



HARVARD UNIVERSITY

SEISMOGRAPH STATION

Oak Ridge Observatory

Bulletin Number 22

January 1, 1944 through June 30, 1944

Part A of Paper Number 97 published under the  
auspices of the Committee on Experimental Geology  
and Geophysics and of the Division of Geological  
Sciences at Harvard University



## Constants of the station:

Latitude: 42° 30' 26" North

Longitude: 71° 33' 45" West

Altitude: 180 Meters

## Mail address for the station:

Harvard Seismograph Station

Geological Museum

Cambridge, Massachusetts, U.S.A.

## Time:

All determinations are reduced to Universal Time. Clock rated daily by time signals from Arlington, Virginia. Accurate within 0.1 second unless otherwise specified.

## Instruments:

Three Benioff 112.7 kg. long and short period combinations, (one vertical, and two horizontal components oriented respectively north-south and east-west) with galvanometric registration and magnetic damping.

## Normal Operating Constants

Instrument	T <sub>0</sub> sec.	T <sub>g</sub> sec.	e	Drum speed	Displacement for acceleration of 10 <sup>-6</sup> gravity
ZSP	1.0	0.2	20:1	60 mm/min	15 mm
NSP	1.0	0.2	20:1	60 mm/min	15 mm
ESP	1.0	0.2	20:1	60 mm/min	15 mm
ZLP	1.0	14.0	20:1	30 mm/min	12 mm
NLP	1.0	14.0	20:1	30 mm/min	12 mm
ELP	1.0	14.0	20:1	30 mm/min	12 mm

Displacements of the ground upward or toward the north or east are designated by +, down or toward the south or west by -.

## Tables used:

For teleseisms, Jeffreys-Bullen 1939  
For local earthquakes and blasts, Harvard travel times  
(Reference: Bulletin Seismological Society of America,  
Vol. 31, No. 4, October 1941).



Date	Phase	Time (UT)	Remarks
1944			
Jan. 5	e	21-31-38	Distant
	e	32-04	
	e	35-05	
	eL	22-10	
Jan. 8	e	17-28-15	Local?
	e	28-17	
	e	28-31	
	e	28-35	
Jan. 10	iP	20-16-53 (comp.)	USC&GS: 18°1 N, 100°6 W O = 20-10.0 Distance about 33°5 Depth about 35 km.
	ipP	17-03	
	iPPP?	18-15	
	iS	22-11	
	isS	22-27	
Jan. 10	i	20-40-22	
	i	40-30	
Jan. 12	eL	15-24	
Jan. 15	e	05-52-27	Distant
	e	52-59	
	eL	06-00	
Jan. 16	iP	00-01-01-8(comp.)	Great destruction at San Juan, Argentina. Distance = 74°5 USC&GS: 31°5 S, 68°W O = 23-49.4
	i	01-11	
	i	01-26	
	eS	10-34	
	iS	10-46	
	eL	26 ca	
Jan. 20	eL	03-57	
Jan. 20	e	12-49-00	
Jan. 20	e	23-59-30	
Jan. 23	i	07-27-04	
	eL	52	
Jan. 25	i	07-52-44	
	i	56-16	
Jan. 25	eP <sub>1</sub>	20-55-54.6	Local or blast. Distance = 72 kms. O = 20-55-42.9
	eS <sub>1</sub>	56-03.4	
	e	56-04.0	
	eL	56-07	



Date	Phase	Time (UT)	Remarks
1944			
Jan. 27	i	04-58-30	
	i	58-35	
Jan. 29	eL	02-51.5	
Feb. 1	iP <sub>1</sub>	03-34-07	Gerede, Turkey, (180 miles east of Istanbul) reported destroyed. Several hundred reported killed or injured. Distance = 73° Double? USC&GS: 41° N, 31° E 0 = 03-22.7
	iP <sub>2</sub>	34-11	
	i	34-57	
	iPP	37-00	
	iPPP	38-47	
	iS <sub>1</sub>	43-35	
	iS <sub>2</sub>	43-39	
	e	44-07	
	e	44-47	
	e	45-21	
	e	46-00	
	eSS	48-31	
	eSSS?	52-03	
	eL	53.0	
Feb. 1	i	05-29-13	Aftershock
Feb. 3	iP	12-23-00 (dil.)	USC&GS: 59°3 N, 138°0 W 0 = 12-15.2
	i	23-06	
	i	24-44	
	e	34.5	
	e	37-00	
Feb. 5	eL	00-08	
Feb. 7	eL	19-05	
Feb. 7	eL	20-26	
Feb. 10	e	20-43-39	Local?
	e	44-00	
Feb. 15	eP	16-01-40	Caribbean. Distance = 21°
	eS	05-32	
	e	24-21	
Feb. 15	eL	05-55	
Feb. 18	e	21-26-09	Local or blast
	e	28	
Feb. 18	e	22-24-49	Local or blast
	e	25-01	



Date	Phase	Time (UT)	Remarks
1944			
Feb. 19	e	18-25-47	
Feb. 20	e	11-46-27	
	e	49-15	
	eL	52.5	
Feb. 23	i	12-36-00	Deep focus.
	i	36-29	
Feb. 25	i	07-41-49	Deep focus?
	e	08-00.4	
Feb. 29	iP	03-51-22 (dil.)	Distance = 56°5; 0 = 03-42-02;
	ipP	52-13	depth of focus about 225 km.
	iS	58-57	USC&GS: 13°7 S, 70°6 W
	isS	04-00-51	0 = 03-42.0
	eSS	02-52	Depth slightly less
	eSSS	04-54	than 200 km.
Feb. 29	iP'	16-47-11	Distance = 127°6; 0 = 16-28-04
	iPP	49-16	
	ePKS?	50-28	
	ePPP	52-12	
	e	53-39	
	eSKS	54-28	
	ePS	59-20	
	ePPS	17-01-06	
	e	07-10	
	eL	41	
Mar. 5	i	17-34-50	Deep focus
Mar. 6	eL	21-31	
Mar. 6	e	22-20-06	
	eL	28	
Mar. 7	eL	08-44	
Mar. 9	e	22-16-47	
Mar. 9	i	22-26-03	
	i	26-25	
	eL	57	
Mar. 18	iP	14-11-27.7	Local or blast
	iS	11-34.6	Distance = km.
	iL	11-37.5	
Mar. 22	iP'?	01-02-26	USC&GS: 7° S, 126° E; 0 = 0-43.0



Date	Phase	Time (UT)	Remarks
1944			
Mar. 22	i	01-28-25	Local. Possibly submarine.
	iP <sub>1</sub>	28-26	
	i	28-38	
	iS <sub>1</sub>	28-41	
Mar. 23	iP <sub>1</sub>	00-35-44	
	iS <sub>1</sub>	35-51.5	
	iL	35-54	
Mar. 28	e	19-04-01	
Mar. 29	iP <sub>1</sub>	02-05-49.0	Local. Distance = kms.
	iS <sub>1</sub>	06-00.8	
	eL	06-06	
Mar. 29	iP	14-59-27.7	Local. Distance = kms.
	iS	59-34.2	
	eL	59-38	
Mar. 31	eL	04-00	
Mar. 31	iP	20-43-11	USC&GS: 3° S, 81° W 0 = 20-34.8
	i	43-18	
	eL	57	
Apr. 9	i	(12-51-15.5)	NESEA: 49°5 N, 67°2 W Clock error unknown
	i	( 52-39)	
	i	( 53-26)	
	i	( 53-34)	
Apr. 11	i	(20-42-23.8)	Reported felt in Woodstock, Vermont
	i	( 42-41.0)	
Apr. 12	iP	(00-37-24.5)	Local
	iS	( 37-31.3)	
	iL	( 37-34.5)	
Apr. 26	i	14-58-10	
May 6	e	00-19-55	
May 17	e	08-18-00	Caribbean
	e	22-12	
	e	42-10	
May 19	i	14-24-50	Local
	i	25-06	



Date	Phase	Time (UT)	Remarks
1944			
May 21	i	17-11-43	Caribbean
	i	11-52	
	i	15-39	
	e	31.0	
May 24	i	01-02-49	
	i	02-44	
May 24	i	01-34-28	Caribbean
	i	34-34	
	i	38-26	
	e	54.5	
May 26	i	01-23-24	USC&GS: 21° S, 179° W 0 - 01-06-39 Depth greater than 600 kms
	i	24-45	
	i	29-22	
May 26	i	13-16-26	USC&GS: 3° S, 152° E 0 - 12-58.1
	i	18-04	
	cL	58	
June 3	iP	19-23-35	Local, possibly submarine
	iS	23-56	
June 3	eP	19-42-35	Local, possibly submarine
	iS	42-54	
June 3	eP	20-02-01	Local, possibly submarine
	iS	02-22	
June 4	eP <sub>1</sub>	02-09-01.4	Reported felt in Washington County, Vermont
	iS <sub>n</sub>	09-24.3	
	iS <sub>1</sub>	09-26.1	
June 5	e	07-02-40	
	i	03-18	
	i	03-30.5	
June 5	eP <sub>1</sub>	17-04-48.0	Local or blast. Distance = 20 kms.
	eS <sub>1</sub>	04-50.5	
	eL	04-51.5	
June 7	eP	13-56-14	Local or blast Distance = 80 km.
	eS	56-24	
	eL	56-28.5	
June 10	eP	02-14-00	Local. Distance = 80 km.
	eS	14-10	
	eL	14-14	



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June 10	eP	14-35-42	Local or blast. Distance = 80 km.
	eS	35-52	
	eL	35-54	
June 16	eP	21-58-40	USC&GS: 19° N, 105° W O = 21-51.5
	e	22-11-31	
	i	11-46	
	e	15-11	
June 20	i	14-22-26	
	i	22-38	
	i	22-41	
June 20	iP	17-11-46.9	Local or blast. Distance = 90 km.
	iS	11-58.4	
	iL	12-01.9	

Cambridge, Massachusetts

Mary P. Collins



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July 1, 1944 through December 31, 1944

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## Normal Operating Constants

Instrument	To sec.	Tg sec.	e	Drum speed	Displacement for acceleration of 10 <sup>-6</sup> gravity
ZSP	1.0	0.2	20:1	60 mm/min	15 mm
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July 4	iP1 iS1 iL	02-03-55.2 04-02.4 04-05	Local. Distance 55 km. ca
July 12	eL	19-46.7	USC&GS: 44°7' N, 114°4' W
July 25	iP iS i iL	00-59-12.6 59-27 59-28 59-29	Local. Distance 115 km.
July 25	iP iS iL	19-19-56.7 20-12.6 20-15	Local, probably blast. Distance 125 km.
July 27	iP ePP eS eL	00-14-19 16-31 22-19 34	USC&GS: 54°5' N, 166°5' W Slightly deeper than normal Distance = 58°
Aug. 5	e	13-13-28	
Aug. 9	eP eS e	04-21-00 24-50 42-12	Caribbean. Distance 21°3'
Aug. 11	eP eS e	09-53-20 57-14 10-15.0	Caribbean. Distance 21°8'
Aug. 28	iP1 iS1 iL	20-50-43 50-46 50-48	Local, probably blast. Distance 24 km.
Sept. 5	iPn iSn	04-39-38 40-24	Felt widely in northeastern America. USC&GS: 45°01' N, 74°44' W S-P distance 430 km.
Sept. 5	iPn i i i iSn i	08-51-58.6 52-04.8 52-32.8 52-38.3 52-44.8 52-47.7	Aftershock
Sept. 9	iPn i i iSn	23-26-42.1 26-47.5 27-15 27-28.6	Aftershock



Date	Phase	Time (UT)	Remarks
1944			
Sept. 11	iP'	10-04-21	Distance about 135°
	i	04-34	
	ePP	07-00	JSA: 7°S, 131°E
	eSKP	08-02	0 = 09-45-17
	i	08-06	
	i	08-22	
Sept. 14	i	06-58-49	Local
	i	58-52	
Sept. 15	iP	00-29-45	Local. Distance 160 km.
	iS	30-05	
Sept. 15	iP	01-59-57	Local. Distance 152 km.
	iS	02-00-16	
Sept. 15	iP	02-58-05	Local. Distance 152 km.
	iS	58-24	
Sept. 18	iP	00-44-55	Local. Distance 95 km.
	iS	45-07	
	iL	45-10	
Sept. 19	i	13-17-42	
Sept. 23	iP	00-31-12.8	Local. Distance 155 km.
	iS	31-33	
	iL	31-44	
Sept. 24	i	11-07-24	
Sept. 27	i	16-58-21	Deep focus?
Oct. 2	iP	17-28-17	USC&GS: 14°5' N, 90°1' W
	ipP	28-50	Depth 100 km.
			0 = 17-21.9
Oct. 2	iP	20-42-45	JSA: 43.5°N, 141.7°E
	ipP	43-02	Depth = 100 km.
			0 = 20-29-57
Oct. 5	e	17-16-30	JSA: 5°0' S, 127°0' E
	eSKS	18-19	0 = 16-51-44
Oct. 5	e	17-47-16	JSA: 19°S, 169°E
			Depth 100 km.
			0 = 17-28-27
Oct. 6	iP	02-45-55	USC&GS: 39°N, 27°E
	eL	03-18	0 = 02-34.7



Date	Phase	Time (UT)	Remarks
1944			
Oct. 9	iP iS iL	20-44-25 44-38.5 44-45	Local, probably blast. Distance 108 km.
Oct. 13	iP iS	15-16-37.5 16-58	Local, probably blast. Distance 165 km.
Oct. 16	eP eS	14-54-08 54-29	Local, probably blast. Distance 170 km.
Oct. 16	eP eS eL	18-40-55 41-05 41-09	Local, probably blast. Distance 80 km.
Oct. 18	iP iS iL	00-30-20 30-30 30-37	Local. Distance 80 km.
Oct. 23	iP iS	18-27-29 27-44	Local. Distance 120 km.
Oct. 23-24	iP eL	23-48-00 00-05.5	USC&GS; 0 <sup>o</sup> .5 N, 80 <sup>o</sup> .0 W C = 23-40-03
Oct. 24	i	00-35-35	
Oct. 24	iP iS i	21-00-08 00-25 00-33	Local, probably blast Distance 135 km.
Oct. 25	iP iS iL	18-35-18 35-34 35-41	Local, probably blast. Distance 125 km.
Oct. 26	iP iS iL	17-36-28 36-45 36-52	Local, probably blast. Distance 135 km.
Nov. 2	i i	11-07-59 08-25	Deep focus
Nov. 3	i i	22-12-03 12-25	
Nov. 8	iP iS	18-56-20 56-35	Local, probably blast. Distance 120 km.



Date	Phase	Time (UT)	Remarks
1944			
Nov. 8	iP iS iL	16-32-27 32-44 32-50	Local. Distance 135 km.
Nov. 16	eL	13-16	JSA: 12 <sup>o</sup> .1 S, 166 <sup>o</sup> .1 E
Nov. 20	i	03-31-59	
Nov. 24	iP' iPP	05-07-44 09-30	JSA: 18 <sup>o</sup> .5 S, 169 <sup>o</sup> .0 E O = 04-49-00
Dec. 7	iP i iPP e ePS eL	04-49-41 49-54 53-37 05-01-13 02-49 20	Destructive in Honshu, Japan USC&GS: 33 N, 137 E O = 04-35.7
Dec. 12	iP	04-28-06	JSA: 52 <sup>o</sup> N, 176 <sup>o</sup> .7 W O = 04-17-24
Dec. 14	iP <sub>2</sub> iP <sub>1</sub> iS <sub>2</sub>	03-15-21.0 15-24.0 15-38.5	Reported felt in Connecticut Distance 140 km.
Dec. 22	iP i	22-42-37 43-12	JSA: 25 <sup>o</sup> S, 70 <sup>o</sup> W O = 22-32-03

Note: During the period represented by this bulletin only the short-period components were in operation.

Geological Museum  
Cambridge 38, Massachusetts

Mary P. Collins