13		R	
	BUL	i			50		C	
16	BHA	i	03	31	05			Prince Edward Island region
16	BUL	traces	19	27	21			
16	BUL	traces	21	04	31			
16	BUL	iP	22	21	56	65		USCGS H = 22 11 23 h ± 17 km. 43.3 N, 41.6 E Georgia, SSSR
17	BUL	iP	03	30	15	20		USCGS H = 03 24 37 46.9 S, 33.3 E h ± 33 Prince Edward Is. region
17	BHA	iP	11	00	53			Kariba area
		iS		01	20			
	BUL	iP_1		01	21			
		iS_1		02	01			
17	BUL	traces	15	25	31			
18	BHA	iP	05	08	02	60	R	USCGS H = 04 58 09 61.0 S, 22.3 W h ± 33 km. Mag. 6.0 Sandwich Islands
	CLK	iP			16	64	C	
18	BHA	i	05	21	38			
18	BUL	i	10	24	09			Local
18	BHA	traces	14	28	00			
18	CLK	iP	21	13	17			Local
		iS			37			
19	CLK	iP	00	35	36			150 km. from station
		iS			52			
19	BHA	eP	01	34	51			Kariba area
		eS		35	15			
19	BHA	i	05	55	35			
				56	14			—P2
	CLK	i			58			
		i		56	(36)			—P2
	BUL	i		56	12		C	
19	BHA	eP	16	02	31			Seismic local
		iS			50			
20	BHA	eP	05	59	50			Probably Kariba area
		eS	06	00	24			
	BUL	traces	06	00	01			
20	CLK	eP	06	49	04	89		USCGS H = 06 36 10 57.6 S, 148.5 E h ± 33 Macquarie Island region
	BHA	eP			24	92	R	
21	CLK	iP	06	09	00	35	R	USCGS H = 06 01 57 14.8 N, 56.1 E h ± 33 km. Arabian Sea

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
21	BUL	iP	08	09	59	44		
21	BHA	eP			28	40		
22	BUL	ePKP	00	47	53	113		USCGS H = 00 29 14
	BHA	iPKP			58	117		6.1 S, 148.9 E h ± 59 New Britain
22	CLK	e	10	19	30			Kariba area
		iS		20	53			
	BHA	eP		32	38			
		iS		33	05			
	BUL	traces		33	02			
23	BHA	eP	01	40	01			Kariba area
		iS			28			
23	BUL	traces	02	40	32			
23	CLK	iP	03	49	59			140 km. from station Probably Port Herald area
		iS			14			
23	BUL	i	10	29	37			± 10 km. from station. Seismic, probably local
23	BHA	iP	16	06	24			Kariba
		iS			51			
	BUL	traces		07	02			
23	BUL	traces	19	40	01			
24	CLK	traces	03	18	33			Seismic
	BHA	traces		22	(29)			
24	CLK	traces	11	45	48			
24	BUL	i	15	06	32			± 10 km. from station. Seismic local
24	BHA	traces	19	22	29	124		USCGS H = 19 04 32
	BUL	ePKP		23	26	121		9.0 S, 158.2 E h ± 33 km. Solomon Islands region
24	BHA	eP	21	32	18			Kariba
		eS			46			
24	CLK	eP	21	55	19			Probably Mozambique channel
		iS		56	37			
	BUL	i		55	43			
25	BHA	traces	00	03	29			
25	BHA	traces	06	06	59			
	CLK	e	07	13	(14)			
25	BUL	traces	09	52	01			
25	BHA	e	20	54	30			
26	BHA	eP	04	26	59	57	R	USCGS H = 04 17 16
	CLK	iP		27	13	59	R	42.1 N, 21.5 E h ± 33 km. S. Yugoslavia
	BUL	iP			37	64		
26	BHA	eP	05	03	37			Kariba area
		iS		04	03			
	BUL	traces		04	00			

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
26	BUL	i	05	41	35		C	
26	BHA	i	05	42	29			
26	BUL	i	05	45	35		R	
26	BUL	e	11	41	30			
26	BHA	iP_n	15	40	56	800 km.		B.P.I. H = 15 38 50 16.3 S, 35.3 E Nyasaland-Mozambique border.
		iS_n		42	10			
		iS_1			50			
	BUL	eP_n	15	40	58	820 km.		
		iS_n		42	14			
		iS_1			55			
27	BHA	e	01	13	08			
27	BHA	iP	07	09	15			Probably Kariba
		iS			43			
27	BHA	eP	15	20	40			B.P.I. H = 15 38 30 16.3 S, 35.3 E Nyasaland-Mozambique border
		iS		21	06			
	CLK	iP		39	30	140 km.		
	BHA	eP		53	17			
		iS			44			
	CLK	iP	16	06	34			± 110 km. After shock
		iS			46			
27	CLK	eP	20	34	21			± 110 km. After shock
		iS			33			
	BHA	traces		39	10			
27	BHA	eP	23	08	38			Kariba
		e?1		09	04			
27	BHA	iP	23	25	48			Kariba
		iS		26	14			
28	BHA	eP	00	56	25			
		eS			52			
28	CLK	iP	08	07	02	74		USCGS H = 07 55 21 11.3 S, 112.1 E Java
	BUL	iP			33	79		
	BHA	iP			39	81	R	
28	CLK	e	15	57	(24)			Seismic local
		i			48			
28	BHA	eP	17	40	11			Kariba
		iS			38			
28	BHA	ePKP	19	10	34	124		USCGS H = 18 51 36 46.6 N, 153.1 E h ± 33 km. Kurile Is. region
	BUL	iPKP			41	128		
28	BHA	eP	23	58	58			Kariba
		iS		59	24			
29	BHA	eP	00	52	46			Kariba
		iS		53	12			
29	CLK	eP_n	00	57	58	350 km.		B.P.I. H = 00 57 06 12.0 S, 34.0 E Lake Nyasa
		iS_n		58	34			
		iS_1			43			
	BHA	eP_n			(46)	750 km.		
		iS_n		59	43			
		iS_1	01	00	24			
	BUL	iS_1	01	01	53	1000 km.		
29	BHA	eP	03	32	02			Kariba
		eS			28			

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
29	BUL	iP	05	43	13	76	R	USCGS H = 05 31 26 6.7 S, 107.1 E h ± 85 km. Java
29	CLK	iP	06	19	02	46		USCGS H = 06 10 22 27.8 N, 55.6 E h ± 37 km. S. Iran
	BHA	iP			17	50	C	
	BUL	iP		19	53	54	C	
29	BUL	i	10	14	35			Very close. Local
29	BUL	iP	17	00	00	79	R	USCGS H = 16 48 42 5.7 S, 110.2 E h ± 530 km. Java Sea
29	BHA	eP	18	13	37			Kariba
		iS		14	03			
	BUL	i		14	02			
		i			40			
29	BHA	iP	19	49	43			Kariba
		iS		50	14			
	BUL	traces		51	00			
29	CLK	traces	20	33	03	125		USCGS H = 20 14 07 30.2 S, 177.3 W h ± 39 km. Kermadec Islands
P2		i		35	36			
	BUL	iPKP		33	04	123	C	
P2		i		35	34			
	BHA	ePKP	20	33	14	129		
29	CLK	traces	21	24	33			Seismic
	BHA	traces		25	48			
	BUL	traces		33	30			
30	BHA	eP	00	18	23			Kariba area
		iS			55			
	BUL	e		18	53			
		i		19	31			
30	BHA	e	04	38	15			Seismic local
		i			42			
	BUL	traces		59	00			
30	BUL	iPKP	06	04	50	124		USCGS H = 05 45 53 29.6 S, 177.3 W h ± 33 km. Kermadec Is. region
	CLK	ePKP			51	126		
	BHA	ePKP		05	01	130		
30	CLK	i	07	11	16			
30	BHA	traces	09	12	06			
		i		17	00			
30	BUL	iP	14	01	25	54	C	USCGS H = 13 51 57 55.9 S, 27.5 W h ± 33 km. Mag. 6.2 Sandwich Islands
	BHA	iP			58	59	C	
	CLK	iP		02	15	63	R	
30	BUL	e	14	42	11			Seismic
30	BHA	iP	19	45	07			Kariba
		iS			34			
	BUL	i		45	31			
31	BHA	eP	01	02	34			Kariba
		iS		(03	00)			
31	BHA	eP	01	05	58			Kariba
		eS		06	24			

July, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
31	BHA	e	01	16	39			Kariba
		i		17	05			
31	BHA	iP	02	15	00			Kariba
		iS			27			
	BUL	eP_n		15	16			
		iP_1			24			
		iS_1		16	07			
	CLK	eP_n			53			
		iS_n		17	04			
		iS_1			38			
31	BHA	iP	02	19	29			Kariba
		iS			55			
31	BHA	eP	02	55	33			Kariba
		eS			59			
31	BHA	eP	03	02	56			Kariba
		iS		03	22			
31	CLK	traces	05	19	48			
31	BHA	iP	09	35	42			Kariba
		iS		36	09			
	BUL	eP_n	09	35	58			
		eP_1		36	07			
		iS_1			51			
31	BHA	iP	09	47	51			Kariba
		iS		48	18			
	BUL	i		48	09			
		i			47			
31	BHA	eP	10	08	(55)			
		iS		09	16			
31	BHA	iP	14	18	04			Kariba
		iS			31			
	BUL	i		18	28			
		i			59			
31	BUL	e	14	56	16			
	BHA	e			19			
31	BHA	eP	15	55	00			Kariba
		iS			27			
31	BHA	traces	19	37	00			
31	BHA	e	22	05	05			
	BUL	e			28			

H. O. Oliver
Winifred Wagner

- AUG 1963

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Lithologic Foundation:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Observer:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
1	BHA	e	02	21	56			
1	BHA	i	23	18	13			
2	CLK	i(S)	00	00	28			Probably local
2	CLK	iP	01	49	09			± 55 km.
		iS			15			
2	BUL	i	15	15	18			Local
		i			19			
2	BUL	eP	16	25	52			Central Africa
		i		26	02			
		i		27	33			
3	BUL	iPKP	04	06	16	122	R	USCGS H = 03 48 06
	BHA	ePKP			20	125	R	7.6 S, 156.8 E
								h ± 402 km. Mag. 5.1
								Solomon Islands
3	BHA	e	10	32	30		C	
	BUL	i			38		C	
	Clk	i		33	08		R	
3	BUL	traces	12	10	01			
3	BUL	iS	12	31	02			
3	CLK	i	13	16	19			
3	BUL	traces	13	20	31			
3	BUL	traces	15	46	01			
3	BUL	$iPKP_1$	16	49	07	145	C	USCGS H = 16 29 35
								52.0 N, 174.3 W
								h ± 33 Mag. 4.4
								Andreanof Is., Aleutian Islands
3	BUL	i	20	11	59			
3	CLK	iPKP	20	44	59	125		USCGS H = 20 26 04
	BHA	iPKP		45	10	128	R	30.7 S, 178.3 W
								h ± 37 Mag. 5.2
								Kermadec Islands.
4	BUL	eP	02	26	56	80		USCGS H = 02 13 50
								42.6 S, 63.4 W Mag. 4.7
								h ± 33 Off coast of
								Southern Chile
4	BHA	e	03	16	(18)			
4	CLK	iP	07	20	33	76	C	USCGS H = 07 08 47
	BUL	iP		21	03	81	R	9.4 S, 114.2 E
								h ± 117 Mag. 5.5
								South of Java
4	BUL	traces	22	40	58			
	BHA	traces		43	00			
5	BUL	e	00	12	19			
		i			33			
	CLK	e		12	31			

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
5	BUL	eP_n	15	18	50			Witwatersrand tremor
		iS_n		19	56			
		iS_1		20	26			
5	BHA	eP_n	15	20	05			Witwatersrand tremor
		eS_n		22	10			
	CLK	iS_1		23	34			
5	CLK	traces	15	52	03	92		USCGS H = 15 39 07 60.7 S, 154.3 E h ± 33 Mag. 5.2 Macquarie Islands region
5	CLK	traces	19	26	03			
6	BHA	e	20	52	38			Probably Central Africa
		e		53	(18)			
6	BHA	iP	01	00	11			Kariba
		iS			38			
6	BHA	eP	01	57	39			Kariba
		iS		58	05			
6	BHA	iP	03	37	56			Kariba
		iS		38	22			
6	BUL	eP_n	08	22	53			Witwatersrand tremor
		iS_1			26			
6	CLK	traces	20	54	00			
7	BUL	iS_1	01	01	(22)			Kariba
7	CLK	eP	03	38	53			
		i			01			
7	BUL	traces	03	36	58			Kariba
		eP_n		38	12			
		iP_1			21			
		iS_1		39	05			
7	BHA	eP	13	09	34			Probably Kariba
		iS			59			
7	BUL	i	15	03	48			Seismic local
7	BUL	e P	17	22	43	54		USCGS H = 17 13 18 56.1 S, 27.0 W h ± 33 km. Mag. 5.4 Sandwich Islands.
	BHA	e P		23	17	59		
7	BHA	e PKP	18	55	35	122		USCGS H = 18 36 46 13.6 N, 90.9 W h ± 67 Mag. 4.7 Near S. coast of Guatemala
	BUL	e PKP			37	124		
	CLK	e PKP			43	130		
7	BHA	eP	19	48	20			Kariba
		iS			48			
	BUL	eP_1		48	46			
		iS_1		49	27			
7	CLK	traces	19	50	03			Kariba
8	CLK	i PKP	02	33	57	128		USCGS H = 02 14 54 54.2 N, 168.1 E h ± 33 Mag. 5.5 Fox Is., Aleutian Is.
	BHA	i PKP		34	02	132		
	BUL	i PKP			12	127		
8	BHA	eP	08	50	28			Kariba
		iS			51			
8	BHA	eP	13	19	13			
		iS			39			

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
8	BHA	eP	13	46	46			Kariba
		iS		47	12			
8	BHA	traces	15	01	00			
8	BHA	eP	15	30	08			Central Africa
		iP		31	07			
		iS			39			
	CLK	i		30	52			
		i		32	24			
9	BUL		15	32	54			Local
10	BHA	iP	03	14	49			Probably Port Herald
		iS		15	00			area
10	CLK	e P	04	36	02	46		USCGS H = 04 27 33
	BHA	e P			15	49		28.1 N, 53.3 E
								h ± 46 S. Iran
10	BHA	e	16	27	43			Probably Central Africa
11	BUL	i	10	15	47		R	
11	BUL	iP	18	28	59			300 km. from station
		i		29	30			
	BHA	eP		29	(21)			
		iS		30	06			
12	BHA	e P	01	18	29	92	C	USCGS H = 01 05 34
								32.5 S, 71.1 W
								h ± 92 km. Mag. 4.7
								Near coast of Central
								Chile
12	CLK	e	10	48	58			
12	CLK	traces	17	50	00			Witwatersrand tremor
	BUL	iS_1		51	31			
12	BUL	i	18	12	15		R	USCGS H = 18 29 38
12	CLK	iP	18	38	25	48		25.3 N, 62.7 E
		i			32			h ± 33 km. Mag. 5.2
	BHA	eP			44	53		Near coast of West
								Pakistan
12	BUL	iP	21	23	27	54	R	USCGS H = 21 14 00
	BHA	iP		24	00	59	C	56.0 S, 27.7 W
								h ± 33 km.
								Sandwich Islands region
13	BHA	i	03	42	31			
	BUL	i		46	19		R	
13	CLK	i	07	13	46		C	
	BUL	i		14	31 K		R	
13	BUL	traces	15	12	59			Seismic
14	BHA	iP	00	15	41			Kariba
		i			42			
	BUL	iP_n		16	01			
		iP_1			10			
	CLK	iP_n			40			
		iS_1		17	49			
14	BHA	iP	00	27	21			Kariba
		iS			47			

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
14	CLK	traces	00	29	40			
14	BHA	iP	00	34	37			Kariba
		iS		35	04			
	BUL	iP_1			05			
		iS_1			44			
14	BHA	eP	00	40	45			Kariba
		iS		41	11			
14	BHA	eP	00		57			
		iS		42	24			
14	BHA	iP	00	48	16			Kariba
		iS			42			
14	BUL	i	00	48	40			Kariba
		i			43			
14	CLK	traces	00	50	03			
14	BHA	iP	00	50	48			Kariba
		iS		51	16			
								Kariba
14	BHA	eP	01	00	23			
		iS			50			
14	BHA	eP	01	21	27			Kariba
		iS			53			
14	BHA	eP	01	46	44			Kariba
		iS		47	10			
14	BHA	iP	01	49	14			Kariba
		iS			40			
14	BUL	eP_1	01	49	39			Kariba.
		iS_1		50	25			
	BHA	iP			55			
		iS		51	22			
	CLK	e			33			
14	BHA	iP	01	59	27			Kariba
		iS			54			
	BUL	eP_n		59	44			
		iP_1			54			
		iS_1	02	00	39			
	CLK	traces	02	00	33			
14	BHA	iP	02	29	10			Probably Kariba
	BUL	iP_n			28			
		iP_1			38			
	CLK	i		30	07			
		i		31	18			
		i			48			
14	BHA	iP	02	38	12			Kariba
		iS			39			
14	BHA	iP	02	40	29			Kariba
		iS			56			
14	BHA	eP	02	45	04			Kariba
		iS			32			
14	BHA	eP	02	54	33			Kariba
		iS			59			
14	BHA	eP	02	57	14			Kariba
		iS			41			
14	BHA	eP	03	41	47			Kariba
		iS		42	13			

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	Remarks
14	BHA	ePKP	03	51	22	121	USCGS H = 03 32 33 4.9 S, 152.3 E h ± 62 Mag. 5.8 New Britain
14	BHA	eP	04	10	33		Kariba
		iS		11	00		
14	BHA	eP	04	40	54		Kariba
		iS		41	23		
14	BHA	iP	04	54	53		Kariba
		iS		55	20		
14	BHA	eP	05	02	53		Kariba
		iS		03	20		
14	BHA	eP	09	12	01		Kariba
		iS			27		
14	BHA	i	09	38	44		Kariba
		i		39	11		
14	BHA	iP	09	57	59		Kariba
		iS		58	26		
14	BUL	eP_1	09	58	25		Kariba
		eS_1		59	10		
14	CLK	traces	10	00	03		
14	CLK	iP	10	14	28		
		iS		15	09		
14	BHA	eP	10	23	48		Kariba
		iS			15		
14	BHA	eP	11	18	34		Kariba
		iS			53		
14	BHA	iP	12	12	47		Kariba
		iS		13	14		
14	BUL	iP_n	12	13	04		Kariba
		iP_1			12		
		iS_1			(57)		
14	CLK	traces	12	13	43		
14	BHA	eP	12	21	56		Kariba
		iS		22	23		
14	BHA	eP	14	55	15		Kariba
		eS			41		
14	BUL	i	15	27	57		± 10 km. local
14	BHA	eP	15	49	26		Kariba
		iS			52		
14	BHA	iP	15	58	12		Kariba
		iS			38		
14	BUL	traces	15	58	59		Kariba
14	BHA	eP	16	12	36		Kariba
		iS		13	03		
14	BHA	eP	16	17	33		Kariba
		iS			59		
14	BHA	traces	18	00	00		Kariba
14	BHA	iP	17	43	06		Kariba
		iS			33		
	BUL	iP_1			33		
		iS_1		44	19		

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
	CLK	traces	17	45	03			
14	BHA	iP	20	06	05			Kariba
		iS			31			
14	BHA	eP	20	16	13			Kariba
		iS			40			
	BUL	traces			59			
15	CLK	traces	00	10	33			
15	BUL	eP_n	00	09	39			Kariba
		iP_1			50			
		iS_1		10	33			
15	BHA	eP	00	14	23			Kariba
		iS			50			
15	BHA	eP	01	37	15			Kariba
		iS			41			
15	BHA	iP	01	41	29			Kariba
		iS			56			
	BUL	eP_1		41	46			
		iS_1		42	28			
		iS_n			40			
15	CLK	traces	01	43	34			
15	BHA	iP	01	44	19			Kariba
		iS			46			
	BUL	eP_n		44	39			
		iP_1			48			
		iS_n		45	27			
15	CLK	traces	01	40	03			
15	BHA	eP	03	15	48			Probably Lake Nyasa
		i		16	18			
		iS_1			33			
	CLK	iP_1		15	57			
		iS_n		16	34			
		iS_1			49			
15	BHA	e	06	30	16			
	BUL	i	✓		19			
	CLK	e			50			
15	BHA	eP	07	40	25			Kariba
		iS			52			
15	BHA	iP	08	13	27	250 km.		B.P.I. H = 08 12 50
		iS			55			Kariba area
	BUL	eP_n		13	44	380 km.		
		eP_1			54			
		iS_n		14	24			
	CLK	eP_n		14	25			
		iS_n		15	31	690 km.		
		iS_1		16	02			
15	BHA	eP	13	18	38			Kariba
		eS		19	02			
15	BUL	iS_1	14	41	03			
15	BHA	eP	15	00	34			Kariba
		iS		01	00			
	BUL	traces			29			
15	BUL	i	15	42	01			10 km. from station

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
15	BUL	iP	17	37	21	94	C	USCGS H = 17 25 05
	BHA	iP			27	.95	C	13.8 S, 69.3 W
	CLK	iP			54	101		h ± 543km. Mag. 7 3/4 Peru-Bolivia border
15	BHA	iP	18	30	04	250 km.		B.P.I. H = 18 29 27
		iS			30			Kariba
	BUL	iP_n		30	23	380 km.		
		iP_1			34			
		iS_1		31	17			
	CLK	eP_n		31	03	690 km.		
		iS_n		32	11			
		iS_1			44			
15	BHA	eP	19	55	50			Kariba
		iS		56	16			
	BUL	traces		57	00			
15	BHA	eP	21	33	34			Kariba
		eS			57			
15	BHA	eP	21	50	52			Kariba
		iS		51	18			
16	BHA	eP	02	20	41			Kariba
		iS		21	07			
16	BHA	iP	04	04	42	250 km.		Kariba
		iS		05	10			B.P.I. H = 04 04 05
	BUL	eP_n		05	01	380 km.		
		iP_1			12			
		iS_1			42			
	CLK	eP_n		05	39	690 km.		
		iS_n		06	48			
		iS_1		07	21			
16	BHA	iS	04	29	51			Kariba
16	BHA	eP	04	50	41			Kariba
		iS		51	07			
16	BHA	iP	05	14	00	250 km.		Kariba
		iS			26			B.P.I. H = 05 13 23
	BUL	eP_n		14	17	380 km.		
		iP_1			27			
		iS_1			58			
	CLK	eP_n		14	57	690 km.		
		iS_n		16	06			
		iS_1			38			
16	BHA	iP	05	47	44			Kariba
		iS		48	11			
	BUL	iP_1		48	11			
		iS_1			52			
16	BHA	iP	08	37	31	250 km.		B.P.I. H = 08 36 54
		iS			58			Kariba
	BUL	e		37	51	380 km.		
		iP_n		38	00			
		iS_n			31			
		iS_1			45			
	CLK	eP_n		38	28	690 km.		
		iS_n		39	37			
		iS_n		40	11			

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
16	BHA	iP	08	44	50			Kariba
		iS		45	16			
16	BHA	i	13	41	56			Central Africa
		i		43	07			
	CLK	traces		43	03			
16	BUL	i	15	13	09			± 10 km.
		i			10			
16	CLK	traces	22	18	03			
16	BUL	traces	23	24	10			
16	BUL	e	23	14	13			
16	BUL	eP	23	31	28	75		USCGS H = 23 19 31
	BHA	eP			50	82		48.9 S, 122.8 E
								h ± 33
								South of Australia
17	CLK	i	02	51	52			Local. Probably
		i		52	17			Mozambique channel
		i			21			
	BUL	traces		54	30			
17	BHA	iP	11	33	40			Kariba
		iS		34	07			
	BUL	iP_1		34	05			
		iS_1			36			
		iS_n			59			
17	BUL	i	15	32	31			± 280 km. Local
		i			59			
18	BHA	eP	11	15	56			Kariba
		iS		16	21			
18	BHA	iP	14	31	07			Kariba
		iS			32			
18	BHA	iP	15	51	49			Kariba
		iS		52	15			
	BUL	eP_1		52	13			
		iS_1			56			
18	BHA	iP	16	31	44			Kariba
		iS		32	11			
	BUL	iP_1		32	09			
		iS_1			51			
18	BUL	i	18	48	26		R	
18	BUL	$iPKP_1$	19	02	46	149		USCGS H = 18 43 16
								50.3 N, 176.9 W
								h ± 33 km. Mag. 5.5
								Andreanof Is.,
								Aleutian Is.
19	BUL	e	22	07	09			Probably Witwatersrand
		i			47			tremor
		iS_1		08	08			
20	BHA	iP	05	26	56			Kariba
		iS		27	23			

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
20	BHA	eP	05	38	33			Kariba
		iS			56			
21	BUL	traces	14	39	01			
21	BHA	i	17	47	20			Central Africa
		i		48	32			
		i		49	15			
21	BHA	i	19	19	44			
21	BHA	iP	20	44	04			Kariba
		iS			30			
	BUL	iS_1		45	12			
22	CLK	i	04	20	23			Probably Mozambique Channel
		i		21	38			
		i		22	(20)			
22	BHA	eP	17	07	20			Kariba
		iS			46			
22	BUL	iPKP	20	11	19	121		USCGS H = 19 52 25
	BHA	ePKP			26	124		9.4 S, 158.0 E
								h ± 33 km. Mag. 6.1
								Solomon Islands
22	BHA	eP	20	29	51			Kariba
		iS		30	16			
23	BUL	traces	02	02	00			
		i			47			
23	BHA	e	02	50	06			Probably Central Africa
		i		51	53			
		i		(53	00)			
	CLK	traces		50	39			
	BUL	traces		55	00			
23	BHA	traces	04	10	00			Kariba
23	BHA	iP	11	11	11			Kariba
		iS			38			
23	BHA	eP	13	18	15			Kariba
		iS			42			
23	BHA	iP	13	24	24			Kariba
		iS			49			
23	BUL	i	15	43	15			
23	CLK	iP	19	34	50			± 50 km. from station
		iS			56			
23	BHA	eP	21	44	28			Kariba
		iS			55			
24	BHA	eP	00	53	27			Kariba
		eS			53			
24	CLK	i	01	20	12			
24	BUL	iP	02	19	19	37	C	USCGS H = 02 11 58
	BHA	iP		20	02	42		54.3 S, 5.2 E
								h ± 28 km.
								Bower Islands region
24	BHA	eP	02	29	50			Kariba
		eS		30	17			
24	BHA	ePKP	03	37	13	128		USCGS H = 03 18 09
								30.7 S, 178.2 W
								h ± 42 km.
								Kermadec Islands

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
24	BHA	iP	07	37	58			Kariba
		iS		38	25			
	BUL	iP_1		39	05			
		iS_1			38			
	CLK	traces		40	03			
24	BHA	eP	07	39	06			Kariba
		iS		43	17			
24	BHA	eP	09	38	21			Kariba
		iS			47			
24	BHA	iP	12	21	32			Kariba
		iS			58			
	BUL	traces		22	01			
24	BHA	e	12	32	21			Kariba
		i			46			
24	BHA	iP	13	07	42	250 km.		B.P.I. H = 13 07 05
		iS		08	09			Kariba
	BUL	iP_1		08	09	380 km.		
		iS_1			52			
	CLK	eS_n		09	47	690 km.		
		iS_1		10	17			
24	BHA	iP	13	27	37	250 km.		B.P.I. H = 13 27 00
		iS		28	04			Kariba
	BUL	iP_n		27	53	380 km.		
		iP_1		28	03			
		iS_n			36			
		iS_1			45			
	CLK	eP_n		28	35	690 km.		
		eS_n		29	44			
		iS_1		30	17			
24	BHA	i	14	27	17			Kariba
		i			55			
24	BUL	traces	14	30	01			Kariba
24	BHA	iP	14	58	05			Kariba
		iS			32			
	BUL	iS_1		59	11			
24	BHA	iP	15	07	41			B.P.I. H = 15 07 04
		iS		08	08			Kariba area
	BUL	iP_n		07	57			
		iP_1		08	05			
		iS_n			39			
		iS_1			50			
	CLK	traces		09	02			
24	BHA	traces	15	59	42			
24	BHA	eP	19	13	03			Kariba
		iS			29			
24	BHA	iP	23	25	56	800 km.		B.P.I. H = 23 24 06
		iS_n		27	13			18.0 S, 35.0 E
		iS_1			(51)			Mozambique
	BUL	iS_n		26	48	720 km.		
		iS_1		27	23			
25	BUL	e	06	21	48		R	
25	BHA	iP	10	22	30			Kariba
		iS			57			
	BUL	i		22	55			
		i		23	33			

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
25	BUL	iPKP	12	36	10	133		USCGS H = 12 18 12
		i			27			17.5 S, 178.8 W
		i		39	03			h ± 565km. Mag. 6.5
	CLK	iPKP		36	24			Fiji Is. region
		i		39	01			
	BHA	iPKP		36	20			
25	CLK	i	17	23	50			
		i		24	24			
25	CLK	iP	23	24	48	300 km.		B.P.I. H = 23 24 06
		iS		25	20			18.0 S, 35.0 E
								Mozambique
26	BHA	iPP	02	48	54	133		USCGS H = 02 28 12
								h ± 546 km.
								26.3 S, 178.8 E.
								Fiji Is. region
26	CLK	eP	04	18	48			
		i		19	52			
26	BUL	iP	05	54	27	75		USCGS H = 05 42 40
	BHA	eP			30	76		h ± 33 km.
								6.8 S, 105.6 E
								Java
26	BHA	eP	23	52	59			Kariba
		eS		53	26			
27	BHA	eP	01	45	28			Kariba
		eS			44			
27	BHA	eP	01	55	40			
		iS		56	10			
27	BHA	eP	03	36	31	91		USCGS H = 03 23 32
								45.9 S, 75.3 W
								h ± 33 km.
								Near coast of
								S. Chile
27	BHA	eP	04	17	50			B.P.I. H = 04 17 13
		iS		18	17			Kariba
	BUL	eP_n		18	07			
		iP_1			59			
27	BHA	traces	05	21	29			
27	BHA	eP	06	54	33			Kariba
		iS			59			
27	BHA	iP	07	34	49			B.P.I. H = 07 34 12
		iS		35	18			Kariba
	BUL	eP_n		35	08			
		iP_1			13			
		iS_1			56			
27	BHA	iP	09	33	33			Kariba
		iS			59			
27	BHA	iP	19	03	47	250 km.		B.P.I. H = 19 03 16
		iS		04	15			Kariba
	BUL	iP_n		04	05	380 km.		
		iP_1			12			
		iS_n			43			
		iS_1			55			
	CLK	iS_1	21	05	56	690 km.		
		iS_n		06	35			
		iS_1						

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
27	BHA	iP	22	31	28			B.P.I. H = 22 31 01
		iS		32	07			Kariba
	BUL	iP_1		32	03			
		iS_1			44			
27	BHA	eP	23	14	58			Kariba
		iS		15	26			
28	BUL	iP_n	00	51	23			B.P.I. H=00 48 00
		iS_n		54	06			S.A. earthquake
		iS_1		(55	31)			Probably Ceres area
	BHA	eP_n		52	26			
		iS_n		58	18			
	CLK	iP_n		52	50			
		iS_n		57	07			
		iS_1		59	09			
28	BUL	i	03	54	11			
28	BHA	eP	12	10	28			
		iS		11	13			
28	BUL	iP_n	15	24	20			Probably Central
		iS_n		25	29			Africa
		iS_1		26	01			
28	BHA	eP	17	47	18			Kariba
		iS			45			
28	BHA	iP	19	59	45			Kariba
		iS	20	00	13			
	BUL	iP_1		00	08			
		iS_1			53			
28	BHA	eP	20	13	13			Kariba
		iS			39			
28	BHA	eP	22	35	22			Kariba
		iS			48			
29	BUL	iP	01	35	26	95	C	USCGS H= 01 22 06
								2.0 N, 123.4 E
								h ± 43 km.
								Northern Celebes
29	CLK	iP	09	04	34	61	R	USCGS H=08 53 48
	BHA	iP			50	66		39.6 N, 74.2 E
					(53)			h ± 31 km.
	BUL	traces		05	(17)			Mag. 5.5
								Sinkiang Prov.,
								China
29	BHA	i	11	03	11			Kariba
		i			37			
29	BUL	eP	15	44	46	112		USCGS H=15 30 31
	BHA	eP			51	112		h ± 23 km.
	CLK	iP		49	11	118		7.1 S, 81.6 W
								Off coast of
								Peru
29	CLK	iP	17	18	36			± 80 km.
		iS			45			
29	BHA	e	21	01	38			Probably Central
	CLK	traces		05	03			Africa
29	BHA	i	21	17	03		R	

August, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
29	CLK	iP	23	41	33			± 50 km. from station.
		iS			49			Probably Port Herald area
30	BUL	iP	00	28	33	76		USCGS H = 00 16 36
	BHA	eP			38	78		8.7 S, 108.6 E
								h ± 33 km.
								Off coast of Java
30	BUL	i	00	41	59		R	
	BHA	e		42	35			
30	BUL	i	00	55	36		C	
	BHA	e			48		R	
30	BHA	e	04	58	05			
30	BHA	eP	19	34	08			Kariba
		iS			35			
31	BUL	traces	11	32	51			
31	BHA	ePP	21	47	06	140		USCGS H = 21 26 09
								21.5 S, 179.2 W
								h ± 543 km.
								Fiji Islands

* *

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SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Lithologic Foundation:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Observer:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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.

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Seismological Officer.

Address.

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September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
1	BUL							Kariba
		iS_1	09	47	42			
	BHA	iP		46	34			Kariba
		iS		47	03			
1	BHA	iP	13	00	58			Kariba
		iS			24			
	BUL	iP_1	13	01	15			Kariba
		iS_1		02	08			
	CLK	e	13	01	55			Kariba
		i		03	04			
		i			35			
1	BHA	eP	14	14	45			
		iS			11			Kariba
1	BHA	e	18	46	45			
		i		47	32			
1	BHA	eP	22	38	03			Kariba
		iS			28			
2	CLK	eP	01	44	47	63		USCGS H = 01 34 30.3 33.9N 74.7E h + 331 km. Northern India Mag 5.1.
	BHA	iP	01	45	10	65		
	BUL	iP	01	45	37	69		
2	BHA	iP	22	32	44			Kariba
		iS		33	10			
	BUL	traces	22	33	11			Kariba
2	BHA	iP	22	39	55			Kariba
		iS		40	21			
	BUL	eP_n	22	40	14			Kariba
		iP_1			24			
		iS_n			54			
		iS_1		41	05			
	CLK	iS_n	22	41	58			Kariba
2	BHA	eP	22	47	48			Kariba
		iS		48	15			
2	BHA	traces	23	41	30			Kariba
2	BHA	iP	23	50	46			Kariba
		iS		51	13			
2	BUL	eP_1		51	14			Kariba
		iS_1		52	00			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
3	BUL	iP	15	33	25			± 10 Km. from station.
		iS			26			
3	BHA	eP	16	37	19			Kariba
		iS			44			
4	BHA	eP	02	47	21			Kariba
		iS			47			
4	BHA	iP	05	16	13	55	R	USCGS H = 05 06 47.0 36.1 N, 5.3 E Near Coast of Algeria.
	CLK	eP		16	40	58		
	BUL	iP		16		61	R	Slight damage at Bir Hadada, Mag.5.2
4	BUL	iS	08	32	23			Kariba
4	BHA	iP	08	42	43			Kariba
		is		43	08			
4	BUL	iP_1	08	43	09			Kariba
		iS_1			54			
		iS						
4	BHA	iP	09	56	40			B.P.I. H = 09 56 02
		iS		57	07			Kariba Area
	BUL	iP_n	09	56	57			
		iP_1		57	04			
		iS_n			34			
		iS_1			46			
	CIK	eS_n	09	58	41			
		iSi		59	17			
4	BHA	iP	11	40	34			Kariba
		iS		41	01			
	BUL	iS_1	11	41	41			
4	CKL	iP	18	47	37	70		USCGS H = 18 36 28.1 24.1 N, 96.0 E Northern Burma h± 148 Km
		i		48	16			
	BHA	iP		48	05	75		Mag.5.0
		i			48			
	BUL	iP		48	21	77		
4	BHA	traces	22	49	00			
4	BHA	e	23	08	30			
5	CKL	iP	03	27	23			± 50 from station
		iS			29			
5	BUL	i	05	31	00			Probably Witwatersrand Tremor
5	BUL	traces	14	33	00			
5	BHA	eP	16	03	51			Kariba
		iS		04	18			
	BUL	traces		05	00			

September, 1963.

	Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
	5	BUL	i	16	35	13		R	
	5	BUL	iS_1	18	57	56			Witwatersrand Tremor
	5	BHA	eP	19	14	23			Kariba
			iS			50			
*	6	BHA	iPKP	10	37	38	133		USCGS H= 10 16 38.9 24.0 S, 179.9 E h ± 500 km. Mag.5.2. Kermadec Islands.
	6	CLK	traces	16	57	05			
	6	BHA	i	18	49	50			Probably Central Africa.
			i		50	14			
	6	CLK	traces	18	52	35			
	6	BUL	iP KP_1	20	51	22	147	C	USCGS H = 20 31 46.1 50.1 N, 129.5 W Vancouver Island h ± 31 Km. Mag. 4.4
	6	BUL	$iPKP_1$	21	16	34	145	C	USCGS H= 20 56 59.9 53.9 N, 165.6 W h± 33 Km. Mag 5.0 Aleutian Islands.
	7	BHA	traces	00	03	30			
	7	CLK	traces	05	33	05			
	7	BUL	iPKP	07	32	43	127		USCGS H = 07 13 39.9 45.4 N, 50.8 E. Kwila Island h ± 33 Km. Mag 5.2
	7	BUL	i	08	23	58			± 50 Km.
			i		24	04			
	7	BUL	iP	08	56	01	85		USCGS H = 08 43 26 8.8 S, 117.5 E h ± 81 Km. Sumbawa
			i		58	40			
		CLK	e		59	27			
	7	CLK	iP	11	10	53			± 100 Km.
			iS		11	63			
	7	BUL	iP_1	11	57	18			Witwatersrand Tremor
			iS_n			51			
			iS_1		58	09			
		BHA	traces		58	00			Witwatersrand Tremor
	7	CLK	iP KP	13	02	47 K	123	R	USCGS H = 12 44 01.1 54.0 N, 160,3 E Kamchatka h ± 110 Km. Mag.5.4.
		BHA	ePKP			53 K	127	R	
		BUL	ePKP		03	01	131		
	7	BHA	iP	13	24	20			Kariba
			iS			47			
		BUL	eP_1			47			Kariba
			is_n		25	19			
			is_1			30			
		CLK	traces		26	03			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
7	BUL	iPP	15	37	30	129		USCGS H = 15 16 55.4 22.0 S, 179.6 W Fiji Island. h ± 558 Km. Mag 4.7
8	BHA	eP	00	11	15			Kariba
		iS			41			
8	BHA	iP	07	49	16			B.P.I. H = 07.48.39
		iS			44			Kariba Area
	BUL	iP_n		49	34			
		iPi			42			
		iS_n		50	11			
		iSi			24			
	CLK	eP n		50	(14)			
		lSn		51	25			
		iS_1		52	00			
8	BHA	e	19	26	08			
8	BHA	traces	20	03	30			
8	BH A	ePKP	20	08	32	133		USCGS H = 19 50 29.8 23.6 S, 179.8 E. Fiji Islands Region h ± 550 KM Mag. 5.7
		i		11	24			
	CLK	iPKP		08	35	128		
		PP		11	08			
	BUL	iPKP		08	36	127		
8	CLK							
		i	20	51	13			
		i			40			
8	BHA	iP	20	49	05			Karib a
		iS			32			
	BUL	iP_1		49	30			Kariba
		iS_1		50	13			
9	BUL	iPP	00	39	30	128	C	USCGS H = 00 19 02.7 22.6 S, 179.5 W Fiji Islands. h ± 550 Km. Mag 4.7
	BHA	ePP			56	134		
9	CLK	ePKP	03	04	27	115		USCGS H = ? 02 45 45.4 4.4 S, 152.7 E New Britain h± 34 Mag 5.6 Kariba
	BUL	iPKP			34	118		
	BHA	iPKP			38	121		
9	BHA	eP	03	29	15			
		iS			41			
	B UL	traces		30	30			
9	CLK	iP	06	41	11			± 110 Km.
		iS			23			Probably Port Herald Area.
9	BHA	e	13	07	18			
		i			46			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
10	BUL	iPKP	17	20	44	148	C	USCGS H = 17 01 07.3 53.8 N, 159.9 W h + 33 Alaska Peninsula Region Mag.5.0
10	BUL	ePKP	19	33	33	129		USCGS H = 19 14 26.8 19.0 S, 175.8 E Tonga Island h ± 33 Km. Mag 5.3.
12	BUL	iS_1	23	14	58			Probably tremor
13	CLK	Tremor	05	50	(38)			
13	BHA	i	17	19	26			
	BUL	i		19	38		C	
	CLK	i		19	44			
					47			
13	BHA	e	18	28	00			
13	BHA	eP	19	31	09			Kariba
		iS			36			
13	BUL	iS_1	19	32	(21)			
13	CLK	iP	20	01	14			± 150 Km from station
		iS			31			
13	BUL	traces	20	04	00			
14	BHA	traces	03	14	00			
15	CLK	i	00	38	52			Probably Central Africa
	BHA							Central Africa
		iS		39	00			
	BUL	traces		42	00			
15	CLK	iPKP	01	05	52	124	C	USCGS H = 00 46 54.1 10.3 S, 165.6 E h± 43 Mag. 7¼ - 7½
	BUL	iPKP			57	126		
	BHA	iPKP		06	02	130		
15	BUL	iS_1	09	04	29			Probably Tremor
15	BHA	iP	12	35	53	250 km		B.P.I. H = 12 35 16 Kariba Area
	BUL	iP_n		36	10	380 km		
		iPi			19			
	CLK	iP_n			50	690 km		
		iS_n		38	00			
		iS_1			32			
15	CLK	e	15	05	02			
15	BUL	e	19	58	26		C	
16	CLK	eP	04	32	01			110 Km
		iS			13			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
? 16	BUL	iPKP	20	24	25	126		USCGS H = 20 05 21.9 13.4 S, 166.5 E. h+ 28 km. Mag 5.0 Santa Cruz Island
16	BHA	i	23	58	37			Probably Central Africa
		i			55			
		i		59	56			
	CLK	i		58	58			
			00	00	36			
16? 17?	BUL	i	00	00	00			
17	CLK	i	10	10	36			Seizmic Local
17	CLK	iPKP	19	39	09	125		USCGS H = 19 20 08.2 10.1 S, 165.3 E h + 17 km Santa Cruz Island. Mag 6.1
	BUL	iPKP			16	126		
	BHA	iPKP			22	131	R	
17	BHA	traces D	20	46	00			
17	BUL	iP	21	25	11	75		USCGS H = 21 13 28 6.7 S, 105.3 E h+ 33 km. Mag 5.3 Java
	BHA	eP			12	76		
18	BHA	eP	12	44	33			Kariba
		iS			50			
18	CLK	iP	17	07	53 A	56	C	USCGS H = 16 58 12.5 40.9 N, 29.2 E h+ 33 km. Mag 5.2 Turkey
	BHA	iP		07	42 K	56	R	
	BUL	iP		08	22 K	57	R	
18	BHA	traces	19	14	30			Probably Kariba
19	CLK	traces	11	10	02			
19	BUL	iS_1	12	26	26			Tremor
19	BHA	e	17	41	21			
20	BHA	e	05	02	58			Kariba
		e		03	25			
20	BUL	i	14	54	01		C	
	BHA	e			11		R	
20	BUL	i	22	24	20		R	
21	BHA	i	00	54	12		R	
	BUL	i			29		R	
21	BHA	iP	03	19	31			Kariba
21	BUL	iP_n	04	19	51			Kariba
		iP_1		20	01			
		iS_1			42			
	CLK	iP_n		20	28			Kariba
		iS_n		21	38			
		iS_1		22	11			
21	BUL	traces	16	28	11			
21	BUL	traces	22	29	31			

September, 1963

Date	Station	P hase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
22	BUL	i	03	08	23	140		USCGS H = 02 49 03.4 52.5 N, 174.9 W Andreanof Island Aleutian Island h± 105 km. Mag 4.8
22	CLK	e	03	15	29			
	BUL	e			32		C	
	BHA	e			42			
22	BHA	iP	05	52	55			Kariba
		iS		53	21			
	BUL	iSi		54	08			Kariba
22	CLK	i	10	49	18			
	BHA	iP	14	51	23			200 Km from station
		iS			44			
22	BHA	e	19	41	14			
23	BHA	eP	00	32	41			
		iS		33	07			
								B.P .I.H = 06. 40. 33.
23	BHA	iP	06	41	10			Kariba Area
	BUL	iP_n	06	41	29			
	CLK	iP_n	06	42	07			

The above shock probably of magnitude 6 was followed by approximately 750 after shocks over the period 23rd September to 30th September 1963. Due to high noise level and numerous number of shocks no arrival times were read on Broken Hill Station. The more intense of the above 750 shocks were recorded at Bulawayo and Chileka stations and are listed below:

23	BUL	iP_1	07	17	19
		iS_1		18	01
23	BUL	iP_1	07	21	57
		iS_1		22	40
23	BUL	iP_1	07	29	45
		iS_1			30
23	BUL	iP_1	07	46	06
		iS_1			52
23	BUL	iP_1	08	06	41
		iS_1		07	27
23	BHA	iP	08	11	09
	BUL	eP_n	08	11	29
	CLK	iP_n		12	06
		iS_n		13	14
23	BUL	iP_1	08	25	21
	BUL	iS_1		26	06
	CLK	iP_n			51
	CLK	lS_n			58

September, 1963

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
23	BUL	iP_n	08	33	06			
		iP_1			16			
	BUL	iS_1		34	00			
	CLK	iP_n			45			
	CLK	iS_n			54			
23	BUL	iP_1	08	38	33			
		iS_1		39	15			
23	BUL	iP_1	08	47	21			
		iS_1		52	18			
23	BHA	iP	09	02	30			
	BUL	iP_1	09	02	49			
	CLK	iP_n		03	27			
23	BUL	iP_n	09	32	52			
		iP_1		34	43			
		iS_n		38	55			
	BUL	iS_1			40			
	CLK	iP_n		39	31			
23	BUL	iP_n	09	47	22			
	CLK	iP_n			59			
		iS_n		49	08			
23	BUL	iP_n	10	10	41			
		iP_1		19	09			
		iS_1			51			
23	BUL	iP_1	10	21	05			
		iS_1			49			
23	BUL	iS_1	10	25	08			
23	BUL	iS	10	32	35			
23	BUL	eP_n	10	42	01			
		iP_1			11			
	CLK	iP_n			39			
		iS_n		43	47			
23	BUL	eP_n	10	51	09			
		iP_1			18			
	BUL	iS_1		52	05			
	CLK	iP_n			48			
	CLK	iS_n			54			
23	BUL	iS_1	10	55	35			
23	BUL	iS_1	10	56	21			
23	BUL	iS_1	11	06	51			
23	BUL	iS_1	11	08	25			
23	BUL	iP_1	11	35	18			
		iS_1		36	01			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
23	BUL	iP_1	11	58	01			
		iS_1			45			
23	BUL	iS_1	12	09	11			
23	BUL	iP_n	12	33	32			
		iP_1			42			
	CLK	iP_n		34	10			
		iS_n		35	19			
23	BUL	iP_1	12	51	30			
		iS_1		52	13			
23	BUL	iS_1	12	54	15			
23	BUL	iS_1	12	56	58			
23	BUL	iS_1	13	16	01			
23	BUL	iP_n	13	24	31			
		iP_1			41			
	BUL	iS_1			21			
	CLK	iP_n		25	12			
	CLK	iS_n		26	20			
23	BUL	iS_1	13	33	48			
23	BUL	iS_1	14	19	18			
23	BUL	iS_1	14	23	40			
23	BUL	iS_1	14	28	02			
23	BUL	iS_1	14	56	01			
23	BHA	iP	15	02	58			
	BUL	iP_n	15	03	16			
	CLK	iP_n			55			
23	BHA	iP	16	08	10			
	BUL	iP_n	16	08	30			
	CLK	iP_n		09	08			
		iS_n		11	13			
23	BUL	iP_n	16	42	09			
		iS_1			51			
23	BUL	iS_1	17	09	11			
23	BUL	iS_1	17	15	50			
23	BUL	iS_1	17	34	45			
23	BUL	iP_1	17	37	01			
		iS_n			32			
		iS_1			45			
23	BUL	iP_n	17	50	08			
		iS_n			37			
		iS_1			50			
23	BUL	iS_1	17	58	52			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
23	BUL	iP_1	18	19	24			
		iS_1		20	10			
23	BUL	iS_1	18	25	53			
23	BUL	iP_n	18	58	31			
		iS_1		59	13			
	CLK	traces	19	00	01			
23	BUL	iS_1	19	29	17			
23	BUL	iS_1	19	32	03			
23	BUL	iP_n	20	58	22			
		iS_n			44			
		iS_1		59	08			
	CLK	traces	21	00	01			
23	BUL	iS_n	22	21	30			
		iS_1			42			
23	BHA	iP	22	24	12			
	BUL	iP_n	22	24	30			
	CLK	iP_n	22	25	08			
23	BUL	iP_1	22	37	15			
	CLK	iP_n			45			
		iS_n			54			
23	BUL	iS_n	22	49	55			
	CLK	iP_n	22	50	00			
		iS_n		51	08			
23	BUL	iS_1	23	03	20			
23	BUL	iS_n	23	11	17			
23	BUL	iS_1	23	36	35			
23	BUL	iS_1	23	38	38			
23	BUL	iS_1	23	42	32			
23	BUL	iS_1	23	46	07			
23	BUL	iS_1	23	49	52			
24	BUL	iP_1	00	04	22			
	CLK	iP_n			52			
		iS_n		06	01			
24	BUL	iS_1	00	26	56			
24	CLK	iP_n	00	38	55			
		iS_n		40	03			
24	BUL	iS_1	00	43	04			
24	BUL	iP_1	00	48	45			
		iS_1		49	26			
	CLK	traces	00	50	01			
24	BUL	iS_1	01	52	02			
24	BUL	iS_1	01	53	27			
24	BUL	iS_1	01	57	58			
24	BUL	iS_1	02	16	43			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
24	CLK	traces	04	05	01			
24	BUL	iP_n	04	48	10			
		iS_1			54			
24	BUL	eP_1	07	44	58			
		iS_1		45	41			
24	BUL	e	08	03	14			
24	BUL	ePn	08	11	17			
		iP_1			26			
		iS_n			57			
		iS_1		12	10			
24	CLK	iS_n	08	13	03			
24	BUL	eP_1	08	39	33			
		iS_1		40	16			
		iS_1		53	12			
24	BHA	iP	09	14	10			
	BUL	iP_n		14	30			
	CLK	iP_n	09	15	08			
		iS_n		16	12			
24	CLK	iP_n	09	32	52			
		iS_1		34	01			
		iS_1		35	35			
24	BUL	iP_n	10	09	35			
		iP_1			45			
	BUL	iS_n			18			
		iS_1			29			
	CLK	iP_1		10	16			
	CLK	iS_n		11	26			
		iS		12	00			
24	BHA	iP	10	18	31			
	BUL	iP_n	10	18	48			
		iP_1			58			
	CLK	iP_n	10	19	29			
		iS_n		20	39			
		iS_1		21	10			
24	BUL	iP_1	11	12	15			
		iS_1		13	00			
24	BUL	iP_1	11	18	52			
		iS_1		19	37			
24	BUL	iP_1	11	42	10			
		iS_1			55			
	CLK	traces	11	44	01			
24	BUL	iP_1	12	15	27			
		iS_1		16	11			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
24	BUL	iP_i	13	24	56			
		iS_1		25	41			
24	BUL	iS_1	14	30	41			
24	BUL	iS_1	14	32	55			
24	CLK	traces	15	57	31			
24	BUL	i	16	44	03			
24	CLK	traces	16	48	01			
24	BUL	e	17	00	08			
24	BUL	iS_1	18	28	55			
24	BUL	eP_n	19	00	38			
		iP_1			49			
		iS_n		01	18			
		iS_1			31			
24	CLK	iS_1	19	03	04			
24	BUL	iS_1	19	15	55			
24	BUL	iP_n	20	52	41			
		iS_n		53	21			
	CLK	eP_n			21			
		iS_1			35			
24	BHA	iP	21	38	20			
	BUL	iP_n	21	38	38			
		iP_1			48			
	CLK	iP_n		39	17			
		iS_n		40	27			
		iS_1			58			
24	BUL	iP_n	22	20	33			
		iP_1			42			
	BUL	iS_n			18			
		iS_1			26			
	CLK	eP_n		21	13			
	CLK	iS_n		22	25			
		iS_1			57			
24	BUL	iS_1	23	58	42			
25	BUL	iP_1	00	51	06			
		iS_1			51			
25	BUL	iP_n	01	45	32			
		iP_1			41			
		iS_n		46	12			
	BUL	iS_1			26			
	CLK	iP_1			12			
	CLK	iS_n		47	22			
25	BUL	iS_1	03	02	25			
25	BHA	iP	03	09	57			

September, 1963.

Date	Station	P hase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
	BUL	iP_n	03	10	13			
		iP_1			22			
		iS_n			53			
	CLK	iP_n	03	10	54			
		iS_n		12	03			
25	BUL	iP_1	03	17	16			
		iS_n			48			
	CLK	iS_n	03	18	57			
		iS_1		19	32			
25	BUL	iP_n	03	23	11			
		iS_1			55			
25	BUL	iP_1	03	29	13			
		iS_1			58			
25	BUL	iP_1	03	46	47			
		iS_1		47	32			
25	BUL	iP_1	04	21	05			
		iS_1			50			
	CLK	iP_1	04	21	38			
		iS_n		22	50			
		iS_1		23	21			
25	BUL	iP_1	04	35	30			
		iS_1		36	15			
	CLK	iS_n	04	37	15			
25	BUL	iS_1	05	07	14			
25	BUL	iP_1	05	11	49			
		iS_1		12	34			
25	BUL	iS_1	05	16	31			
25	BUL	iS_1	06	52	02			
25	CLK	iP_n	07	05	25			
25	BUL	iP_1	07	30	42			
		iS_1		31	27			
25	BUL	iP_n	07	33	02			
	CLK	i			42			
25	BUL	iS_1	07	58	30			
25	BUL	iS_1	08	02	47			
25	BUL	iS_1	08	05	58			
25	BHA	iP	08	10	46			
	CLK	iP_n		11	42			
		iS_n		12	50			
		iS_1		13	28			
25	BUL	iP_n	08	14	00			
		iP_1			09			
25	BUL	iS_1	08	25	16			
25	BUL	iS_1	08	31	09			

September, 1963

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
25	BUL	iP_1	09	09	29			
		iS_1		10	13			
25	BUL	iS_1	09	12	33			
25	BUL	iP_1	09	19	13			
		iS_1			56			
25	BUL	iS_1	09	24	05			
25	BUL	iS_1	09	32	56			
25	BUL	iP_1	09	35	29			
	BUL	iS_1			09			
	CLK	iP_n		36	03			
	CLK	iS_n		37	10			
		iS_i			42			
25	BUL	iS_1	09	45	52			
25	BUL	iP_1	09	59	07			
		iS_1			51			
25	BUL	iP_1	10	13	20			
		iS_1		14	06			
25	BUL	iP_1	10	15	31			
		iS_1		16	14			
25	BUL	iS_1	10	23	12			
25	BUL	iS_1	10	33	48			
25	BUL	iP_1	10	37	26			
		iS_1		38	10			
25	BUL	iS_1	10	42	06			
25	BUL	iS_1	10	53	21			
25	BUL	iP_1	11	15	02			
		iS_1			46			
25	BUL	iS_1	11	21	11			
25	BUL	iS_1	11	25	23			
25	BUL	iS_1	11	31	31			
25	BUL	iS_1	11	40	20			
		iP_1	11	42	50			
25	BUL	iS_1		43	36			
25	BUL	iS_1	11	49	05			
25	BUL	iP_1	11	51	11			
		iS_1			54			
25	BUL	iS_1	12	25	37			
25	BUL	iS_1	12	52	60			
25	BUL	iS_1	12	55	14			
25	BHA	iP	13	06	21			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
	BUL	iP_n	13	06	39			
		iP_1			49			
		iS_n		07	20			
		iS_1			31			
25	BUL	iP_1	13	21	09			
		iS_1			53			
25	BUL	iS_1	13	38	51			
25	BUL	is_1	13	51	22			
25	BUL	iP_1	13	55	37			
		iS_1		56	22			
25	BUL	iS_1	14	17	02			
25	BUL	iP_1	14	21	12			
		iS_1			56			
25	BUL	iP_1	14	25	12			
		iS_1			56			
25	BUL	iS_1	14	44	05			
25	BUL	iS_1	15	35	37			
25	BUL	iP_1	15	44	41			
		iS_1		45	26			
25	BUL	iP_1	16	08	38			
		iS_1		09	22			
25	BUL	iP_1	16	11	16			
		iS_1			58			
25	BUL	iP_1	16	49	21			
		iS_1		50	06			
25	BUL	iS_1	16	53	03			
25	BUL	iP_1	17	35	13			
		iS_1			57			
25	BUL	iP_1	18	44	31			
		iP_n			40			
		iS_n		45	11			
		iS_1			24			
	CLK	traces	18	46	01			
25	BUL	iP_1	19	01	31			
		iS_1		02	16			
	CLK	traces	19	03	01			
25	BUL	iP_n	20	00	38			
		iS_n		01	10			
		iS_1			23			
25	BUL	iS_1	20	16	38			
25	BUL	iS_1	20	51	49			
25	BUL	iS_1	21	01	16			
25	BUL	iS_1	21	36	01			

SEPTEMBER, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
25	BUL	iS_1	22	14	30			
25	BUL	traces	22	44	01			
25	BUL	iS_1	22	52	26			
25	BUL	iP_1	23	29	05			
					49			
	CLK	traces	23	30	31			
25	BUL	iP_1	23	37	50			
		iS_1		38	33			
	CLK	traces	23	39	31			
26	BUL	iS_1	00	02	18			
26	BUL	iP_1	02	45	16			
		iS_1		46	00			
26	BUL	iP_1	03	02	03			
		iS_1			47			
26	BUL	iP_1	03	20	51			
		iS_1		21	39			
26	BUL	iP_1	03	52	07			
		iS_1			51			
26	BUL	iS_1	04	44	41			
26	BUL	iS_1	05	42	51			
26	BUL	iS_1	10	25	08			
	CLK	traces	10	26	01			
26	BHA	iP	13	41	17			
	BUL	iP_1	13	41	45			
		iS_1		42	31			
26	BUL	iP_1	14	00	55			
		iS_1		01	38			
	CLK	traces	14	02	31			
26	BUL	iP_1	14	04	28			
		iS_1		05	12			
26	BUL	iP_n	14	35	08			
		iP_1			19			
		iS_1		36	05			
	CLK	iS_n	14	36	56			
26	BUL	S_1	14	39	26			
26	BUL	iS_1	15	43	11			
26	BUL	iP_n	16	40	33			
		iP_1			42			
	CLK	iP_n	16	41	15			
		iS_n		42	22			
26	BHA	iP	16	57	01			
	BUL	iPn		57	20			
		iS_1			29			
		iS_n		58	00			
	CLK	iP_n	16	58	00			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
		iS_n		59	09			
26	BUL	iS_1	17	57	15			
26	BUL	iS_1	18	46	58			
26	BUL	iP_1	18	50	18			
		iS		51	02			
26	BUL	iP_1^1	21	11	32			
		iS_1		12	14			
26	BUL	iP_1	21	26	22			
		iS_1		27	04			
26	CLK	iS_n	21	29	00			
26	BUL	iP_1	23	05	05			
		iS_1			49			
	CLK	iS_n	23	06	46			
		iS_1		07	17			
26	BUL	iP_1	23	38	33			
26	BUL	iS_i	23	59	16			
27	CLK	traces	00	00	01			
27	BUL	iP_1	00	29	12			
		iS_1			54			
27	CLK	traces	00	30	41			
27	BUL	iP_n	02	52	31			
		iP_1			41			
		iS_1		53	25			
	CLK	iP_n	02	53	12			
		iS_n		54	20			
		iS_1			55			
27	BHA	iP	05	18	28			
	BUL	iP_n	05	18	47			
		iP_1			56			
	CLK	iP_n		19	26			
		$i S_n$		20	36			
		iS_1		21	13			
27	BUL	iS_1	06	34	08			
27	BUL	iP_1	07	53	05			
		iS_n			35			
		iS_1			47			
27	BUL	iS_1	08	47	09			
27	CLK	iS_n	09	51	53			
		iS_1		52	45			
27	BUL	iP_1	10	12	02			
		iS_1			46			
		iS_n			33			
	CLK	iS_n		13	41			
		iS_1		14	18			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
27	BUL	iS_1	10	50	59			
27	CLK	traces	10	52	00			
27	BUL	iS_1	12	43	13			
27	BUL	iS_1	15	02	38			
27	BUL	iS_1	16	22	33			
27	BUL	iS_1	18	29	05			
27	BHA	iP	19	17	28			
	BUL	iP_i		17	47			
		iP_n			56			
27	BUL	iP_n	19	49	57			
		iS_n		50	05			
	CLK	iP_n	19	50	37			
		iS_n		51	49			
27	BUL	iP_1	20	00	45			
		iS_1		01	29			
	CLK	traces	20	02	01			
27	BUL	iP_n	20	18	57			
		iP_1		19	06			
27	BUL	iP_n	20	40	05			
		iP_1			14			
		iS_1			58			
	CLK	iS_n	20	41	24			
27	BUL	iP_n	21	39	33			
		iP_1			42			
		iS_1		40	25			
27	CLK	traces	21	40	19			
27	BUL	iP_1	22	10	38			
		iS_1		11	22			
27	CLK	iS_n	22	12	14			
		iS_1			50			
27	BUL	iS_1	22	17	15			
27	BUL	iS_1	23	06	50			
27	BUL	iS_1	23	13	25			
27	BUL	iS_1	23	15	03			
27	CLK	traces	23	19	31			
28	BUL	iS_1	00	26	11			
28	BUL	iS_1	01	41	48			
28	BUL	iS_1	01	44	13			
28	CLK	traces	02	03	01			
28	BUL	iP_1	03	51	28			
		iS_1		52	09			
28	CLK	traces	04	53	01			
28	BHA	iP	05	26	31			
	BUL	iP_n	05	26	50			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
28	CLK	iP_n	05	27	30			
		iS_n		28	41			
28	BUL	iP_1	05	40	22			
		iS_1		41	03			
28	CLK	i	06	11	26		C	
28	BUL	iP_1	06	54	38			
		iS_1		55	22			
28	CLK	iP_n	07	04	49			
		iS_n		05	57			
		iS_1		06	34			
28	BUL	iP_n	07	48	38			
		iP_1			48			
28	CLK	iP_n	67	49	20			
		iS_n		50	30			
		iS_1		51	07			
28	BUL	iS_1	08	13	47			
28	BUL	iS_1	08	43	06			
28	BUL	iS_1	09	34	21			
28	BUL	iS_1	09	50	19			
28	BUL	iP_1	10	22	56			
28	CLK	iS_n	10	24	35			
		iS_1		25	12			
28	BUL	iP_1	11	27	02			
		iS_1			47			
28	BUL	iP_1	11	52	47			
		iS_1		53	29			
28	BUL	iS_1	12	28	30			
28	BUL	iS_1	14	25	50			
28	BUL	iS_1	14	35	35			
28	BUL	iP_n	14	42	21			
		iP_1			29			
	BUL	iS_n		43	01			
		iS_1			13			
	CLK	iP_n			58			
	CLK	iS_n		44	05			
28	BUL	iP_1	15	20	41			
		iS_1		21	44			
28	CLK	iS_n	15	22	21			
28	BUL	iP_1	15	36	36			
		iS_1		37	21			
28	CLK	traces	15	56	25			
28	BUL	iP_1	16	14	31			
		iS_1		15	16			
28	BUL	iS_1	16	34	29			
28	CLK	iS_n	16	43	11			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
28	BUL	iS_1	17	00	23			
28	CLK	iS_n	17	35	56			
28	BUL	iS_1	17	36	01			
28	BUL	i	18	53	57			
28	BUL	iS_1	18	17	47			
28	BUL	iS_1	18	18	46			
28	BUL	iS_1	19	23	51			
28	BUL	iS_1	20	32	01			
28	BUL	iP_n	21	06	07			
		iP_1			17			
	BUL	iS_1		07	01			
	CLK	iP_n			49			
	CLK	iS_n			58			
		iS_1		08	33			
29	BUL	iP_1	02	38	37			
		iS_1		39	22			
29	CLK	traces	02	40	52			
29	BUL	iP_1	04	06	58			
		iS_1		07	42			
	BUL	iS_1	04	57	43			
29	BUL	iS_1	05	05	05			
29	CLK	traces	05	06	46			
29	CLK	traces	05	26	01			
29	BUL	iP_n	08	02	21			
		iP_1			30			
		iS_1		03	13			
29	CLK	iS_n	08	03	12			
		iS_1			53			
29	BUL	iS_1	12	15	24			
29	BUL	iP_1	14	34	36			
		iS_1		35	08			
29	CLK	iS_n	14	36	46			
29	CLK	i	15	41	43			
29	BUL	iP_1	17	01	26			
		iS_1		02	10			
29	BUL	i	19	39	27			
29	CLK	i	22	25	57			
		i		26	07			
29	BUL	i	22	26	29			
30	BUL	iS_1	01	29	02			
30	BUL	iS_1	01	54	28			
30	BUL	iP_n	02	03	49			
		iP_1			58			
	BUL	iS_1			41			

September, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
		iS_n		05	39			
		iS_1		06	14			
	CLK	iP_n		04	30			
30	BUL	iS_1	02	53	49			
30	BUL	iS_1	09	51	03			
30	BUL	iP_1	10	59	03			
		iS_1			46			
30	BUL	iS_1	14	15	06			
30	BUL	iS_1	17	01	08			
30		iS_1	19	05	39			
30	CLK	iP_n	22	11	40			
		iS_n		12	51			
30	BUL	iP_n	22	17	01			
		iS_n			09			
30	BUL	iP_1	22	33	08			
		iS_1			53			
30	CLK	traces	22	34	00			
30	BUL	iP_1	23	19	40			
		iS_1		20	25			
30	CLK	traces	23	21	01			
30	BUL	iP_n	23	52	16			
		iP_1			25			
	BUL	iS_1		53	08			
	CLK	iP_n			56			
	CLK	iS_n		54	05			
		iS_1			37			
23	CLK	i	18	42	22			
	BHA	i			33			

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H.O. Oliver

Winifred Wagner.

S. RHODESIA

OCT '63

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	ARC Dist	C/R	Remarks
1	BHA	iS	00	00	15			Kariba
1	BHA	iS	00	26	24			"
1	BHA	iP	00	59	20			"
		iS			40			"
1	BUL	iS_1	01	00	30			"
1	BHA	iP	01	03	01			"
		iS			29			"
	BUL	iP_1			28			"
		iS1		04	09			
1	BHA	iS	01	06	32			"
1	BHA	iP	01	26	30			"
1	BUL	iS_1	01	27	38			"
1	BHA	iP	01	56	50			"
1	BUL	iS_1	01	58	00			"
1	BHA	iP	02	58	46			"
		iS		59	06			"
	BUL	iP_1			09			"
		iS_1			51			"
1	BHA	iS	03	01	29			"
1	BHA	iS	04	02	52			"
1	BHA	iP	04	08	06			"
		iS			34			"
1	BUL	iP_1	04	09	20			"
1	BHA	iP	05	09	56			"
1	BUL	iP_1	05	37	21			"
		iS_1		38	04			"
1	CLK	Traces	01	05	01			"
1	CLK	Traces	01	29	12			"
1	CLK	e	02	37	37			
		i		38	06			
1	CLK	[illegible]						
1	CLK	Traces	03	00	01			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	θ/R.	Remarks.
1	CLK	Traces	01	05	01			
1	CLK	Traces	01	29	12			
1	CLK	e	02	37	37			
		i		38	06			
1	CLK	Traces	03	00	01			
1	BHA	iP	08	19	57			Kariba
		iS		20	23			
1	BUL	P_1	08					
	BUL	eP_1		20	20			
		iS_1		21	08			
1	BHA	iS	08	49	24			
			09		11			
1	BHA	e	09	15	45			Kariba
		e			11			
1	BHA	iP	10	34	33			"
		iS		35	01			
1	BHA	iP	12	33	35			"
1		iS		34	01			
1	BHA	iS	12	49	21			"
1	BHA	iP	13	07	16			"
		iS			42			
1	BHA	eP	13	57	03			"
		iS			30			
1	BHA	iP	14	25	36			"
		iS		26	03			
1	BHA	iS	16	37	10			"
1	BHA	eP	17	12	09			"
		iS			34			
1	BHA	iP	19	33	13			"
		iS			40			
	BUL	Traces	19	33	40			"

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
1	BHA	eP	19	36	21			Kariba
		eS			43			
1	BHA	eP	20	02	00			
		eS			27			
1	BHA	iP	20	07	33			
		iS			34			
	BUL	eP_1		08	01			
		iS_1			48			
1	BHA	iP	20	43	09			
		iS			36			
	BUL	eP_1			39			
		iS_1		44	26			
1	BHA	iS	22	01	41			
1	BHA	Traces	22	00	00			
1	BHA	iP	23	13	27			
		iS			54			
	BUL	eP_n			42			
		iP_1			54			
		iS_n		14	35			
		iS_i			40			
1	BHA	eP	23	18	03			
		eS			31			
1	BUL	Traces	23	25	00			
1	BHA	iP	23	53	49			
		iS		54	15			
	BUL	iS_1	23	55	00			
2	CLK	Traces	23	16	00			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
2	BHA	iP	00	20	59			Kariba
		iS		21	25			
	Bul	iS_1	00	21	11			"
2	BHA	eS	00	41	44			"
2	BHA	iP	01	26	11			"
		iS			36			
2	BHA	eP	02	34	41			"
		iS		35	06			
	BUL	Traces	02	35	36			"
2	BHA	eP	03	20	00			"
		iS			26			
2	CLK	Traces	03	33	00			
2	BHA	eP	03	57	46			"
		iS		58	14			
2	BHA	iP	04	09	29			"
		iS			55			
	BUL	iP_1		09	55			
		iS_1		10	38			
		Traces						
2	CLK	Traces	04	11	02			
2	BHA	eP	08	35	13			"
		iS			39			
2	BUL	e	10	15	41			
		i			50			
2	BHA	eP	12	01	39			"
		is		02	04			
	BUL	Traces		03	00			
2	BHA	eP	13	14	17			"
		iS			44			
2	BHA	iP	13	16	31			"
		iS			58			
		Traces						
2	BUL	Traces	13	18	30			
2	BHA	eP	15	31	25			"
		iS			52			
2	BHA	iP	15	35	32			"
		iS			58			
2	BUL	iS	15	36	38			"
2	BHA	eP	19	46	33			"
		eS		47	01			
2	BHA	eP	19	54	56			"
		eS		55	22			
2	CLK	i	23	30	55			± 50 Km from station
		i		31	02			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
2	BHA	iP	23	34	27			Kariba
		iS			54			
2	BUL	iP_1	23	35	50			"
		iS_1		36	46			
2	CLK	e	23	37	02			
2	BHA	eP	23	39	57			"
		iS			24			
2	BHA	eP	23	46	38			"
		eS			06			
2	BHA	iP	23	50	45			"
		is		51	13			
	BUL	iP_1			11			
		iS_1			53			
	CLK	Traces	23	53	00			
3	BHA	iP	01	45	14			"
		iS			41			
3	BHA	eP	02	01	43			"
		eS		02	11			
3	BHA	eP	04	36	37			"
		iS		37	03			
3	BHA	iP	10	28	46			"
		iS		29	12			
3	BUL	eP_n	10	29	03			
		iS_n			41			
		iS_1			54			
	CLK	Traces	10	31	02			
3	BHA	iP	10	36	41			"
		iS		37	07			
3	BHA	eP	10	43	02			"
		iS			29			
3	BUL	eP_n	11	43	18			
		iP_n			28			
		iS_n			58			
		iS_1		44	09			
3	CLK	e	11	58	30			
3	BUL	iP	15	30	19			10Km from station USCGS 15.48.17 58.5S 25.1W Sandwich I's h=54Km
		iS			20			
3	BUL	eP	15	57	40	A 55	c	
	BHA	eP		58	14	60		
3	BHA	eP	17	13	13			Kariba

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
		eS			38			
3	BUL	eP	18	05	18	55		USCGS 17.55.54 25.5W 58.6S h=33KM Sandwich I's Mag 5.5
3	BHA	eP	18	23	18			Kariba
		iS			46			
3	BHA	iP	19	05	58			"
		iS		06	25			
3	BUL	iS_1	19	07	08			"
3	BUL	iS_1	20	55	48			"
		iS_1^n		56	09			
3	BHA	iS_1	20	56	04			
3	BHA	eP	22	20	24			"
		iS_1			51			
3	BHA	iP_1	22	36	58			"
		iS		37	25			
	BUL	iP			18			
		iP_1^n			27			
	CLK	iP_1	22	37	58			
		iS^n		39	04			
3	CLK	eP_p^n	23	42	52	103		USCGS 23.24.34 32.2W 131.6E h=33Km. Kyushu Japan.
4	BHA	eP	01	17	34			Kariba
		eS			59			
4	BHA	eP	01	27	11			"
		iS			38			
4	BUL	eP	03	53	53	55	C	USCGS 03.44.28 58.4S 25.0W Mag5.5 Sandwich I's
4	BHA	eP	07	46	08			Kariba
		iS			36			
4	BHA	eP	13	01	19			"
		eS			45			
4	BHA	iP	13	23	09			"
		iS			36			
4	BHA	eP	14	16	37			"
		iS		17	04			
4	BHA	eP	14	45	10			"
		iS			36			
4	BUL	Traces	15	57	00			"
4	BHA	eP	16	00	26			"
		iS			52			
4	BHA	Traces	16	59	00			"
4	BHA	iP	18	07	13			"
		iS			43			
	BUL	eP_1			39			
		iS_1		08	24			
4	BHA	iP_1	18	40	08			"
		iS			35			
4	BUL	Traces	18	40	00			"
4	BHA	eP	19	28	45			"
		iS		29	11			
4	BUL	Traces			50			
4	BHA	eP	19	35	59			"
		iS		36	26			
4	BHA	eP	22	20	27			"
		iS			54			
4	BHA	eP	23	18	29			"
		iS			55			
	BUL	iP			55			
		iS		19	26			
		iS_1^n			41			
4	CLK	Traces	23	20	34			
5	BHA	iP	00	28	39			"
		iS		29	06			
5	BHA	eP	01	05	46			"
		iS		06	13			
	BUL	iP			00			
		iP_1^n			11			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
	CLK	e			43			
		i		07	52			
		i		08	26			
5	BHA	iP	01	22	47			Kariba
		iS		23	14			"
5	BHA	iP	01	48	24			"
		iS			51			
	BUL	eP_1			50			
5	BUL	ePKP	02	14	52	143		USCGS 01.55.35 16.0S 173.2W h±79Km Tonga I's Mag 5.5
	BHA	iPKP			59	146	R	
5	BHA	iP	03	48	48			Kariba
		iS		49	15			
	BUL	eP_1			15			
		eS_1			58			
5	BHA	iP^1	05	10	25			"
		iS			50			
	BUL	iP_1	05	10	50			
		iS_1		11	32			
	CLK	Traces	05	12	30			
5	BHA	iP	05	22	23			"
		iS			49			
5	BHA	iP	05	43	12			"
		iS			41			
5	BUL	iP_1	05	43	30			"
		iP^1			40			
		iS^n		44	20			
5	CLK	iP^1	05	45	20			
		iS			51			
5	BHA	eP	05	51	26			"
		iS			51			
5	BHA	iP	08	26	59			"
		iS		27	27			
5	BHA	iP	10	42	44			"
		iS		43	11			
	BUL	eP_1	10	43	11			
5	BHA	i	11	04	19			"
		i			45			
5	BUL	eS_1	11	05	23			"
5	BUL	eS_1	12	32	49			"
5	BHA	i	13	07	20			"
		i			45			
5	BUL	i	14	38	42			
		i			51			
5	BHA	i	14	59	39			"
		i	15	00	07			
5	CLK	iP	15	03	37	27	R	
5	BHA	iP			49	29		USCGS 14.57.47 11.6N 42.8E h±33Km French Somaliland Mag 4.9
	BUL	eP		04	32	35		
5	BHA	eP	15	56	08			Kariba
		iS			36			
5	BHA	i	16	21	00			
		i		22	32			
5	BHA	iP	16	31	53			"
		iS		32	20			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
	CLK	iP	16	56	30	690		B.P.I. H=16.54.56
		iS		57	38			
5	BHA	iP_n	16	55	34	250		Kariba Area
		iP_1			36			
	BUL	iP_n			51	380		
		iP_1		56	00			
5	BHA	iP	17	06	31			
		iS			58			
5	CLK	eP	17	34	15	27		USCGS 17.18.25 11.7N, 42.6 H±33Km
	BHA	eP		34	45	29		
	BUL	Traces		35	50			Fr. Somaliland
5	BHA	iP	17	39	18			Kariba
		iS			46			
5	BHA	iP	18	21	08			
		iS			37			
	BUL	eP_1		21	34			
		eS_1		22	17			
5	BHA	iP	18	32	52			
		iS		33	19			
5	BHA	iP	18	34	47			
		iS		35	14			
5	BHA	iP	18	53	42			
		iS		55	08			
5	BHA	iP	19	01	48			
		iS		02	15			
5	BUL	Traces	19	03	00			
5	BHA	eP	19	17	13			
		iS			40			
5	BHA	iP	19	20	00			
		iS			27			
5	BUL	eS_1	19	21	14			
5	BHA	iP	20	04	37			
		iS		05	04			
5	BUL	eP_1	20	05	01			
		eS_1			45			
5	CLK	Traces	20	07	00			
5	BHA	eP	20	18	34			
		eS		19	08			
5	CLK	iP_n	21	56	10			Probably Mozambique Channel
		iP_1			13			
		iS_1			42			
5	BHA	Traces	21	58	00			

October,1965.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
5	BHA	Traces	21	58	00			Kariba
5	BHA	eP	22	58	21			"
		iS			48			
6	BHA	eP	03	49	35			"
		eS		50	01			
6	BHA	iP	05	17	12			"
		iS			38			
6	BHA	iP	06	03	52			"
		iS		04	17			
	BUL	iP_1		04	16			
		iS_1		05	01			
6	CLK	Traces	06	05	57			
6	BHA	iP	06	20	49			"
		iS		21	16			
	BUL	iS_1			58			
6	BHA	iP^1	06	59	56			"
		iS	07	00	26			
	BUL	iP_1		00	23			
		iS_1		01	08			
	CLK	Traces		02	01			
6	BHA	iP	11	52	57			"
		iS			24			
	BUL	eP_1		53	25			
		iS_1		54	06			
6	BHA	e	13	07	11			
		i			42			
6	BHA	eP	15	42	31			"
		iS			56			
6	BUL	e	17	18	39			
6	BUL	iP	17	28	06	86	C	USCGS 17.15.33 33.9S
	BHA	iP			21	89	C	70.0W h=101 Km Mag5.1 Central Chile
6	BHA	eP	17	36	09			Kariba
		iS			34			
6	BHA	iP	17	58	45			"
		iS		59	10			
	BUL	iP_1			12			
		iS_1			52			
6	BHA	iP^1		59	41			"
		iS	18	00	07			
6	BHA	iP	18	16	54			"
		iS		17	19			
6	BUL	iS_n	18	17	52			
		iS^n		18	07			
6	BHA	iP^1	19	15	51			"
		iS		16	18			
6	BHA	eP	20	49	57			"
		iS		50	24			
7	CLK	iP_n	23	59	58	950		B.P.I. h=23.57.5
		iS^n	00	01	28			
		iS^n		02	12			
	BHA	eP^1		00	23	1150		Central Africa.
	BUL	Traces			39			
7	BHA	iP	00	17	28			Kariba
		iS			55			
7	BHA	eP	03	34	26			"
		iS			51			
7	BHA	iP	04	04	48			"
		iS		05	13			
	BUL	eS_1			58			
7	BHA	iP^1	07	44	10			"
		iS			37			
7	BHA	iP	08	27	10			"
		iS			36			
7	BHA	iP	08	40	57			"
		iS		41	23			
7	BUL	ePP	13	35	01	128	C	USCGS 13.14.24 23.6S,179.9E
	BHA	iPP			16	134	C	h=550Km Mag5.7 FIJI I's.

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
7	BHA	iP	17	01	09			Kariba
		iS			34			
7	BHA	e	17	10	34			
7	BHA	eP	19	23	18			"
		iS			45			
7	BHA	eP	20	32	14			"
		iS			40			
7	BHA	iP	20	56	21			"
		iS		57	48			
7	CLK		21	48	07			
7	BHA	iP	21	57	57			"
		iS		58	22			
7	BHA	iP	22	53	25			"
		iS			51			
8	BHA	ePKP	00	36	36	144		USCGS 00.17.01 15.1S, 173.2W h±33Km Mag6 Samoa Is. region
8	BHA	i	02	05	40			Kariba
		i		06	06			
8	BUL	eP	03	03	18	80	C	USCGS 02.51.06 28.6N, 95.1E h±24Km.Mag5.4 Assam India.
8	BHA	eP	09	35	54			Kariba
		iS		36	21			
8	BUL	eP	13	17	44	26	C	USCGS 13.12.15 45.5S, 35.3E h±33Km
	BHA	iP		18	33	32		Prince Edward Is. region
8	BUL	iS_1	15	11	30			
8	BHA	iP^1	15	25	15			Kariba
		iS			42			
8	BUL	iS_1	15	26	27			"
8	BHA	$_tP^1$	15	32	26			"
		iS			53			
8	BUL	iS_1		33	38			"
8	BHA	iP^1	18	52	05			"
		iS			31			
8	BHA	iP	18	58	50			"
		iS		59	17			
	BUL	eP_1			16			
8	BUL	iS_1	19	00	05			
8	BHA	eP^1	21	11	14			"
		iS			41			
8	BHA	iP	21	16	41			"
		iS		17	08			
8	BHA	iP	21	17	47			"
		iS		18	14			
8	BUL	eP_1	21	44	04		C	
		iS_1			49			
8	BHA	eP^1	22	12	58			"
		iS		13	25			
8	BUL	iP_1	22	18	17			"
		iS_1		19	01			
9	CLK	Traces	22	20	01			"
9	BHA	Traces	01	00	30			
9	BHA	eP	01	18	05			"
		iS			37			
9	BHA	eP	02	41	52			"
		eS		42	19			
9	BHA	iP	03	03	52			"
		iS		04	19			
9	BUL	Traces	03	05	00			"
9	BHA	iP	03	52	57			"
		iS		53	24			
	BUL	iP_1		53	13			"
		iP^1_n			22			"
		iS			50			
		iS^n_1		54	05			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
	CLK	iP_n	03	53	50			
		iS_n		54	59			
		iS_1		55	39			
9	BUL	Traces	07	20	28			
9	BHA	iP	09	51	15			Kariba
		iS			42			
9	BHA	iP	10	34	13			"
		iS			40			
9	BHA	iP	11	54	01			
		iS			28			
9	BHA	iP	13	07	06			"
		iS			33			
)		[illegible]	13		5			
9	BUL	Traces	13	09	35			
9	BHA	eP	13	21	10			"
		iS			35			
9	BUL	e	15	08	38			
9	BHA	iP	15	23	17			"
		iS			47			
	BUL	e	15	23	44			
		iS_1		24	28			
9	BUL	e	16	33	05			
9	BHA	iS	17	39	58			"
	CLK	iP	17	57	21			Probably Tanganyika
		iS		58	16			
9	BHA	iP_n	17	57	50			
		iS_n		58	42			
		iS_i		59	17			
9	BUL	iS_n	18	00	19			Kariba

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
		iS_1		00	47			
9	BUL	iS_a	0	00	50			Kariba
		iS_1		01	14			
9	BHA	iP	19	28	04			"
		iS			29			
9	BHA	iP	20	58	16			"
		iS			11			
9	CLK	Traces	21	00	52			
9	BHA	iP	21	04	00			"
		iS			26			
10	BUL	Traces	04	23	04			
10	BHA	iP	08	58	51			"
		iS		59	16			
10								
10	BUL	Traces	09	00	00			
10	CLK	Traces	09	01	00			
10	BHA	eP	16	27	36			"
		iS		28	01			
10	BHA	eP	16	52	41			"
		iS		53	08			
10	BHA	iP	19	50	07			"
		iS			33			"
	BUL	eP_1	19	50	08			"
		iS_n			33			
		iS_1		51	09			
	CLK	e	19	51	05			"
		i		52	15			
10	BHA	iP	19	56	57			"
		iS		57	24			
	BUL	iS_1	19	58	08			"
10	CLK	e	21	51	57			Probably Tanganyika
		i		52	45			
		i		53	07			
		i		54	17			"
	BHA	i	21	52	16			"
		i		53	15			
		i			52			
11	BHA	eP	00	50	09			Kariba
		eS			37			
11	BHA	eP	01	02	18			
		eS			45			
11	BHA	iS	01	05	33			"
11	BHA	iP	01	30	14			"
		iS			42			
11	BHA	iP	01	34	32			"
		iS		35	02			
	BUL	e			36			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
11	BHA	iP	03	12	44			Kariba
		iS		13	11			
11	BHA	iP	05	58	45			"
		iS		59	13			
11	BHA	iP	08	51	57			"
		iS		52	24			
	BUL	Traces	08	53	00			
11	CLK	e	10	18	01		C	
11	BHA	iP	10	18	37			"
		iS		19	04			
	BUL	Traces	10	18	00			
11	BHA	iP	15	24	42			"
		iS		25	07			
11	BHA	iP	18	05	10			"
		iS			37			
	BUL	Traces	18	05	35			
11	BHA	eP	19	16	00			"
		iS			26			
11	BHA	eP	20	18	21			"
		iS			46			
11	BHA	eP	22	27	52			"
		iS			19			
12	BHA	eP	02	18	05			"
		eS			31			
12	BHA	eP	02	42	00			"
		eS			26			
12	BHA	iP	03	29	35			"
		iS		30	30			
	BUL	iS_1	03	30	43			
12	BHA	iP	03	49	30			"
		iS			57			
12	BUL	e	03	50	20			
		i			41			
12	BUL	i	05	07	26			
12	BHA	iP	07	35	52			"
		iS		36	17			
12	BUL	iS_1	07	37	05			
12	BHA	iP	11	45	47			
		iS		47	21			
12	BUL	iPKP	11	45	56	126	R	USCGS 11.26.57 44.8N 149.0E
12	BUL	iPKP	11	59	29	127		h=40Km Kienib I's
12	BUL	iP	15	06	40			Mag 6 3/4 11.41.47 48.3N
		iS			41			149.2E h± 40Km
								Kienib I's Mag4.5
								10 Km from Stn.
12	BHA	iP	15	13	09			Kariba
		iS			36			
12	BUL	iS_1	15	14	17			"
12	BHA	eP	15	50	47			"
		iS		51	14			
12	BHA	iP	16	22	53			"
		iS		23	21			
12	BHA	iP	18	25	06			
		iS			33			
12	BHA	eP	21	03	38			"
		iS		04	04			
12	BHA	i	21	42	17			
		e						
13	BHA	iP	00	27	19			"
13	BUL	iS_1	00	28	31			
13	BHA	eP	01	20	59			"

October, 1963. Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
		iS		21	23			
13	BUL	Traces	01	22	11			
13	BUL	Traces	01	42	25		C	
13	BUL	Traces	01	53	54			
13	BHA	eP	02	22	15			Kariba
		iS			42			
13	BUL	eP	04	15	16			
		iS		16	18			
13	CLK	ePKP	05	36	47	119	C	USCGS 05.17.57 44.8N
	BHA	ePKP	05	36	53	124		149.5E h=60Km Kurile I's Mag.8.
13	BHA	eP	08	29	23			Kariba
		iS			50			
13	BHA	eP	10	13	05			"
		iS			37			
13	BUL	Traces	10	14	18			
13	BUL	Traces	13	01	28			
13	BUL	e	13	17	22			
		i			35			
13	BHA	eP	16	02	35			"
		iS		03	01			
13	BHA	iPKP	16	18	47	125	C	USCGS 15.59.52 45.6N
	BUL	iPKP			54	128	C	150.5E h=33Km Kurole I's Mag 6.1
13	BHA	iP	17	21	20			Kariba
		iS			45			
	BUL	eP			46			
		iS_n		22	27			
13	BHA	eP_1	17	33	17			
		iS			43			
13	BHA	iP	17	38	57			"
		iS		39	24			
13	BUL	Traces	17	39	42			
13	BHA	iP	18	12	50			"
		iS		13	15			
13	BHA	iP	18	24	49			"
		iS		25	16			
13	BUL	Traces	18	25	44			
13	BHA	eP	19	55	56			"
		iS		56	21			
13	BHA	eP	20	22	55			"
		iS		23	21			
13	CLK	ePKP	22	13	48	120		
	BHA	iPKP			56	125		USCGS 21.55.00 44.7N 152.1E h=50Km Mag 5.5 Kurile I's
13	BHA	eP	22	42	20			Kariba
		iS			46			
13	BUL	e	22	54	38			
13	BHA	eP	23	20	13			"
		iS			39			
14	CLK	iP	02	12	43	70	R	USCGS 02.01.24 25.2N
	BHA	iP		13	09	76	C	95.3E h=33Km E.India
	BUL	iP			24	78	C	Mag.5.3
14	BHA	iP	03	05	21			Kariba
		iS			46			
14	BHA	iP	06	35	57			
		iS		36	22			
	BUL	iS_1	06	36	05			
14	BUL	i	06	45	45		C	
14	BHA	iP	10	57	33			Kariba
		iS		58	00			
14	BHA	iP	10	59	56			"
		iS	11	00	21			
	BUL	e	11	00	23			
		i		01	09			
14	BUL	e	13	40	44			
14	CLK	e	21	23	28			
15	CLK	Traces	01	26	01			

October, 1962.

Date	Station	Phase	h.	m.	s.	Arc Dist	C/R	Remarks
15	BHA	iP	09	20	08			Kariba
		iS			35			
	BUL	eP	09	20	23			
		iP_n			33			
		iS_1		21	15			
	CLK	eP_1	09	20	57			
		iS_n		22	15			
		iS_1		22	55			
15	BHA	iP_1	09	24	15			"
	BUL	iP_1			37			
	CLK	iP_1	09	25	12			
		iS_n		26	22			
15	BHA	iP_n		33	48			"
		iS		34	15			
	BUL	iP_1			13			
		iS_1			53			
15	BHA	iP_1	10	53	35			"
		iS		54	02			
15	BHA	iP	14	11	57			"
		iS		12	24			
15	BUL	eP_1	14	28	54			"
		iS_1		29	08			
15	BHA	eP_1	14	40	59			"
		iS		41	26			
15	BHA	eP	19	51	56			"
		eS		52	20			
15	BHA	eP	21	08	57			"
		iS		09	22			
15	BHA	iP	21	58	46	100	R	USCGS 21.44.58 3.0S 129.9E h±27Km Coram Mag52
15	BHA	eP	22	54	29			Kariba
		eS			56			
15	BHA	eP	23	15	55			"
		eS		16	22			
15	BHA	iP	23	27	36			"
		iS		28	01			
	BUL	eP_1	23	28	06			
		iS_1			43			
15	BHA	iP	23	34	09			
		iS			34			
15	BHA	Traces	23	36	00			
16	BHA	eP	00	24	23			"
		iS			50			
16	BHA	eP	00	51	18			"
		iS			44			
16	BHA	eP	01	25	35			"
		iS		26	02			
16	CLK	iP	02	29	58			±140Km from station
		iS		30	12			
16	BHA	eP	03	17	55			Kariba
		iS		18	20			
16	BHA	i	15	34	58			Probably Central Africa
		i			53			
		i		35	26			
16	CLK	e	15	40	40		R	
	CLK	e			31	64		USCGS 15.43.00 38.6N
16	BHA	i		53	55	68		73.4E h±45Km Tadzhik S.S.R.
	BUL	i		54	22	72	C	Mag 5.9
16	BHA	iP	16	50	14			Kariba
		iS			40			
16	BHA	eP	17	08	40			"
		iS		09	07			
16	BHA	iP	17	16	40			"
		iS		17	05			
16	BUL	iS_1	17	17	52			
16	BHA	iP_1	17	23	23			"

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
		iS			40			
	BUL	eP_1			53			
		iS_1			37			
16	CLK	e	17	25	01			
16	CLK	eP	18	25	09			
16	CLK	eP	19	11	12	48		USCGS 19.02.25 28.8N 58.0E S Iran ht32 Mag45
16	BHA	iP	19	47	06			Kariba
		iS			32			
16	BHA	eP	23	54	05			"
		iS			30			
17	BHA	eP	01	01	08			"
		eS			34			
17	BHA	eP	02	10	24			"
		iS			48			
17	BUL	eP	09	49	12			"
		iS			51			
17	BHA	iP	10	50	15			"
		iS			41			
17	BUL	iS_1	10	51	26			
17	BHA	iP	10	51	53			"
		iS		52	19			
17	BHA	eP	14	35	18			"
		iS			43			
17	BHA	iP	17	17	32			±10Km From Station
		iS			33			
17	BHA	iP	17	58	31			Kariba
		iS		59	00			
	BUL	eP_1		58	58			
17	BUL	iS_i		59	40			
17	BHA	eP	18	04	34			"
		iS		05	00			
17	CLK	e	20	18	30			Probably central Africa
		e		19	47			
		i		20	26			
17	BHA	eP	22	18	41			Kariba
		iS		19	08			
17	BHA	ePKP	23	43	26	123		USCGS 23.24.34 44.6N 149.0E h±45 Kurile I's Mag 5.4
18	BHA	iP	00	44	15			Kariba

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
		iS			41			
18	BHA	iP	01	04	29			Kariba
		iS			55			
18	BUL	iS_1	.01	05	36			
18	BHA	eP	02	01	46			
		iS		02	14			
18	BHA	eP	02	51	21			"
		iS			47			
18	CLK	e	03	11	09		R	
18	CLK	e	03	14	48			
18	BHA	eP	04	26	06			"
		iS			33			
18	BHA	iP	06	43	12			"
		iS			40			
18	BHA	iP	07	55	37			"
		iS		56	04			
	BUL	eP	07	55	56			
		iS		56	48			
18	CLK	Traces	07	57	50			
18	BHA	eP	08	26	04			"
		iS			32			
18	BUL	eP_1	08	58	31			"
		iS_1			17			
18	CLK	Traces	09	00	00			
18	BHA	iP_1	09	58	07			"
		iS_1			36			
18	BHA	iP	10	46	42			"
		iS		47	08			
18	BHA	iP	11	45	42			"
		iS		46	08			
	BUL	eP_1	11	46	09			
		iS_1			52			
18	BHA	iP	12	55	36			"
		iS		56	00			
	CLK	e			25			
18	CLK	iP	15	44	29			Seismic Probably
		iS			57			Local
18	BUL	iS_1	15	46	42			Kariba
18	BHA	iP	19	41	29			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
		iS			54			
18	BUL	iS_1	19	42	31			
18	BHA	e	21	48	31			
18	BHA	i	22	17	32			
19	CLK	Traces	00	23	43		R	
19	BHA	eP	00	55	22			Kariba
		iS			49			
19	BHA	eP	01	24	10			"
		eS			36			
19	CLK	ePP	02	38	53	120		USCGS 02.18.38 46.8N 153.7E h±45Km Kurile I's Mag 5.2
19	BHA	iP	04	22	07			Kariba
		iS		23	05			
19	BUL	iP_1	04	23	03			Probably Kariba
		iS_1			48			
	CLK	e	04	24	44			
19	BHA	iP	10	15	09			Kariba
		iS			35			
19	BHA	iP	10	44	58			"
		iS		45	24			
	BUL	eP_1		45	24			
		iS_1		46	11			
19	BUL	i_1	15	21	38			
19	BUL	iP	15	38	44			10Km from station
		iS			45			
19	BHA	iP	19	16	45			Kariba
		S		17	09			
19	BHA	eP	19	20	04			
		iS			31			"
20	BHA	iP	00	35	57	90	C	USCGS 00.22.53 37.7S 73.2W h±35 Km Nr Coast of Chile Mag.5.0
20	CLK	iPKP	01	12	03	119		USCGS 00.53.07.2 44.7N
	BHA	iPKP			07	125		150.7E Kurile I's
		i		14	02			h±25 KM Mag6¾
	BUL	ePKP		12	20	126	C	
		i			44			
20	BHA	iP	01	57	44			Kariba
		iS		58	11			
	BUL	e			32			
		i			51			
20	BHA	eP	02	38	42			"
		iS		39	09			
20	BHA	i	03	44	54			
20	BHA	ePKP	09	29	37	124		USCGS 09.10.43 44.4N 150.0E h±40Km Kurile I's Mag5.5
20	BUL	e	11	07	29			
	BHA	e			34			
	CLK	ePKP			07	119	R	USCGS 11.52.20 44.7N
	BUL	ePKP			21	126	R	150.2E h±45Km Kurile I's Mag 5.1
20	BHA	ePKP	12	11	09	124		
20	BHA	i	13	08	13		C	
	CLK	e			51		R	
	BUL	i			52		C	
20	BHA	eP	14	08	16			Kariba
		iS			43			
20	BHA	iS	14	09	18			"
	BUL	eP			28			
		iS_1		10	26			
20	BHA	iP_1	14	13	15			"
		iS			46			
20	BUL	iS_1	14	14	26			
20	BHA	iP_1	14	29	21			± 120Km
		iS			35			
20	BHA	eP	14	33	43			Kariba
		iS		34	07			
20	BHA	eP	15	20	21			"

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Δ c Dist	C/R	Remarks
		iS			45			
20	BHA	iP	15	26	56			Kariba
		iS		27	15			
	BUL	iP_1			18			
		iS_1		28	02			
20	BHA	eP_1	15	56	32			"
		eS			57			
20	BHA	eP	15	40	46			"
		iS			12			
20	BHA	eP	16	43	10			"
		iS			37			
20	BUL	Traces	18	00	22		C	
20	CLK	ePP	18	19	11	118	R	USCGS 17.53.58.7 44.2N 149.6E h=45 Km Kurile I's Mag 5.0
21	BHA	iP	00	11	56			Kariba
		iS		12	22			
	BUL	iP_1		12	21			
		iS_1		13	05			
	CLK	Traces		13	00			
21	BHA	eP	01	42	29			"
		iS			56			
21	BHA	eP	03	36	27			"
		iS			54			
21	BHA	iP	05	41	20			"
		iS			47			
	BHA	eP	06	24	51			"
		iS		25	16			
21	BHA	eP	08	47	17			"
		iS			46			
21	CLK	Traces	09	11	05			
21	CLK	e	11	20	13		C	
21	BHA	eP	12	55	02			"
		iS			29			
21	BUL	Traces	16	27	31			
21	BHA	eP	18	02	58			"
		eS		03	25			
21	BHA	eP	20	13	32			"
		iS		14	01			
21	BHA	eP	20	25	55			"
		iS		26	21			
21	BHA	eP	20	28	42			"
		iS		29	09			
21	BUL	e	23	01	19			
21	BHA	iP	23	08	59			"
		iS		09	28			
21	BUL	iS_1	23	10	09			
22	BHA	e	00	21	11			
		i			51			
		i		22	09			
22	BHA	ePKP	03	36	08	124	R	USCGS 03.17.15 45.0N Mag5.2 150.0E h=45Km Kurile I's
22	BHA	iP	03	39	23			Kariba
		iS			49			
	BUL	iP_1			51			
		iS_1		40	39			
22	BHA	e	06	33	14			"
		e			39			
22	CLK	Traces	08	10	06		R	
22	BUL	Traces	08	44	21			
22	CLK	Traces	09	04	03			"
22	BHA	eP	13	27	24			"
		iS			50			
22	BHA	eP	13	29	46			"
		iS		30	12			
22	BUL	eP	13	43	45			W.W.R. Tremor
		iS_n		44	52			
		iS_1		45	22			
	BHA	e			01			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
22	BHA	e	13	53	03			Kariba
		e			30			
22	BHA	e	14	19	04			"
		e			30			
22	BHA	ePKP	15	54	30	132		USCGS 15.35.26 11.6S 166.3E h±80Km Santa Cruz I's Mag4.5
22	BHA	iP	21	28	58			Kariba
		iS		29	25			
22	BUL	iS_1	21	30	07			"
22	BHA	eP	22	47	28			"
		iS			53			
22	BHA	e	22	55	40			"
		e		56	05			
22	BHA	eP	23	21	25			"
		eS			51			
22	BHA	eP	23	28	12			"
		iS			36			
22	BUL	Traces	23	29	23			
23	BHA	iP	00	18	34			"
		iS		19	D2			
	BUL	iS_1			42			
23	BHA	iP	00	51	11			"
		iS			39			
23	BHA	eP	02	02	36			"
		iS		03	11			
23	BHA	iP	03	52	38			"
		iS		53	07			
23	BHA	iP	03	53	40			"
		iS		54	07			
23	BUL	Traces	04	32	42			
23	BHA	iP	04	36	50	83	R	USCGS 04.24.06 31.4S 68.7W h±110Km San Juan. Prov. Arg. Mag4.7.
		[illegible]	07	[illegible]	[illegible]			
23	BHA	iP	07	53	37			Kariba
		iS		54	06			
	BUL	eP_n		53	53			
		[illegible]	[illegible]					
		iP_1		54	03			
		iS			27			
		iS_1^n			47			

October, 1963.

Date	Station	Phase	h: G:	M:	s: T:	Arc Dist.	C/R	Remarks.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			KARIBA
	CLK	[illegible]		[illegible]				
	CLK	eP_n		54	35			
		iS_n		55	45			
		iS_n		56	25			
23	BHA	eP_1	09	17	49			Kariba
		eS		18	16			
23	CLK	eP_n	10	02	02			
		iS_n		03	18			
		iS_1			59			
23	BHA	e	10	03	06			
		i		05	09			
23	BHA	eP	10	10	20		"	
		iS			47			
	BUL	i		13	36			
		i			38			
23	BHA	eP	10	32	11		"	
		iS			38			
23	BHA	iP	11	16	06			
		iS			33			
23	BHA	iP	12	53	25		"	
		iS			42			
	BUL	eP_1			53			
		iS_1		54	40			
23	BUL	e	13	11	34			
23	BHA	eP	14	33	55		"	
		iS		34	21			
23	BHA	e	15	52	06		"	
		i			32			
23	BHA	iP		09	32		"	
		iS		10	02			
23	BHA	eP	18	57	50		"	
		iS		58	16			
23	BHA	iP		33	55			
		iS		34	23			
23	BHA	eP	19	48	51		"	
		iS		49	18			
23	BHA	iP	20	34	46		"	
		iS		35	13			
	BUL	eP_1			21			
		iS_1			38			
23	BHA	iP	22	42	34		"	
		iS		43	01			
24	BUL	eP_1	01	27	06		"	
		iS_1			49			
	BHA	eP			10			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Rrmarks.
2	Bha							
		iS			38			
24	CLK	Traces	01	28	46			
24	BHA	iP	01	56	07			Kariba
		iS			34			
	BUL	iS_n		56	31			
		iS_l			37			
24	BHA	eP	05	56	38			"
		iS			05			
24	CLK	eP	07	37	16	67	C	USCGS 07.26.23 4.9S
	BHA	eP			53	74	R	102.9E h±50 Km
	Bha							Off S.coastof Somalia
24	BHA	iP	09	02	02			Kariba
		iS			27			
24	BHA	iP	09	52	03			"
		iS			33			
	BUL	eP_n		52	21			
		iP_n			26			
		iS_l		53	13			
	CLK	Traces			58			
24	BUL	eP_n	13	22	51			
		iS_l			43			
24	BHA	iP	13	23	31			"
		iS		24	00			
	CLK	iS_n			36			
24	BHA	eP	13	27	03			"
		iS			30			
24	BHA	eP	13	42	25			"
		iS			53			
24	BHA	iP	14	59	13			
		iS			45			
24	BUL	iS_l	15	00	31			
24	CLK	iS_l	15	01	55			
24	BHA	eP	16	38	45			
		iS		39	13			
24	BHA	eP	16	55	09			"
		iS			35			
24	BHA	iP	17	47	38			"
		iS		48	08			
	BUL	iP_i			05			
		iS_l			47			
	CLK	Traces		49	00			
24	BHA	e	21	35	03			
24	BHA	e eP	21	44	44			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
		iS		45	11			
	BUL	eP_1			12			
		iS_1			55			
24	BHA	eP	23	57	04			
		iS			27			
25	CLK	Traces	00	29	33			
	BHA	Traces		30	00			
25	CLK	Traces	11	01	03.			
25	BHA	e	15	57	26			
25	BHA	eP	18	23	51			
		iS		24	16			
26	BHA	eP	00	28	59		R	
		iS		29	25			
26	BHA	eP	04	05	20			
		iS			37			
26	BHA	Traces	07	50	22			
26	BHA	Traces	08	05	13			
26	BHA	eP	23	58	54			
		iS		59	21			
27	BUL	iP_n	00	16	43			
		iP_1			53			
		iS_n		17	24			
		iS_1			38			
27	BHA	iP	00	17	24			
		iS		18	27			
	CLK	i			42			
27	BHA	eP	01	25	15			
		iS			46			
27	BHA	eP	01	29	21			
		iS			44			
27	BHA	eP	06	59	22			
		iS			44			
27	BHA	eP	12	41	05			Kariba
		iS			31			
27	BUL	Traces	12	42	05			
27	BHA	e	13	36	46		R	
27	BUL	Traces	15	33	59			
27	BHA	eP	20	15	48			"
		iS		16	10			
27	BHA	iP	22	14	23			"
		iS			50			
27	BUL	Traces	22	15	30			
28	BHA	iP	01	41	58			Kariba Area
		iS		42	38			
	BUL	eP		42	00			
		iS			07			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
	CLK	eP_n			57			
		iP_1		44	16			
		iS_1			58			
28	CLK	i	01	44	12			
		i			59			
28	BUL	Traces	01	53	00			
28	BHA	eP	05	19	00			
		iS		19	28			
	BUL	iS_1		20	08			
28	BUL	iP_1	07	21	54			
		iS_1		22	35			
28	BHA	eP	09	14	08			
		iS			37			
28	BUL	Traces	09	15	13			
28	BUL	iS_1	09	58	50			
28	BHA	iPKP	12	22	21	129	C	USCGS 12.03.19 52.8N 159.8E h±33Km Mag5.5¼ Kamchatka
28	BUL	i	14	22	29			
28	BHA	iP	17	36	55			Kariba
		i			[illegible]			
		iS			23			
28	BUL	iS_1	17	38	10			
28	BHA	eP	18	06	23			"
		iS			53			
	BUL	Traces		07	00			
28	BUL	i	19	27	49			
28	BHA	iP	19	45	42			"
		iS		46	10			
29	BHA	iP	00	52	46			"
		iS		53	11			
29	BHA	iP	10	57	32			"
		iS		58	03			
	BUL	iS_1			44			
29	BHA	eP	11	33	31			"
		iS			59			
29	BHA	eP	13	52	51			"
		iS		53	20			
29	BUL	iP	16	01	56	87	R	USCGS 15.49.10 24.8S, 68.6W Mag5.0 h±67 Km N.Chile
	BHA	eP		02	10	88	C	
29	GLK	Traces	17	49	12			
29	BHA	Traces	19	43	08			
29	BHA	Traces	20	16	45			
29	BHA	e	22	36	26			
	BUL	e			51			
30	BHA	iP	04	44	23			Kariba
		iS			51			

October, 1963.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks
	BUL	iS_1		45	35			
30	CLK	Traces	04	46	34			
30	BHA	eP	08	39	06			Kariba
		iS			37			
30	BHA	e	14	19	48			
30	BHA	iP	14	24	16			"
		iS			45			
	BUL	iS_1		25	24			
30	BUL	iP	14	46	20			10Km from station
		iS			22			
30	BHA	e	15	45	27			
30	BHA	eP	18	30	37			Probably central Africa
		i			38			
	CLK	eP		31	12			
		i		33	18			
		i		34	40			
	BUL	iP		31	50			
		i		34	44			
		i		36	21			
30	BHA	eP	22	28	16			
		iS			45			
	BUL	iS_1		29	26			
30	BHA	eP	23	32	09			Kariba
		iS			38			
	BUL	Traces		33	00			
31	BHA	iP	00	36	56			"
		iS		37	25			
31	BHA	ePKP	03	36	55	139	C	USCGS 03.17.42 21.8S 175.0W h±33Km Mag 6¼ Tonga I's
31	BUL	e	10	17	32			
31	BUL	Traces	16	06	39			
31	BHA	iP	20	11	25			Kariba
		iS			54			
	BUL	eP			54			
		iS		12	38			"
31	BUL	iP_1	20	47	05			
		iS_1			47			
31	BHA	iP	22	37	20			"
		iS			48			
	BUL	Traces		38	30			
31	BHA	iP	22	46	22			"
		iS			50			
	BUL	iP_1			51			
		iS1		47	35			

H.O. Oliver.
Winifred Wagner.

Department of Federal Surveys,
Salisbury,
Southern Rhodesia.

SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
1	BUL	traces	22	38	14			
1	BUL	eP	22	46	50			
		iS		47	34			
1	BHA	eP	03	05	04			Kariba
		iS			37			
1	BUL	traces	06	09	35			
1	CLK	eP	07	09	33	34		USGGS H = 07.02.41 14.6N 53.6E, 33 Km. Gulf of Aden Mag 5.1
1	BHA	eP	16	13	08			Kariba
		iS			36			
1	BUL	iS_1	17	37	55			Kariba
1	BHA	eP	17	13	46			
		eS		14	14			
1	BHA	eP	18	03	26			Kariba
		iS			55			
	BUL	iP_1		03	51			
		iS_n		04	23			
		iS_1			35			
1	CLK	traces	18	05	00			
1	BHA	eP	18	33	38			Kariba
		eS		34	03			
1	BHA	eP	19	06	47			Kariba
		eS		07	11			
1	BUL	i	20	40	27			Kariba
1	BHA	e	20	22	00			
1	BHA	iP	20	47	31			Kariba
		iS			58			
	BUL	iS_1		48	41			
1	BHA	eP	20	56	04			Kariba
		iS			33			
1	BHA	e	21	18	42			
1	BHA	eP	22	50	09			
		eS			32			
1	BHA	eP	22	58	45			Kariba
		eS		59	14			
1	BHA	e	23	00	13		R	
1	BUL	iP	23	00	19			
1	BHA	iP	23	00	38			Kariba
		eS		01	05			
1	BUL	iP_1	23	01	04			
		iS_n			35			
		iS_1			49			
	CLK	e			18			
		iS_n		02	44			
		iS_1			58			
2	BHA	eP	00	18	44			
		iS		19	12			
2	BHA	eP	00	51	37			Kariba
		iS		52	00			
2	BHA	eP	01	04	33			Kariba
		eS			58			
2	BHA	eP	01	28	00			
		eS			26			
2	BHA	eP	01	59	13			Kariba
		iS			50			
2	BHA	iP	03	10	52			Kariba
		iS		11	21			
	BUL	traces			17			
2	BHA	iP	04	32	57			Kariba
		iS		33	25			
	BUL	iS_1		34	10			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks.
2	BHA	eP	06	45	58			Kariba
		iS		46	25			
	BUL	iP_1			26			
		iS_1		47	09			
2	BHA	iP	07	40	56			Kariba
		iS		41	22			
	BUL	iS_1		42	07			
2	CLK	e	07	46	55			Kariba
		i		48	05			
		i			42			
2	BHA	iP	09	41	32			Kariba
		iS		42	00			
2	BHA	eP	12	04	14			
		iS			41			
2	BHA	eP	12	14	24			
		iS			52			
2	BHA	eP	12	48	11			
		iS			39			
2	BUL	eP_n	16	07	04			
		iP_1			13			
		iS_n			43			
		iS_1			56			
2	BHA	eP	16	07	17			Kariba
		iS			44			
2	CLK	iS_n	16	08	55			
		iS_1		09	32			
2	BHA	iP		19	09			
		iS			37			
	CLK	iS_n	16	20	45			
		iS_1			33			
2	CLK	eP	17	15	20			
		iS		16	12			
2	BHA	eP		15	32			
2	BHA	eP	19	10	27			Kariba
		iS			54			
2	BHA	eP	20	41	20			Kariba
		iS			49			
2	BHA	eP	22	21	08			Kariba
		iS			34			
2	BHA	eP	23	15	50			Kariba
		iS		16	19			
	BUL	traces			04			
3	BHA	eP	01	03	54			Kariba
		iS		04	21			
	BUL	traces			20			
3	CLK	ePKP	03	28	44	111		USCGS H = 03
	BHA	iPP		29	06	104	C	10 12 3.5S 77.8W h ± 33 km Peru Ecuador border. Mag 6¾
3	CLK	e	03	51	42			
3	CLK	iP	03	53	49			
		iS			59			
3	BHA	e		55	41			Probably Central Africa
		i						
3	CLK	e	06	42	01			Probably Nyasa-land
		i			07			
3	BHA	traces	06	43	03			
3	BUL	iS_1	06	44	54			Kariba
3	BHA	eP	07	16	26			
		iS			51			
3	BHA	eP	18	31	53			
		iS			34			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc. Dist.	C/ R	Remarks.
3	BHA	eP	20	49	38			Kariba
		iS			05			
	BUL	traces			59			
3	BHA	eP	23	55	00			Kariba
		iS		56	05			
4	BHA	iP	00	52	25			Central Africa
		iS			51			
	BUL	traces			59			
4	CLK	i	01	30	15		C	
	BUL	i			38		R	
	BHA	e			43		R	
		i			48			
4	BHA	iP	05	52	55			
		iS		53	35			
	BUL	eP_n			12			
		iP_1			21			
		iS_1		54	02			
4	CLK	traces	05	54	03			
4	BHA	iP	07	50	38			Kariba
4	BUL	eP_n	07	53	56			
		iP_1		54	08			
4	CLK	eP	07	54	37			Kariba
		iS		55	52			
4	BHA	eP	08	07	38			Kariba
		iS		08	04			
4	BHA	eP	08	10	14			Kariba
		iS			38			
4	BHA	i	08	32	38			Central Africa
		i		34	52			
	CLK	iS_1	08	35	48			
4	BHA	iP	10	07	53			
		iS		08	20			
	BUL	eP_1			20			
		iS_1		09	04			
4	BUL	iS_1	10	22	53			
4	BUL	traces	12	59	14			
4	BHA	eP	13	56	36			Kariba
		iS		57	02			
4	BUL	traces	14	37	00			
4	BHA	eP	14	36	07			Kariba
		iS			33			
	CLK	e			59			
		i			14			
		i			59			
4	BUL	traces	14	51	59			
4	BHA	eP	14	55	44			Kariba
		iS		56	13			
4	BUL	traces	14	56	53			
4	BHA	iS	15	48	47			Kariba
5	BUL	traces	16	06	59			
5	BHA	iP	19	47	11			Kariba
		iS			38			
	BUL	traces			59			
5	BHA	traces	20	01	29			
5	BHA	eP	21	50	44			Kariba
		iS		51	10			
5	BHA	eP	22	56	02			Kariba
		iS			29			
	BUL	iS_1		57	13			
5	BUL	eP	23	20	23	54		USCGS H = 23 10 54. 55.5 S, 28.4 W h = 33 Km. Sandwich Is.region
6	BHA	traces	00	31	05			
6	CLK	iP	00	55	54			About 50 Km from station

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
		iS			59			
6	BHA	e	01	34	15			
6	CLK	iP	02	02	47			
		iS		03	07			
6	CLK	iP	02	05	02			Seismic local
		iS			23			
6	BUL	traces	02	31	59			USCGS H=02 13 16 2.6S, 138.4 E h=33 Km. Western New Guinea. Mag 5.7
6	BHA	iP	03	15	47			
		iS		16	15			
6	BHA	e	05	56	15		C	
6	BHA	iP	06	54	38			
		iS		55	05			
6	BHA	iP	07	17	14			Kariba
		iS			39			
6	BHA	eP	08	38	57			Kariba
		iS		39	25			
6	BHA	traces	09	20	30			
6	BHA	eP	09	34	36			
		eS		35	60			
6	BHA	eP	09	45	08			
		iS			12			
6	BHA	eP	10	03	33			
		iS			59			
6	BHA	iP	10	55	25			Kariba
		iS			54			
6	CLK	iS_1	10	58	05			Kariba
6	BHA	eP	12	02	38			
		iS		03	07			
6	CLK	iS_1	12	05	20			Kariba
6	BHA	iP	13	02	00			
		iS			26			
6	BHA	eP	16	44	24			Kariba
		iS			51			
6	CLK	eP	18	14	16			100 Km from station
		iS			26			
6	BHA	eP	18	43	36			
		eS		44	03			
6	BHA	traces	23	48	15			
7	BHA	iP	01	27	57			Kariba
		iS		28	24			
7	BHA	iP	01	29	00			Kariba
		iS			56			
7	BHA	eP	02	03	07			Kariba
		iS			32			
7	BHA	iP	02	06	51			Kariba
		iS		07	16			
7	BHA	traces	03	11	51			
7	BHA	iP	10	01	44			Kariba
		iS		02	11			
	BUL	eP	10	02	12			
		iP_n			43			
		iS_1			5 8			
	CLK	e	10	03	49			
		e		04	27			
7	BHA	iP	10	05	00			Kariba
		iS			32			
	BUL	eP_1			59			
		iS_1			45			
	CLK	traces	10	07	36			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks.
7	BHA	e	10	16	23			
7	CLK	traces	10	22	03			
7	BUL	e	10	26	50			
7	BHA	eP	10	55	52			
		iS		56	19			
7	BUL	e	12	17	34			
		e		18	45			
		i		19	13			
	BHA	traces	12	20	45			
7	BHA	eP	12	24	30			Kariba
		iS			58			
7	CLK	traces	13	21	01			
7	CLK	traces	13	47	24			
7	BUL	i	15	01	04			
7	BHA	iP	19	11	38			
		iS		12	04			
	BUL	iP_1			05			
		iS_1			50			
7	BHA	eP	23	38	06			Kariba
		iS			35			
8	BHA	eP	00	06	09			Kariba
		iS			34			
8	BHA	iP	00	29	41			Kariba
		iS		30	09			
	BUL	eP_1			08			
		iS			52			
8	BHA	iP	00	41	02			Kariba
		iS			30			
8	BUL	iP_n	00	42	22			
		iP_1			32			
		iS_1		43	16			
8	CLK	eP_1	00	43	03			Kariba
		iS_n		44	10			
		iS_1			47			
8	BHA	eP	01	31	21			Kariba
		iS			50			
8	BHA	iP	06	00	49			Kariba
	BUL	iP_n		01	07			
		iP_1			17			
		iS_1		02	00			
	CLK	eP_n			46			
		iS_n		03	00			
8	BHA	eP	07	11	31			Kariba
		iS			59			
8	BHA	iP	09	55	20			Kariba
		iS			49			
	CLK	eP_n	09	56	18			
		iS_n		57	29			
		iS_1		58	01			
8	BHA	eP	09	59	34			Kariba
		iS	10	00	00			
	CLK				55			
8	BHA	iP	10	49	26			Kariba
		iS			52			
8	BHA	iP	11	16	00			Kariba
		iS			28			
8	BHA	eP	11	41	50			Kariba
		iS		42	17			
8	BHA	eP	15	20	05			Kariba
		iS			31			
8	BHA	eP	17	07	08			Kariba
		iS			34			
8	BHA	eP	18	51	03			Kariba
		iS			30			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
8	BHA	eP	19	10	45			Kariba
		eS		46	11			
8	BHA	eP	20	42	15			Kariba
		iS			42			
8	BHA	eP	20	18	54			Kariba
		iS		19	22			
8	BHA	eP	22	00	35			Kariba
		iS		01	04			
9	BHA	eP	02	14	12			Kariba
		eS			37			
9	BHA	eP	03	42	36			Kariba
		iS		43	03			
9	BHA	iP	04	15	30			Kariba
		iS			57			
9	BHA	traces	09	55	02			
	BUL	iP_n	09	55	39			
		iS_n		56	23			
9	BHA	e	12	05	52			
9	BHA	eP	12	50	21			Kariba
		iS			43			
9	BHA	iP	15	25	34			Kariba
		iS		26	00			
9	BHA	eP	15	32	45			
		iS		33	19			
9	BHA	iP	15	32	53			
		iS		33	18			
9	BHA	eP	17	38	05			
		eS			31			
9	BHA	l	21	28	03		C	
9	BHA	iP	23	02	02			Kariba
		iS			31			
9	BUL	i	23	27	59			
9	BHA	eP	23	54	41			Kariba
		iS		55	07			
10	BHA	eP	00	07	09			
		iS			35			
10	BHA	ePcP	01	13	11	97	R	USCGS H = 01 00 38 9.2S 71.5W h = 600 km. Western Brazil. Mag. $6\frac{1}{2}$
10	BHA	iP	03	52	36			Kariba
		iS		53	03			
10	BHA	traces	04	40	00			
10	BHA	e	08	58	55			
10	BUL	traces	09	12	59			
10	BHA	eS_1	09	35	33			Kariba
10	BHA	eP	11	12	34			Kariba
		iS		13	01			
10	BHA	eP	11	20	52			Kariba
		eS		21	18			
10	BHA	iP	12	23	06			Kariba
		iS			34			
10	BHA	iP	12	54	50			Kariba
		iS		55	16			
10	BHA	iP	13	01	32			Kariba
		iS			59			
10	BHA	iP	17	25	48			Kariba
		iS		26	17			
10	BHA	e	23	18	03			
		i			38			

November, 1963, continued.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
11	BHA	eP	03	48	29			Kariba
		eS			56			
11	BHA	traces	03	31	48			
11	BUL	ePKP	11	48	07	136		USCGS H=11 29 06 16.9S 174.4W h = 185 km Tonga Islands Mag. = 5.2
	BHA	ePKP		48	08	138		
11	BHA	traces	12	32	14			
11	BUL	eP_1	21	39	02			
		iS_1			47			
12	BUL	traces	00	16	00			
12	BUL	traces	04	48	00			
12	BUL	traces	06	05	00			
12	CLK	eP	07	15	32 A	51	C	USCGS H=07 06 31 35.5 N 29.7 E h = 69 km S.W. Coast of Turkey Mag = 5.0
12	BHA	iP	10	04	09			Kariba
		iS			37			
12	BHA	eP	15	01	10			Kariba
		iS			43			
12	BHA	eP	23	22	31			Kariba
		iS		23	00			
13	BHA	eP_n	02	42	48			Probably Central Africa.
		iS_n		44	29			
		iS_1		45	27			
	CLK	iP	02	43	18			
		iS		45	14			
13	BHA	traces	06	51	16			
13	CLK	traces	06	54	00			
13	BHA	traces	12	25	10			
13	BHA	iP	17	48	14			Kariba
		iS			40			
14	BHA	eP	04	08	58			Kariba
		iS		09	25			
14	BHA	i	14	06	29		C	
14	BHA	eP	17	12	28			
		iS			49			
15	BHA	traces	06	42	39			
15	CLK	e	11	48	12		C	
15	BHA	iP	17	49	50			
		iS		50	11			
15	CLK	e	17	51	33			
		e			29			
15	BHA	eP	17	54	46			Probably Kariba
		iS		55	08			
15	CLK	i	18	00	33			
15	BHA	iS	18	01	03			Central Africa
15	CLK	traces	21	25	18	118		USCGS H=21 06 34 44.3 N 149.0 E h = 50 km Kurile Islands Mag. = 6.0
15	BHA	ePKP	21	25	24	123	C	
15	BHA	e	21	35	24		R	
16	BHA	iP	04	10	50			Kariba
		iS		11	16			
16	BHA	iP	06	11	00			Kariba
		iS			27			
	BUL	iP_1			27			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
16	CLK	traces	04	13	07			
16	BHA	e	11	18	52			
16	BHA	traces	11	51	29			
16	BHA	eP	15	36	46			Probably Kariba
		iS		37	14			
16	BHA	eP	17	07	33			Kariba
		iS			59			
16	BHA	traces	17	41	48			
16	BHA	eP	22	59	47			Probably Kariba
		eS	23	00	14			
17	BUL	i	00	59	17		C	
	BHA	i			37		R	
	CLK	e			48		R	
17	BHA	eP	02	05	22			Kariba
		iS			49			
17	BHA	traces	02	29	32			
17	BUL	traces	03	14	19			
	BHA	eP	03	14	25			Kariba
		iS			53			
17	BUL	traces	03	22	00			
	BHA	eP			17			Kariba
		iS			47			
17	BHA	eP	05	19	19			Kariba
		iS			46			
	BUL	iS_1			58			
17	BHA	eP	07	30	37			Kariba
		iS		31	02			
17	BHA	traces	10	22	37			
17	BHA	eP	11	36	11			Kariba
		iS			37			
17	BHA	traces	11	55	00			
17	BHA	eP	12	55	34			Kariba
		iS		56	03			
	BUL	iS_1			45			
17	BHA	e	17	56	08			
		i			55			
		i		57	18			
17	CLK	iS_n	19	58	51			Central Africa
17	BHA	eP^n	21	18	14			Kariba
		iS			41			
18	BHA	iP	01	10	26			
		iS			38			
18	CLK	iP_n	01	11	44			Central Africa
		iS_n		13	10			
		iS_1		14	05			
18	BUL	iP_n	01	12	37			Central Africa
		iS_n		14	49			
		iS_1		16	18			
18	BHA	iP	06	07	05			About 10 km from station
		iS			07			
18	BHA	eP	10	50	47			Kariba
		iS		51	15			
18	BHA	traces	11	26	00			
18	BHA	ePKP	14	57	58	141		USCGS H=14 38 28.9 29.9 N 11.36 W h ± 14 km. Gulf of Mexico. Mag=6½
	BUL	$ePKP_1$		58	03	145		
18	BHA	iP	16	09	07			Kariba
		iS			35			
	BUL	iS_1			17			
18	BHA	eP	18	04	23			Kariba
		iS			49			
	BUL	traces		05	01			
18	BHA	traces	18	31	00			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/ R	Remarks
19	BUL	i	08	20	24			Seismic local
19	BUL	traces	08	45	01			
19	BHA	e	15	57	17		C	
19	BHA	e	18	28	30			
19	BHA	iP	22	55	21			Kariba
		iS			30			
	BUL	iP_1			47			
		iS_1		56	30			
19	BHA	eP	23	12	12			Kariba
		eS			41			
19	BHA	eP	23	15	21			Kariba
		eS			49			
19	BHA	iP	23	29	45			Kariba
		iS		30	12			
	BUL	iP_1			09			
		iS_1			54			
	CLK	iS_1		32	23			
20	BHA	i	00	20	20			Central Africa
		i		21	44			
		i		22	18			
	CLK	iS		21	43			
20	BHA	traces	03	33	00			
20	BHA	traces	03	39	06			Kariba
20	BHA	iP	04	25	52			Kariba
		iS		26	21			
	BUL	iP_1			16			
		iS_1		27	01			
20	BHA	iP	08	05	31			
		iS		06	03			
20	BUL	iP_1	15	21	08	720		B.P.I.H. = 15.19. 36
		iS_n		22	18			
		iS_1			50			
	BHA	iP_n	15	22	25	1320		
20	BUL	iS_1	15	56	54			
20	BHA	eP	21	17	51			Kariba
		eS		18	20			
21	BUL	iP_1	11	54	56			
		iS_1		55	38			
21	CLK	traces	11	57	05			
21	BHA	eP	23	55	45			Kariba
		iS		56	12			
22	CLK	eP	00	29	29	73	R	USCHS H=00 18 35 5.9 S 107.9 E h = 393 km. Near North Coast of Java. Mag = 5.1
	BUL	iP	00	30	02	78	R	
22	BUL	iP_1	03	22	09			Kariba
		iS_1			56			
	CLK	traces	03	24	00			
22	BUL	iP_1	06	30	56			Kariba
		iS_1		31	43			
	CLK	traces	06	33	05			
22	BUL	eP_1	06	43	41			Kariba
		iS_1		44	28			
	CLK	traces	06	46	05			
22	CLK	traces	06	54	27			
22	BUL	iP_1	11	56	48			Kariba
		iS_1		57	28			
	CLK	eP_n			13			
		iS_n		58	28			
		iS_1		59	06			
22	BUL	e	16	52	52			
		i		53	40			
		iP_1	19	42	11			
22	BUL	iS_1			54			Kariba

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
	CLK	e	19	43	44			
		i		44	26			
23	CLK	iS_1	22	11	41			
23	CLK	$ePKP_1$	08	10	32	148		USCGS H= 07 50 46 30.1 N 114.0 W h = 14 km Gulf of California Mag. = 6
23	CLK	traces	19	25	04			
24	BHA	traces	21	28	33			Probably Kariba
24	BHA	traces	22	02	05			
24	BUL	iP	23	07	45	55	C	USCGS H=22 58 16
	BHA	eP		08	18	59	R	56.1 S 27.5 W
	CLK	iP	00	08	32	63	C	h=33 km. Sandwich Islands Mag. = 5.6
25	BUL	traces	00	47	00			
25	BHA	eP	05	20	48			Kariba
		iS		21	13			
25	BHA	eP	20	55	10			Kariba
		iS			35			
26	BHA	eP	02	25	08			Kariba
		iS			34			
26	BHA	eP	04	09	33			Kariba
		iS		10	00			
26	BHA	traces	05	39	16			
26	BUL	traces	10	31	00			
26	BUL	traces	10	52	39			
26	BUL	traces	11	18	00			
26	BHA	i	12	11	25			Probably Central Africa
		i		14	46			
		i		15	22			
26	BHA	iP	14	50	35			Kariba
		iS		51	02			
	BUL	iP_1			00			
		iS_1			46			
26	BUL	traces	15	31	28			
26	BHA	eP	16	38	17			Kariba
		eS			41			
26	BUL	traces	16	54	00			
26	BHA	eP	16	53	59			Kariba
		iS			26			
26	BHA	iP	18	58	02			Kariba
		iS			30			
26	BUL	traces	18	59	00			
27	CLK	i	12	11	46		R	
27	CLK		12	16	19			Central Africa
27	BHA	eP	12	44	49			Kariba
		iS		45	14			
27	BHA	e	14	23	45			Cantral Africa
		i		27	21			
27	CLK	e	14	27	48		R	
27	BUL	traces	14	30	00			
27	BHA	e	17	47	50		C	
27	BUL	iS_1	19	25	25			Kariba
27	BHA	eP	20	00	00			Kariba
		eS			25			
27	BUL	iP	21	21	53	65	R	USCGS H= 21 10 39.9 30.8 N 71.9 E h ± 33 km. Northern India Mag.=5.1
27	BHA	traces	22	49	54			Probably Kariba
28	BHA	eP	00	54	00			Kariba
		iS			27			

November, 1963. contd.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
28	BHA	eP	14	16	37			Kariba
		iS			57			
28	BHA	iP	15	24	45			Kariba
		iS		25	11			
	BUL	iP_1			11			
		iS_1			59			
28	BHA	iP^1	22	47	25			About 180 km from station
		iS			43			
29	BHA	iP	00	00	38			Kariba
		iS		01	02			
29	BHA	traces	00	56	00			Probably Kariba
29	BHA	eP	13	50	21			Kariba
		iS			49			
29	BHA	eP	19	10	57			Kariba
		eS		11	24			
29	BHA	eP	20	32	48			Kariba
		eS			15			
		i		08	09			
29	BHA	eP	22	23	21			Kariba
		eS			50			
30	BUL	e	00	19	59			
		i		21	50			
30	BHA	e	07	37	19			Probably Central Africa
		i			42			
30	CLK	iP_n	07	58	54			Probably Mocambique
		iS_n		59	55			about 700 km from
		iS_1	08	00	33			station
30	BUL	traces	08	04	00			
30	BHA	iP	21	51	22	69	R	USCGS H = 21.40.20 6.3 N 94.? E h $\pm$ 33 km. Nicobar Islands Mag. = 5.3

Winifred Wagner

H.O. Oliver.

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SEISMOLOGICAL BULLETIN.

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

Stat:	Chileka (CHL)	Bulawayo (BUL)	Broken Hill(BHA)
Lat:	15° 40.8' S	20° 08.6' S	14° 26.46' S
Long:	34° 58.6' E	28° 36.8' E	28° 28.08' E
Litho-logic Founda-tion:	Charnockitic granulites of the Basement Complex	Hornblend schists of of the Bulawayan System	Dolomite and shales of the middle Katanga system
Hgt:	781 metres	1341 metres	1206 metres
Inst:	Vertical and Horizontal Willmore S.P.		
Seismo. officer:	Sen. Met. Officer Chileka	Director, Federal Surveys	Director, Federal Surveys
Obser-ver:	Officer-in-charge Chileka	Officer-in-charge Goetz Observatory	Officer- in-charge Broken Hill Observatory
Inst:	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
Seismological Officer.

Address.

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

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
1	BHA	traces	10	34	00			
1	BHA	iP	13	06	17	245 cm		BPI H = 13 05 40
		iS			45			Kariba
	CLK	eP		07	11	680 cm		
		i_1^{pn}		08	15			
		iS_n			49			
1	BHA	eP	19	39	55			Kariba
		iS		40	22			
1	BHA	eP	19	57	47			Kariba
		iS		58	13			
2	BHA	eP	01	43	18			Kariba
		iS			42			
2	BHA	iP	06	47	05			
		iS			32			
2	BHA	i	09	25	53			Kariba
		i		26	18			
	CLK	traces		27	02			
2	BHA	i	10	03	08			Kariba
		i			35			
2	CLK	traces	12	41	24			
2	BHA	iP	13	46	02	48		44.4 S 15.6 W h± 33 km. Tristan da Cunha Region Mag. = 5.8
2	BHA	iP	15	03	47			Kariba
		iS		04	14			
2	BHA	iP	16	05	26			Kariba
		iS			54			
2	BHA	iP		08	55			Kariba
		iS		09	21			
2	BHA	iP	17	11	38	250 cm		BPI H = 17 11 01
		iS		12	06			Kariba
	CLK	eP			33	680 cm		
		iP_1^n		13	45			
		iS_1		14	16			
2	CLK	traces	19	27	00			
2	CLK	e	19	52	16			
2	BHA	iP	00	20	03			Kariba
		iS			30			
3	BHA	traces	12	02	01			
3	BHA	eP	13	11	44			Probably Kariba
		iS		12	11			
3	BHA	e	16	09	05		C	
3	BHA	ePKP	21	34	25	131	R	USCHS H=21 15 10 12.2 S 166.0 E Santa Cruz Islands h ± 40 km. Mag. = 4.8
3	BHA	ePKP	21	49	18	131	C	USCGS H=21 30 05 12.0 S 166.0 E h± 40 km. Santa Cruz. Mag.=4.5
3	BHA	traces	22	13	01			
3 4	BHA	ePcp	23	16	56	92	C	USCGS H = 23.03 41.6 22.4 S 69.3 W h± 18 km Northern Chile Mag 3¼
		i		17	05			
	CLK	ePcp			20	99		
4	BHA	i	00	07	51		R	
4	BHA	iP	00	28	07			Kariba
		iS			34			
	CLK	iS_1		30	12			
4	BHA	traces	00	57	01			
4	BHA	ePKP	01	43	39	126		USCGS H = 01 27 34.1 43.2 N 153.1 E h± 20 km Kurile Islands Mag 5.2

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/R	Remarks
4	BHA	eP	02	47	31			Kariba
		iS			59			
4	BHA	traces	02	55	01			
4	CLK	traces	04	04	32			
	BHA	traces		06	01			
4	BHA	iP	05	44	57			Kariba
		iS		45	23			
	CLK	eP_n		46	51			
		iS_n		47	57			
4	BHA	iP	07	36	17			Kariba
		iS			44			
4	BHA	iP	09	51	03			Kariba
		iS			32			
4	BHA	eP	11	25	32			Kariba
		iS		26	00			
4	BHA	eP	11	27	02			Kariba
		iS			30			
4	BHA	iP	11	55	16			Kariba
		iS			43			
4	CLK	traces	14	30	01			
4	BHA	traces	18	25	00			
4	CLK		22	13	18	640		BPI H = 22 11 50
				14	14			
	BHA	eP_n			14	1100		10.0 S 37.0 E
		iS_n		15	55			Tanganyika
		iS_1		16	43			
5	BHA	traces	00	51	17			
5	BHA	traces	21	30	00			
6	BHA	eS_n	20	22	13			
7	BHA	ePKP	04	25	58	134		USCGS H = 04 07
		i		26	13			52.8 22.1 S
	CLK	ePKP			01	131		179.4 W
								h + 546 km. Fiji
								Islands region
								Mag. = 5.5
7	CLK	e	12	24	57			
8	CLK	e	02	03	43			
8	CLK	e	21	00	05			
9	CLK	e	02	01	30			
		i		02	08			
9	CLK	traces	11	11	59			
9	CLK	e	20	44	00			
10	CLK	e	03	43	49			
10	CLK	i	06	41	04			
10	BUL	traces	11	25	59			
10	BUL	e	12	13	03			
		i			42			
10	BUL	iP_1	18	07	49			Kariba
		iS_1		08	34			
11	BUL	i	02	52	15			
11	CLK	traces	04	52	00			
11	BUL	traces	06	10	33			
11	BUL	eP	08	54	35			Probably Kariba
		iS		58	17			
11	BUL	traces	10	49	56			
11	BUL	e	13	05	21			
11	BUL	e	14	58	56		C	
11	BUL	traces	15	11	40			
12	CLK	traces	08	08	00			
12	BHA	traces	13	51	59			
12	BHA	e	15	14	54			
13	CLK	traces	01	50	00			
13	BHA	traces	06	50	52			

December, 1963. Contd.

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
13	BUL	e	09	06	43			
		i		07	24			
13	BHA	eS	18	46	08			Probably Kariba
13	CLK	i	20	22	46			
13	BHA	iP	20	57	45			Kariba
	BUL	iP_1		58	09			
		iS_1			50			
13	BHA	iP	21	07	51			Kariba
	BUL	iP_1	21	08	15			
		iS_n			46			
13	CLK	traces	21	09	57			
13	CLK	traces	21	14	32			
13	BUL	iP_1		15	28			
		iS_1		16	13			
13	BUL	traces	21	20	00			
14	BHA	eP cP	00	18	33	90	R	USCGS H = 00 05 39.8 2.3 S 61.2 W h ± 33 km. Northern Brazil. Mag. = 4.8
14	BHA	iP	01	31	55			Kariba
14	CLK	traces	01	34	05			
14	BHA	iP	02	05	47			Kariba
	BUL	iP_1		06	11			
		iS_1			55			
14	BUL	traces	04	05	30			
14	BHA	iP	07	33	25			Kariba
	BUL	eP_n			43			
		iP_1			51			
	CLK	eP_n	07	34	25			
		iS_n		35	31			
14	BHA	traces	09	16	00			
14	CLK	e	09	17	13			
14	CLK	i	09	58	15		C	
14	CLK	i	15	10	41			Seismic Local
15	CLK	i	19	45	10			
	BUL	i			43			
	BHA	i			45			
16	BHA	eP	00	42	36			Probably Kariba
		eS		43	02			
16	CLK	iP	02	02	35	68	R	USCGS H = 01 51 23.2 6.1 S 104.9 E h ± 33 km. West Coast of Sumatra Mag. = 6.1
	BUL	iP		03	08	73	R	
	BHA	iP			11	71	C	
16	BUL		02	18	21		C	
16	BUL		04	28	26		C	
16	BHA	i	04	32	46			Kariba
	BUL	eP_1		33	10			
		iS_1			55			
16	BHA	iP	05	48	26			Kariba
		iS			54			
	BUL	eP_1			49			
		iS_1		49	34			
16	CLK	iP	13	57	21	54	R	USCGS H = 13 47 56.4 37.1 N 20.9E h ± 15 km. Ionian Sea. Mag. = 5.6
	BUL	eP		58		58		
16	BUL	iP_1	16	11	10			Probably Kariba
		iS_1			45			
16	BUL	iP_1	21	44	39			Probably Kariba
		iS_1		45	22			
17	BUL	traces	15	53	01			
17		traces	16	10	38			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist	C/R	Remarks.
	BHA	eP	18	45	41			Kariba
		iS		46	08			
17	BUL	eP			10			
		iS			53			
17	BHA	eP	19	35	05			Kariba
		iS			32			
	BUL	eP_1			33			
		iS_1		36	18			
17	BUL	ePKP	23	41	48	146	C	USCGS H=23 22 11.2 52.9 N 165.4 W h± 33 km. Fox Islands Aleutian Islands Mag. = 4.9.
18	BHA	iP	00	25	50			Kariba
		iS		26	15			
18	BUL	e	00	48	52			
		i		49	09			
	CLK	e		48	56			
		i		49	09			
	BHA	i			02			
		i			16			
18	BHA	eP	06	51	47	74		USCGS H = 06 40 05.9 41.7 N 82.5 E h ± 33 km Sinkiang Prov. China. Mag. = 5.2
18	BUL	iP	15	16	06			10 km from station
		iS			07			
19	BUL	eP_n	00	57	23			West Rand Tremor
		iS_n		58	22			
		iS_1			46			
	BHA	eP_n			37			
19	CLK	traces	01	00	02			
	BHA	iS_n		00	30			
		iS_1		01	31			
19	BUL	traces	15	23	01			
19	BUL	iP	20	46	13	84	C	USCGS H = 20 33 50.1 35.2 S 68.0 W h ± 32 km. Mendoza Prov. Argentine Mag. = 5.3
	CLK	eP			56	92	C	
19	BUL	iPKP	22	54	34	144	C	USCGS H = 22 34 59.8 52.0 N 170.8 W h± 33 km. Fox Islands. Aleutian Islands. Mag. = 4.4
20	BU:	iPKP	00	42	43	123	C	USCGS H = 00 23 50.2 8.6 S 160.4 E Solomon Islands h ± 69 km. Mag.= 5.5
20	CLK	e	09	10	20		C	USCGS H = 08 57 17.8 7.0S 129.3 E h ± 103 km. Mag=5.5
20	CLK	e	15	32	33		R	
20	CLK	eP	15	55	58	31	R	USCGS H= 15 49 44.9
	BUL	iP		56	52	36	R	12.8 S 66.0 E h ± 33 km. Indian Ocean. Mag. = 5.6
	CLK	eP	16	30	19	31		USCGS H= 16 24 05.1
	BUL	eP		31	13	36	C	12.7 S 66.3 E h± 33 km. Indian Ocean. Mag.= 4.9
20	CLK	eP	16	52	27	31	C	USCGS H = 16 46 14.4
	BUL	eP		53	20	36		12.6 S 66.4 E h ± 33 km. Indian Ocean. Mag.= 4.9

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
21	BUL	iP_1	02	26	45			Kariba
		iS_1		27	29			
21	BUL	e	05	00	28			
21	BUL	eP_1	10	34	09			Kariba
		eS_1			50			
21	CLK	traces	10	35	59			
21	CLK	e	10	41	09			
21	CLK	e	10	46	40			
21	CLK	e	10	56	59			
21	BUL	iPcP	13	28	49	96	C	USCGS H=13 09 09.6. 16.1 N 119.7 E h± 49 km. Near West Coast of Luzon Manila Mag.5.6
21	CLK	eP	19	47	45			Probably Tanganyika
		iS		49	00			
22	BUL	traces	02	58	02			Probably Kariba
23	BHA	eP	19	34	21			Kariba
		iS			48			
23	BHA	eP	23	02	31			Kariba
		iS			58			
	BUL	e			57			
		i		03	28			
24	BUL	iP_1	08	09	07			Probably Kariba
		iS_n			36			
		iS_1			49			
24	BUL	iPKP	11	37	13	126	R	USCGS H=11 18 15.2 13.1 S 166.7 E h± 61 km. Santa Cruz region Mag.= 5.5
24	CLK	i	13	19	46			
26	CLK	i	20	26	37	150 cm		BPI H = 20 26 12 16.30 S 34.30 E Mozambique Nyasaland border
	BHA	eP_n	20	27	48	720 cm		
		iS_n		28	54			
		iS_1		29	40			
	BUL	eP_n		27	49	720 cm		
		iP_1		28	54			
		iS_1		29	30			
26	CLK	eP_n		57	32			
		iS_n			55			
26	BUL	e	21	00	24			
		i		01	14			
27	BHA	eP	02	56	40			Kariba
		eS		57	05			
27	BHA	traces	12	56	12			
28	BHA	iP	01	08	08			Kariba
		iS			37			
	CLK	iS_1		10	55			
28	BHA	ePKP	03	04	08	122	R	USCGS H=05 45 20.2 5.1 S 153.5 E h± 70km. New Ireland Region Mag.= 5.5
28	BHA	iP	06	42	35			Kariba
		iS		43	00			
	CLK	iS_1		45	12			
28	BUL	iPKP	09	22	42	121	R	USCGS H=0.9 03 52.9 32.7 S 178.9 W h ± 33 km Kermodec Islands Mag.= 5½
	CLK	ePKP			46	123		
	BHA	iPKP			53	126	R	
28	BUL	i	09	32	45			
28	BUL	traces	10	08	43			
28	BHA	e						
		i	16	29	37			Probably Kariba
				30	02			

Date	Station	Phase	h. G.	m. M.	s. T.	Arc Dist.	C/ R	Remarks
28	BUL	iP	18	09	25	69		USCGS H=17 58 33.1
	BHA	eP			56	72		60.4 S 51.8 W
								h± 49 km
								South Shetland Is.
								region. Mag.= 5.4
28	BHA	iP	23	52	08			Kariba
		iS			10			
	BUL	e			32			
		i		53	20			
29	BHA	e	00	06	59			Probably Central
								Africa
		i		08	16			
		i		09	00			
29	BUL	iPcP	17	28	32	92	C	USCGS H= 17 15 39.2
								18.5 S 69.7 W
								h± 113 km. Northern
								Chile. Mag.=69.1
29	BUL	e	23	08	39			
30	BUL	e	01	34	03			
30	BHA	traces	01	52	43			Kariba
30	BHA	traces	02	33	21			
30	BHA	eP	02	56	59			
		iS		57	24			
30	BUL	iP_1	07	23	24			Kariba
30	CLK	traces	07	25	01			
30	BHA	e	12	54	19			
30	CLK	iPKP	13	48	11	119	R	USCGS H=13 29 25.3
	BUL	iPKP			26	127	C	45.5 N 150.6 E
								h± 40. Kurile I's.
								Mag. = 5.7
30	CLK	traces	14	36	55			
30	CLK	e	15	17	7		R	
30	CLK	iP	22	16	29	64	R	
	BHA	iP		17	09	70	C	USCGS H=22 06 07.1
	BUL	iP			16	71	C	6.9 N 94.7 E
								h± 64 km. Nicobar
								Islands. Mag.=5.6
31	BUL	eP_n	10	42	48			Kariba
		iP_1			58			
31	BHA	iP	12	43	31			Kariba
		iS			58			
31	BUL	e	13	40	43			
31	BUL	traces	13	44	31			
31	BUL	eP	14	11	44			Kariba
		iS			55			
	CLK	iS_1		14	07			
31	BUL	i	15	28	15			
31	CLK	e	16	47	51			
31	BUL	iP_1	17	45	10			Kariba
		iS_1			51			
31	BUL	i	19	46	52			

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