

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

h = 65 meters
 Gabbrodiorite.

WESTON, MASS.

BULLETIN

of the Weston College Seismological Observatory

Wiechert 80k NE Benioff 100k (long and short period) NEZ Bosch-Omori 25k NE

1938
January

No. 13

01.48	H NE iS N i NE eM	11 25 06 37 55 41 02 46 17	$\Delta = 35^{\circ}$ (measured) USCGS = 15° N, 98° W apparently aftershocks of Mexican quakes of December 31.74
01.98 02.00	H NE eSS N eL	23 28 05 00 01 42 17 00	$\Delta = 105^{\circ}$ (ca) from L-SS
02.94	H NEZ iP Z i Z i Z iPPP NE iS N iPcS N i	22 27 12 34 12 34 26 34 41 35 49 39 48 40 54 43 06	$\Delta = 34.4^{\circ}$ from S-P Compression = 2.5 mm to North = 1 mm to East = trace USCGS = 15.7° N, 98° W
07.64	Z iP P ? NE e N e NE eL	15 46 27 04 42 12 44 16 18 40	$\Delta = 110^{\circ}$ (ca) from L-PP ?
11.63	H Z eP Z ePP NE iSLS E eSKKS Z ePS NE eSS NE eL	15 11 54 25 49 29 50 36 20 37 12 38 41 44 04 59 00	$\Delta = 99^{\circ}$ from SKS-PP felt in Japan. Strasbourg gives 'h' as 200 km
23.15	H EZ iP NEZ iP ₂ EZ iP ₃ EZ ePcP Z ePP Z ePPP NE iS E iPS E eSS EZ eL	08 32 42 44 15 44 25 44 36 44 50 47 02 48 39 53 38 54 09 58 27 09 07 16	$\Delta = 71.5^{\circ}$ from S-P USCGS = 21.2° N, 156.1° W felt in Hawaii. Multiplicity of the 'P' phases expectional.
24.23	H Z e NE e EZ e	05 29 01.3 31 22.6 31 24.9 31 29.5	'H' determined by Harvard. Quake felt in Arnprior, Ontario, Canada.

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24.44	H	10 31 45	$\Delta = 107^\circ$ from SS-PPS JSA= 60.4° S, 35.6° W 'iSS' on both horizontal components exceptionally strong.
Z	eP	46 14	
Z	eP'	49 35	
NZ	iPP	50 34	
Z	iPPP	53 11	
Z	ePPPP	56 27	
E	iSKS	56 35	
N	iS	59 14	
N	iPS	59 50	
N	iPPS	11 00 44	
NEZ	iSS	05 48	
E	eSSSS	14 27	
E	eG	15 52	
NEZ	eL	20 00	

The following disturbances, while not sufficient to give epicentral distance, are evidently of deep origin.

10	NEZ	iP	17 59 38	Compression= 4.5 mm to South= trace to East= 0.5 mm
	Z	i	59 46	
	E	i	59 55	
16	NZ	iP	13 48 25	Dilatation= 6.5 mm to North= 1.5 mm
	Z	i	49 45	
16	NZ	iP	21 50 26	Dilatation= 4 mm to North= trace
	NZ	i	50 33	
22	Z	iP	15 46 41	Compression
	Z	i	50 06	

Other seismic phases:

Short period: 04.64; 06.56; 09.59; 10.69; 10.72; 12.64 (3)
 12.65; 12.67; 22.66; 23.36; 24.45; 28.02;
 28.63; 28.65; 29.61; 29.63; 29.63; 29.67;
 29.70.

Long period: 03.94; 07.30; 12.15; 12.52; 16.58; 22.13;
 25.71; 26.17; 29.19; 30.75.

Daniel Linehan, S.J.
Seismologist

1938
February

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(contin)

13.34	H	08 03 48	$\Delta = 127^\circ$ from SKS-P'
Z	iP'	23 00	Compression
E	iSKS	29 59	USCGS= 38° S, 179° W
E	eSKKS	31 47	
E	ePPPS	37 58	
N	eSS	41 47	
Z	eSSSS	52 07	
N	eG	56 43	
NEZ	eL	09 03 37	
14.04	H	02 54 18	$\Delta = 82^\circ$ from S-P
NEZ	iP	03 06 43	
NZ	iPeP	06 57	
Z	ipP ?	07 11	
NE	iS	17 07	
NE	iPS	17 28	
E	ePPPS	18 09	
15.14	H	03 27 35	$\Delta = 45^\circ$ from S-P
Z	iP	35 58	Dilatation= 3 mm
EZ	i	36 09	JSA= 19.5° N, 26° W
NE	eS	42 29	
NEZ	eSS	45 50	
E	eL	49 30	
15.30	EZ	iP	07 05 25 aftershock of the above.

The following disturbances, while not sufficient to give epicentral distance, are evidently of deep origin.

01	NEZ	iP	19 10 40	Dilatation= 14 mm
	Z	i	10 49	to South= trace
				to East= 1.5 mm
24	Z	iP	03 29 01	
	Z	i	29 14	
24	Z	iP	03 53 08	Evidently an aftershock
	Z	i	53 21	of the above
27	Z	iP	00 34 17	
27	Z	iP	01 41 58	Strasbourg= 60° N, 145° E

Other seismic phases:

Short period: 02.20; 03.49; 03.90; 04.90; 05.10; 05.68;
 07.76; 08.82; 10.03; 10.75; 12.00; 12.50;
 13.12; 13.35; 14.13; 14.70; 15.21; 15.66;
 16.14; 17.24; 17.25; 22.21; 22.56; 23.83;
 24.36;

Long period: 03.67; 03.85; 04.40; 06.33; 07.08; 22.08.

Daniel Linehan, S.J.
Seismologist.

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

h = 65 meters
Gabbrodiorite.

WESTON, MASS.

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of the Weston College Seismological Observatory

Wiechert 80k NE Benioff 100k (long and short period) NEZ Bosch-Omori 25k NE

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1938
February

01.79	Z Z Z Z NEZ Z NE NE E N NE N NE N N	H eP eP' iP' ePP iPP iSKP iSKP ePPP eSKS iPPPP eSKKS ePPPPP e(PPP)' eSS eSSS	19 04 24 21 12 23 43 23 48 26 16 26 40 27 22 27 30 29 32 30 58 32 44 33 40 34 20 42 00 44 24 50 02	$\Delta = 142^{\circ}$ from SKP-P' Compression on iP' JSA = 5° S, 131° E
04.44	Z E N NE	H eP eS eSS eL	10 27 15 35 26 42 07 45 22 47 55	$\Delta = 44.5^{\circ}$ from S-P
05.10	Z NZ NZ NZ N NZ NE NE E	H eP iP ipP i iPP i iS isS eScS	02 23 38 30 42 30 45 31 20 31 50 32 14 32 58 36 26 37 26 40 46	$\Delta = 38^{\circ}$ from S-P Dilatation = 22.5 mm to South = 16 mm h = 130 km JSA = 5.1° N, 75.7° W
06.04	E N EZ NEZ	i i i iM	00 58 05.3 58 07.2 58 07.7 58 11.8	Local quake
08.30	Z NE N N	H eP iS iSS eL	07 16 20 24 23 30 58 34 24 38 50	$\Delta = 43.5^{\circ}$ from S-P
08.60	E E NEZ	H iS iSS eL	14 20 50 36 17 39 38 43 50	$\Delta = 47^{\circ}$ from SS-S
10.86	Z	H iP	20 37 57 49 24	$\Delta = 72^{\circ}$ (measured) Strasbourg = 35.1° N, 26.5° E

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

$h = 65$ meters
 Gabbrodiorite.

WESTON, MASS.

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of the Weston College Seismological Observatory

Wiechert 80k NE Benioff 100k (long and short period) NEZ Bosch-Omori 25k NE

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 March

08.23		H	05 35 00	$\Delta = 121^{\circ}$ from SS-PP
	Z	ePP	55 23	
	NE	eSS	06 13 23	
	NE	eL	29 43	
09.22		H	05 16 54	$\Delta = 37^{\circ}$ from S-P
	Z	iP	24 13	USCGS = 6.1° N, 83° W
	Z	ePP	25 41	
	N	eS	29 57	
	E	eL	35 13	
11.62		H	14 50 53	$\Delta = 68^{\circ}$ (measured)
	Z	iP	15 01 49	H taken from Kew felt near west Greece no surface waves
13.75	Z	iP	17 57 27	Aftershock of 11.62
22.64		H	15 22 08	$\Delta = 40^{\circ}$ from S-P
	NEZ	eP	29 58	Compression = 2 mm
	EZ	iP	29 59	to East = 1 mm
	Z	iPP	31 23	JSA = 52.2° N, 133.1° W
	Z	iPeP	31 58	
	NE	iS	36 29	
	NEZ	iSS	39 18	
	EZ	L	41 30	
	E	ePeSScP	47 24	
22.94		H	22 27 07	$\Delta = 41^{\circ}$ from PP-P
	Z	iP	35 31	
	EZ	iPP	37 01	
	NE	eS	41 42	
	EZ	eL	49 10	
25.35		H	08 22 18	$\Delta = 49^{\circ}$ from S-P
	Z	iP	28 43	
	N	eS	33 31	
	EZ	eL	39 00	

The following disturbances, while not sufficient to give epicentral distance, are evidently of deep origin.

04	NEZ	iP	02 35 40	Dilatation to South-East
08	Z	iP	08 09 42	Dilatation = 2.5 mm
	Z	i	09 50	
16	Z	i	04 56 24	Compression = 1.5 mm

Other seismic phases:

Short period	01.64; 02.08; 02.60; 03.14; 03.68; 04.62; 04.75; 04.93; 05.19; 06.17; 08.11; 08.81; 09.68; 10.64; 11.09; 11.83; 12.08; 12.97; 13.18; 14.70; 14.84; 15.24; 15.81; 16.67; 17.03; 18.68; 20.84; 21.85; 23.84; 24.88; 25.68; 28.84; 29.83; 30.43; 31.69.
Long period:	06.13; 08.88; 09.13; 10.73; 14.08; 14.25; 21.09; 23.60; 24.74; 25.69; 26.35; 26.38; 26.60; 31.98.

Daniel Linchan, S.J.
 Seismologist.

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(contin)

20.27		H	06 28 50	$\Delta = 110^\circ$ from SS-PP
	Z	ePP	49 03	
	N	iS ?	55 52	
	Z	ePS	57 54	
	N	iSS	07 04 23	
	Z	eSSS	08 23	
	Z	eL	22 30	
22.18		H	04 19 21	$\Delta = 42.5^\circ$ from S-P Dilatation to West ?
	EZ	eP	23 16	
	EZ	iPP (PcP)	25 02	
	EZ	iPcP (PP)	25 11	
	E	iPcS	28 55	
	NE	eS	29 38	
	NE	eSS	32 17	
	NE	eL	35 15	
25.38	Z	iP	09 12 34	Dilatation
	Z	i	12 43	
	Z	eL	27 30	
25.71		H	17 08 04	$\Delta = 32^\circ$ from S-P Dilatation= 7 mm to South= 1 mm Strasbourg= 13° N, 87° W
	Z	eP	14 29	
	NZ	iP	14 31	
	Z	ePP	15 18	
	Z	ePcP	17 10	
	NE	iS	19 40	
	EZ	eSS	21 21	
	N	eL	23 31	

The following disturbances, while not sufficient to give epicentral distance, are evidently of deep origin.

02	Z	iP	07 42 44	Dilatation
	Z	i	42 57	
02	Z	iP	21 36 54	
	Z	e	37 13	
	Z	i	37 35	
	Z	i	38 17	
04	Z	iP	21 27 42	Compression
17	Z	iP	09 16 10	
	Z	i	16 24	
24	Z	iP	14 21 28	

Other seismic phases:

Short period - 01.53; 01.80; 02.81; 02.82; 03.18; 04.18;
 04.97; 05.61; 06.70; 07.74; 08.02; 09.79;
 10.09; 11.61; 12.31; 13.62; 13.69; 14.71;
 14.78; 15.27; 15.34; 16.24; 18.87; 21.04;
 21.91; 22.07; 22.89; 23.97; 25.88; 26.56;
 26.86; 26.88;

Long period: 01.92; 02.25; 05.48; 07.97; 11.48; 12.46;
 13.50; 13.57; 16.85; 18.95; 19.95; 20.86;
 21.08; 23.06; 24.06; 25.50; 25.66; 28.27;
 29.22; 29.35; 29.37; 29.42.

Daniel Linehan, S.J.
Seismologist

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

h = 65 meters
Gabbrodiorite.

WESTON, MASS.

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Wiechert 80k NE Benioff 100k (long and short period) NEZ Bosch-Omori 25k NE

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02.09	H NZ iP ₁ N iP ₂ E iS ₁ N iS ₂	02 13 22.4 13 38.5 13 39.6 13 50.3 13 51.7	$\Delta = 97.5$ km. from S ₁ -P ₁ Harvard Travcl Times Felt in Rochester, N.H.
13.12	H Z eP NEZ iP EZ iPcP EZ ipP Z isP EZ iPP Z iPPP NE iS NE iss Z eG ? Z eP'P'	02 45 54 55 44 55 47 56 23 56 55 57 27 58 00 59 40 03 03 53 05 40 10 50 24 48	$\Delta = 63^{\circ}$ from S-P Dilatation= 59 mm to North= 5 mm to East= trace h= 300 km JSA= 39.4° N, 15° E
14.05	H Z iP' Z epP' Z ePP Z i Z i E eSKS ? NZ ePS Z iPKKP NEZ iPPS NZ eSS	01 16 05 35 00 35 39 35 54 36 38 37 26 43 23 45 16 45 43 46 12 51 30	$\Delta = 115^{\circ}$ from PKKP-P' Dilatation h= 150 km
17.61	H NZ iP Z iP ₁ Z ipP Z iPP N iS N i N iss N i N eM	14 39 38 49 53 50 03 50 13 52 03 57 59 58 08 58 34 58 52 15 12 44	$\Delta = 62^{\circ}$ from S-P Compression= 29.5 mm to North= 4 mm h= 80 km (ca) Strasbourg= 17° S, 68° W
19.46	H Z eP EZ iP Z iPcP Z i NE eS NE eSS Z eM	10 59 23 11 10 55 11 00 11 34 11 43 20 31 25 21 41 00	$\Delta = 74^{\circ}$ from S-P Dilatation= 13 mm to East= 1 mm h= greater than normal JSA= 39.0° N, 33.1° E Destructive in Turkey

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The following disturbances, while not sufficient to give epicentral distance, are evidently of deep origin.

01	Z	iP	01 51 39	
02	NZ	iP	23 47 13	Dilatation= 5 mm
	Z	i	47 29	to South= 2 mm
	N	iS ?	53 04	
03	Z	iP	19 28 18	Dilatation= 8 mm
	Z	i	28 45	
06	Z	iP	02 24 30	Compression
08	Z	iP	14 58 50	Compression= 3 mm
	Z	i	15 01 30	
09	NEZ	iP	06 39 21	Dilatation to North West
11	Z	iP ?	22 28 40	
12	Z	iP	18 46 08	Compression
12	Z	iP	22 21 05	Compression
14	Z	iP	23 48 28	
15	Z	eL	00 03 35	
15	Z	iP	04 47 22	
19	Z	eP	18 54 35	
	Z	i	54 40	
	Z	i	56 30	
	Z	i	57 59	
22	Z	iP	03 06 10	Dilatation
	Z	i	06 18	
26	Z	iP	08 43 44	
27	Z	iP	21 34 15	

Other seismic phases

Short period: 02.64; 02.63; 03.25; 03.81; 04.30; 04.80;
 05.02; 05.37; 05.84; 06.51; 06.65; 07.50;
 07.84; 08.16; 09.70; 10.16; 11.33; 11.75;
 12.85; 13.67; 13.72; 14.49; 17.29; 17.78;
 18.61; 19.62; 19.64; 19.66; 20.82; 21.88;
 24.45; 25.76; 25.88; 27.28; 27.67; 27.70;
 27.83; 28.67; 28.83.

Long period: 09.70; 13.09; 13.13; 13.55; 13.69; 14.30;
 14.55; 20.35; 20.77; 23.69; 30.93; 31.01;
 31.57; 31.75; 31.83.

Daniel Linehan, S.J.

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No. 17
(contin)

19.71	H	17 08 05	$\Delta = 145^\circ$ from SKP-PP USCGS= 0.5° N, 119° E
	Z eP ?	25 19	
	NZ iP'	27 47	
	NEZ iPP	30 51	
	NEZ iSKP)	31 37	
	NEZ iSKP)	31 43	
	Z iPPP	34 01	
	N eSKKS	37 43	
	NE eSKSP	41 06	
	EZ eSS	43 57	
	NEZ eG	10 00	
	NEZ eL	15 10	
23.30	H	07 18 25	$\Delta = 95^\circ$ from PP-P Dilatation to North USCGS= 36° N, 141° E felt in Japan
	NZ eP	31 57	
	NZ iP	32 00	
	NZ iPP	35 53	
	N iSKS	42 35	
	E eS ?	43 34	
	NZ iPS	44 31	
	E eSS	49 47	
	E eSSS	55 13	
	E eSSSS	55 13	
	NE iSSSS	57 05	
	NZ eL	08 04 03	
	NEZ eM	11 00	
23.35	H	08 22 00	$\Delta = 120^\circ$ measured Strasbourg= 19° N, 119° E Near Formosa
	Z iP	40 38	
	Z i	41 59	
28.43	H	10 14 10	$\Delta = 39^\circ$ from S-P Compression= 1 mm to East= 0.5 mm USCGS= 43° N, 125° W felt in Oregon
	EZ iP	21 37	
	EZ iPP	23 03	
	Z iPcP	23 11	
	E iS	27 45	
	EZ eSS	30 15	
	N eSSS	31 01	
	NEZ eL	33 23	
28.70	H	16 42 01	$\Delta = 89^\circ$ from S-P Compression USCGS= 43° N, 144° E
	Z iP	54 56	
	NE iSKS	17 05 27	
	N eS (SKKS)	05 47	
	N eSSS	15 25	
	N e	18 15	
	NE eL	23 00	
30.60	H	14 29 45	$\Delta = 127^\circ$ from PP-P' Dilatation USCGS= 20° S, 169° E
	Z eP diff	45 30	
	Z eP'	48 46	
	EZ iPP	50 34	
	E iSKP ?	52 10	
	E e	15 00 16	
	Z iPPS	02 06	
	N iSS	08 09	
	E eSSS	12 12	
	Z eL	30 00	
	Z eM	37 12	

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

h = 65 meters
 Gabbrodiorite.

WESTON, MASS.

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of the Weston College Seismological Observatory

1938
May

Wiechert 80k NE

Benioff 100k (long and short period) NEZ

Bosch-Omori 25k NE

No. 17

03.09	H	02 15 36	$\Delta = 33^{\circ}$ from S-P
NEZ	iP	22 03	Dilatation= 15.2 mm
EZ	ipP	22 23	to South= 3.2 mm
EZ	isP	22 36	to West= 2.8 mm
EZ	ePP	23 20	h= 100 km
Z	iPcP	24 43	USCGS= 18° N, 99° W
NEZ	iS	27 24	
N	esS	28 56	
06.76	H	18 17 26	$\Delta = 32.5^{\circ}$ from S-P
Z	iP	24 02	Dilatation= 4 mm
NZ	i	24 08	USCGS= 12.6° N, 86.9° W
Z	i	24 28	
N	ePP	25 02	
N	ePPP	25 18	
NE	iS	29 18	
NZ	eSSS	31 22	
E	i	31 32	
NEZ	eM	36 08	
08.57	H	13 47 42	$\Delta = 175^{\circ}$ from SS-PP
Z	eP ₁	14 08 11	
Z	eP ₂	09 33	
EZ	ePP	13 22	
NE	eSKKS	20 12	
NE	iSS	34 27	
NE	eL	15 08 00	
11.61	H	14 44 45	$\Delta = 36^{\circ}$ from S-P
Z	eP	51 47	USCGS= 16.9° N, 101° W
Z	iPP	52 50	
NE	iS	58 22	
EZ	eL	15 02 20	
12.65	H	15 39 01	$\Delta = 131^{\circ}$ from SKP-P'
Z	eP'	58 13	USCGS= 8° S, 147° E
Z	iP'	58 15	Dilatation iP'= 7 mm
NEZ	iPP	16 00 26	
NEZ	iPP ₂	01 43	
NZ	iSKP	02 08	
Z	iPPP	03 16	
NE	i	04 55	
N	iS ?	09 36	
NE	eSKSP	10 26	
N	iPPS	12 06	
NE	ePPPS	13 36	
NZ	iSS	18 10	
E	eSSS	22 42	
E	eSSSS	27 02	
NEZ	iL	40 42	
15.15	H	03 53 30	$\Delta = 28^{\circ}$ from S-P
Z	eP	59 25	Strasbourg= 48° N, 33° W
N	eS	44 17	
NE	eL	47 55	
NE	eM	50 25	

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June

WESTON, MASS.

No. 18
(contin)

23.17		H	03 57 56.6	$\Delta = 27$ km from S ₁ -P ₁ Compression= 5.25 mm to South= 6.0 mm to East= 1.5 mm felt near Lowell, Mass.
	NEZ	iP ₁	58 01.1	
	NEZ	iS ₁	04.48	
23.54		H	12 55 33	$\Delta = 127^\circ$ from PP-P' Dilatation= 9 mm(iP') JSA= 19.1°S, 168.9°E
	Z	eP diff	13 11 06	
	Z	iP'	14 22	
	EZ	iPP	16 10	
	E	eSKP ?	17 38	
	Z	ePPP	19 14	
	E	ePS	26 14	
	Z	ePPS	27 59	
	EZ	eSS	33 30	
25.99		H	23 45 13	$\Delta = 47^\circ$ from S-P Strasbourg= 77°N, 2°E Arctic Ocean
	NEZ	iP	53 43	
	Z	i	54 18	
	EZ	iPP	55 53	
26		H	00 00 59	
	EZ	eL	07 23	
28.80		H	19 17 48	$\Delta = 32.5^\circ$ from S-P Dilatation h= greater than normal Felt in Mexico Readings disturbed by large microseisms.
	NEZ	iP	24 27	
	E	i	24 54	
	E	ePP	25 08	
	E	e	26 21	
	E	eS	29 51	
30.70		H	16 45 35	$\Delta = 132^\circ$ (ca) from L-P' Readings disturbed by large microseisms. USCGS= 24°S, 167°E
	Z	eP'	17 03 41	
	Z	e	05 42	
	E	e	22 50	
	E	eL	44 10	
	Z	eM	48 00	

* NESAS = "North Eastern Seismological Association"

The following disturbances, while not sufficient to give epicentral distance, are evidently of deep origin.

04	NEZ	iP	22 56 33	Dilatation to North
11	Z	iP	01 45 59	
19	Z	iP ?	17 19 18	

Other Seismic phases

Short period: 01.50; 01.75; 02.22; 02.24; 03.13; 03.70; 05.15;
 06.78; 07.57; 08.82; 09.63; 09.64; 09.77; 15.85;
 17.72; 21.80; 25.68; 29.54; 29.66; 29.68.

Long period: 06.13; 07.22; 11.74; 12.34; 13.17; 15.90; 16.52;
 16.99; 17.07; 17.19; 22.15.

D. Linehan, S.J.
Seismologist.

1938 June	WESTON, MASS.			No. 18 (contin)
15.21		H	05 07 45.2	$\Delta = 512$ km from S_2-P_n Dilatation to North East. Felt in New Brunswick NESA = $45^\circ N, 66^\circ W$.
	NEZ	iP _n	08 56.0	
	NE	iS ₂	09 51.0	
	NEZ	iL	10 18	
15.32		H	07 44 03	$\Delta = 73^\circ$ from S-P Compression = 3 mm h = 100 km JSA = $31.3^\circ S, 74.1^\circ W$
	Z	iP	55 24	
	Z	ipP	55 48	
	Z	isP	56 02	
	NE	eS	08 05 41	
15.55	Z	eP'	13 01 41	
	Z	eM	48 00	
16.09		H	02 15 22	$\Delta = 106^\circ$ from S-PP USCGS = $29^\circ N, 128^\circ E$ China Sea
	Z	iP	29 36	
	Z	i	29 46	
	Z	eP'	33 29	
	Z	iPP)	34 01	
	E	iPP)	34 16	
	Z	ePPP	36 30	
	E	eSKS	40 42	
	E	eS	41 45	
	Z	ePKKP	44 57	
	EZ	eSS	49 25	
	EZ	eM	03 14 40	
19.57		H	13 44 26.8	
	EZ	iP _n ?	47 35.4	
	EZ	iP ₂	37.5	
	EZ	iS ₂	49 25.5	
20.59		H	14 03 22	$\Delta = 57^\circ$ from S-P Dilatation h = greater than normal
	Z	eP	12 04	
	Z	ePcP	12 59	
	E	eS	19 56	
	N	eSS	24 04	
	EZ	eM	34 50	
20.99		H	23 50 25	$\Delta = 93^\circ$ from PS-P Strasbourg = $41.3^\circ N, 77.3^\circ E$ PS very large on N-S component. Felt in Turkestan.
21.	NZ	eP	00 03 35	
	Z	iP	03 38	
	NZ	iPP	07 10	
	NZ	iPPP	09 07	
	N	iSKS	14 08	
	NE	iS ?	14 20	
	N	iPS	15 44	
	N	eSS	21 02	
	N	eSSS	24 22	
	NZ	eM	42 10	
21.28	Z	eP	06 53 13	
	N	eL	07 44 00	
22.98	Z	iP	23 27 12	Dilatation
	Z	i	29 23	
	Z	i	30 14	
	N	e	46 33	
23.05	Z	eP	01 15 22	$\Delta = 70^\circ$ (ca) from S-P h = greater than normal
	Z	i	15 41	
	NEZ	eS	24 57	

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

$h = 65$ meters
 Gabbrodiorite.

WESTON, MASS.

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of the Weston College Seismological Observatory

	Wiechert 80k NE	Benioff 100k (long and short period) NEZ	Bosch-Omori 25k NE	
1938 June				No. 18
05.05	H	01 12 55		$\Delta = 60^{\circ}$ from S-PP
	Z ePP	25 42		
	N eS	31 23		
	Z e	35 31		
	Z eL	42 00		
05.09	H	02 03 47		$\Delta = 60^{\circ}$ from S-PP aftershock of the above.
	Z ePP	16 36		
	N eS	22 17		
	N eL	31 23		
09.80	H	19 15 00		$\Delta = 140^{\circ}$ (ca) from SS-P' USCGS = 2° S, 128° E Banda Sea $h =$ greater than normal.
	NZ eP'	34 18		
	Z i	34 35		
	NEZ iPP	37 18		
	NEZ iSKP	38 11		
	N ePPP	40 13		
	NE eSKSP	47 19		
	N iPS	47 35		
	N i	50 49		
	N ePPPS	51 05		
	NE eSS	55 31		
	NE eL	20 17 50		
09.95	H	22 42 28.6		$\Delta = 567$ km from S_n - P_n NESA = 44.5° N, 63° W * Harvard Travel Times
	NZ i P_n	43 46.5		
	NZ i P_2	49.1		
	NEZ i	44 43.0		
	NEZ i S_n	47.0		
10.41	H	09 53 40		$\Delta = 112^{\circ}$ from PP-P USCGS = 25° N, 125° E PPS very large amplitude
	Z eP	10 08 20		
	Z iP	08 24		
	Z eP'	12 15		
	Z iPP	12 57		
	Z i	13 18		
	NE iSKS	19 02		
	NE eSKKS	19 57		
	E iS ?	20 38		
	NZ ePS	22 08		
	N e	22 20		
	Z ePKKP	23 12		
	NEZ iPPS	23 28		
	NZ eSS	28 52		
	Z eSSS	33 12		
	E iPEPP'	35 32		
	E eG	40 22		
10.75	H	18 05 55		$\Delta = 34.5^{\circ}$ from S-P Dilatation = 1 mm USCGS = 16.5° N, 98° W
	Z iP	12 50		
	Z i	13 13		
	Z i	13 35		
	N iPP	13 49		
	E eS	18 21		
	Z ePcSScP	30 48		

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W



h = 65 meters
 Gabbrodiorite.

WESTON, MASS.

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of the Weston College Seismological Observatory

Wiechert 80k NE

Benioff 100k (long and short period) NEZ

Bosch-Omori 25k NE

1938
 July

No. 19

02.	N	e	07 55 56	
	N	eL	08 07 45	
02.	Z	e	21 13 04	
	N	eS ?	17 30	
	NE	eL	20 19	
03.13		H	02 05 43	$\Delta = 796$ km from S_1-P_1
	NZ	iP ₁	07 52.5	NESA = 45° N, 62° W
	NEZ	i	53.5	
	NEZ	i	57.2	
	NE	iS ₁	09 37.5	
	Z	i	45.3	
04.88		H	21 12 20	$\Delta = 127^{\circ}$ from PP-P'
	Z	iP'	31 35	
	Z	ePP	33 24	
	Z	iSKP	35 17	
	EZ	e	43 17	
	EZ	ePPS	44 57	
	E	eSSS	54 52	
	EZ	eL	22 12 37	
	NEZ	eM	18 40	
05.09		H	02 03 25	$\Delta = 130^{\circ}$ from SKS-P'
	Z	iP'	22 40	Compression = 2.5 mm
	EZ	eSKS	29 50	
	NE	eSKKS	31 32	Aftershock of this
	EZ	eSYSP	35 02	at 03:55 ?
	E	ePPPS	37 47	
	EZ	eSS	42 07	
	NEZ	eSSS	46 47	
	EZ	eL	03:05 35	
05.	Z	i	03 13 36	Other phases lost in
	Z	eM	04 03 00	surface waves of 05.09.
05.68		H	16 12 35	$\Delta = 68$ km from S_1-P_1
	NEZ	iP ₁	12 47.2	local quake or quarry
	EZ	iP ₁ P ₁	49.9	blast.
	E	i	54.4	
	NE	iS ₁	55.7	
	NE	iS ₁ S ₁	58.7	
	NEZ	iL	59.2	
05.92		H	22 07 00	$\Delta = 125^{\circ}$ ca., from SKS-P'
	Z	eP(diff)	22 58	USCGS = 24° S, 173° E
	Z	eP'	26 11	
	Z	ePP	27 58	
	NE	ePPS	39 24	
	NE	eSS	45 04	
	EZ	eL	23 06 30	
	EZ	eM	12 00	
06.	EZ	iL	01 15 04	

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No. 19
(contin)

06.06	H	01 27 30	$\Delta = 125^\circ$ ca., from PP-P'
Z	eP'	43 26	
EZ	ePP	45 36	
Z	eSKP	47 15	
EZ	ePPP	48 08	
EZ	eSKS	50 41	
NEZ	eSKKS	52 04	
Z	ePPS	56 43	
Z	ePPPS	57 46	
NZ	iSS	02 02 14	
E	eSSS	06 40	
E	eG	16 00	
E	eL	23 42	
07.	NEZ	iS ₁	16 19 38.2 local
07.	NE	e	17 57 15
	NE	eSS	18 02 20
	NEZ	eL	21 35
07.	NEZ	eP ?	23 41 00
	Z	i	26.4
	NE	iS ₁	37.3 local
08.	NZ	iL	12 15 00
08.	NEZ	e	14 29 10
	N	e	35 50
	NZ	eL	53 00
08.	Z	e	23 06 00
	NZ	eM	15 00
09.	E	eL	07 10 00
12.	NE	e	03 58 00
	NEZ	eL	04 05 00
12.	Z	e	12 56 17
	N	e	13 14 35
	NE	e	29 17
	NEZ	eL	36 30
13.	NEZ	iS ₁	17 10 52.5 local
14.	N	iL	11 59 50
15.	N	e	00 08 22
	N	e	11 50
	EZ	eL	28 36
15.95	H	22 45 47	$\Delta = 701$ km, from S ₂ -P ₂
EZ	iP ₂	47 35.1	Dilatation= 1 mm
NE	i	48 38.6	MESA= 48°N, 67.5°W.
E	i	48.3	
EZ	i	58	
E	iS ₂	49 04	
20.02	H	00 23 26	$\Delta = 69.5^\circ$ from S-P
NEZ	iP	34 42	Dilatation= 6 mm
Z	iPcP	35 09	to North= trace
Z	e	36 32	to East= 1 mm
NE	eS	43 48	Surface waves weak. Felt
Z	eSSS	51 36	near Athens, Greece.
NE	eL	56 35	Strasbourg= 38°17' N, 23°45' E.

1938 July	WESTON, MASS.			No. 19 (contin)
20.	Z	i	12 09 32	
	Z	i	09 46	
	Z	i	09 51	
	NE	e	16 02	
	N	eM	20 35	
22.32		H	07 48 04	$\Delta = 38^\circ$ from S-P
	NEZ	eP	55 29	Compression= 7.5 mm
	NEZ	iP	55 31	to North= 2 mm
	NEZ	i	55 58	to East= 2.5 mm
	Z	i	56 18	USCGS= 18.9° N, 107° W
	NEZ	iPP	57 00	
	NE	iPPP	57 26	
	NE	iS	08 01 28	
	EZ	eSS	04 06	
	EZ	eL	07 21	
	NEZ	eM	09 35	
22.	NEZ	iP	13 38 46.2	$\Delta = 131$ km from S-P
	NE	iS	39 02.0	local or quarry blast.
23.	Z	eP' ?	23 21 30	Probably deep focus.
	Z	i	22 30	
	Z	i	23 21	
	N	e	31 38	
24.55		H	13 12 28	$\Delta = 60^\circ$ from S-P
	NEZ	iP	22 23	Compression (iP)= 5 mm
	NEZ	iP ₂	22 25	" (iP ₂)= 26 mm
	Z	i	22 33	to South= 1.5 mm
	Z	i	22 40	to East= 0.5 mm
	Z	i	22 47	JSA= 53° N, 164° W
	NZ	iPP	24 54	Multiplicity of P phases
	NE	iS	30 37	very noticeable.
	NE	iPS	30 55	
	E	iScS	32 12	
	N	eSS	34 54	
	Z	eSSS	37 16	
	NZ	e L	41 10	
25.92		H	22 10 59.7	$\Delta = 60$ km from S ₁ -P ₁
	NEZ	iP ₁	11 09.7	Dilatation to North West
	NEZ	iP ₁ P ₁	10.3	local, or quarry blast.
	NEZ	i	13.6	
	NEZ	iS ₁	17.1	
	N	iS ₁ iS ₁	23.6	
26.	NEZ	eP ₁	17 03 02.8	$\Delta = 133$ km from S ₁ -P ₁
	NE	eS	17.5	
	NE	iS ₁	19.0	
27.	Z	e	01 40 17	
	N	e	41 41	
	NZ	eL	02 00 30	
	NZ	eM	09 00	
27.	NZ	eM	17 58 15	
27.	NEZ	e	20 06 48	
	NZ	eL	15 00	
28.	Z	iP	08 29 31	Compression= 3 mm
	Z	i	29 38	Probably deep.
28.	NEZ	iS ₁	20 13 06.5	local.

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No. 19
(contin)

29.32		H	07 44 18.5	$\Delta = 265$ km from S_2-P_2 felt in New York City.
	NEZ	ePn	57.5	
	Z	i	58.8	
	NZ	iP ₂	45 00.0	
	NEZ	i	04.3	
	NEZ	iS _n	24.1	
	NEZ	iS ₂	30.0	
	NE	i	33	
29.55		H	13 06 21	$\Delta = 137^\circ$ from PP-P' Compression Strasbourg= $0.3^\circ N, 99.3^\circ E$ felt in Sumatra.
	Z	iP'	25 58	
	Z	ePP	28 26	
	Z	i	28 40	
	NZ	eSKP	29 29	
	NZ	iPPP	31 43	
	N	ePS	38 45	
	E	eSS	46 47	
	N	eSSS	51 35	
	N	eSSSS	56 25	
31.	Z	iP	15 17 06	Dilatation= 1 mm
	Z	e	21 16	
	Z	eL	31 00	

Other seismic phases.

Short period: 01.25; 01.90; 04.63; 05.67; 06.71; 06.76;
 07.36; 07.67; 07.94; 08.34; 08.65; 08.67;
 08.72; 09.02; 09.46; 10.14; 11.64; 11.98;
 12.63; 12.67; 13.51; 13.62; 13.64; 13.88;
 14.02; 14.48; 14.67; 14.76; 14.86; 14.91;
 15.35; 15.63; 15.64; 15.85; 16.09; 18.67;
 18.87; 18.97; 19.64; 20.59; 20.60; 21.14;
 21.79; 22.30; 22.69; 22.69; 23.05; 23.58;
 24.12; 24.13; 25.77; 25.77; 26.56; 26.86;
 27.08; 27.64; 28.08; 28.78; 28.78; 29.53;
 29.67; 30.16; 30.53; 30.57; 31.17.

Long period: 02.34; 05.42; 06.30; 06.45; 06.54; 17.49;
 18.39; 21.42; 23.58; 28.92.

Daniel Linchan, S.J.
Seismologist

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

$h = 65$ meters
 Gabbrodiorite.

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Wiechert 80k NE Benioff 100k (long and short period) NEZ Bosch-Omori 25k NE

1938 August No. 20

01	Z	iP	06 18 17	
02.38		H	09 02 30	$\Delta = 250$ km from S_n-P_n Compression to North East Felt near New York City. NESAs = $41^{\circ} 05' N$, $73^{\circ} 42' W$
	NEZ	iP _n	03 08.0	
	NEZ	i	08.7	
	NZ	iP ₂	10	
	NEZ	iS _n	31.6	
	NZ	iS ₂	38	
	NZ	iS ₁	42	
02.80		H	19 13 05.5	$\Delta = 100$ km from S_1-P_1 Compression = 0.25 mm to East = 0.5 mm local or quarry blast NESAs = $42.1^{\circ} N$, $72.5^{\circ} W$
	EZ	iP ₁	18.1	
	Z	i	19.7	
	NEZ	iS ₁	30.3	
	NEZ	i	32.8	
	EZ	iL	36.5	
02.	N	e	20 08 40	
	NZ	eM	16 00	
03.56		H	13 32 10	$\Delta = 41^{\circ}$ from PP-P
	Z	iP	40 16	
	Z	iPP	41 49	
	Z	ePPP	42 16	
	E	eS	46 23	
	NE	eSS	49 25	
	NEZ	eM	57 03	
04.37		H	08 54 48	$\Delta = 66^{\circ}$ from S-P Dilatation = 12 mm to South = 2 mm to East = 0.25 mm $h = 200$ km USCGS = $24^{\circ} S$, $65.4^{\circ} W$
	NEZ	iP	09 05 18	
	Z	iP	06 13	
	Z	iS	06 16	
	Z	i	07 52	
	Z	i	09 28	
	NE	iS	13 49	
	E	i	14 58	
	E	iS	15 21	
	N	iSS	18 17	
	NE	eSSS	21 13	
	E	eG	22 09	
	Z	eP'P'	33 42	
06.68		H	16 21 52	$\Delta = 205$ km from S_1-P_1 Quarry blast in Bethlehem, N.Y.
	EZ	iP ₂	22 24.3	
	EZ	iP ₁	26.0	
	E	i	35.6	
	NEZ	iS ₁	49.8	
08.	NZ	eL	11 44 00	
08.	NZ	e	15 49 10	
	N	eL	56 00	
08.	NZ	e	18 32 41	
	NZ	iL	44 46	
14.	Z	iP	01 35 44	
	Z	i	35 49	
15.	Z	iP	11 12 51	Felt in Albania. Strasbourg = $41^{\circ} N$, $20^{\circ} E$.

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No. 20
(contin)

16.19	H Z iP' NZ ePP E eSKKS Z e N e NZ ePS N ePPS NE iSS NE eM	04 27 54 46 30 47 23 54 58 56 50 57 03 57 18 58 18 05 03 10 33 40	$\Delta = 114^\circ$ from SS-P' Strasbourg= 22.6' N, 94.6°E
16.	NEZ iP Z i	14 01 35 02 44	Compression= 6 mm to South= 1 mm to East= 0.25 mm
17.07	H Z iP Z iPcP NE eSKS N eS N e	01 45 36 58 06 58 12 02 08 28 08 35 09 32	$\Delta = 83^\circ$ from S-P Compression= 1.5 mm Strasbourg= 47° N, 150°E
18.40	H Z eP' Z iP' Z iP P' Z i Z i NZ iPP Z i Z iPPP NE iSKKS E eSS N eSSS	09 30 00 49 23 49 28 49 52 52 32 52 56 53 03 53 42 56 20 59 08 10 10 56 17 42	$\Delta = 146^\circ$ from SKKS-P Compression= 4 mm h= 100 km ca. Strasbourg= 4° S, 104°E
18.	Z iP Z i Z iP N eS ?	12 00 03 00 10 00 48 08 18	Compression= 2 mm
18.	NE i N i Z eL	19 31 18 35 42 20 01 00	
20.	Z i NE eM	08 50 14 09 35 00	
21.	Z iP	12 01 22	Dilatation= 3 mm
21.	Z iP Z e N eSS	16 29 52 35 42 38 52	$\Delta = 42^\circ$ ca. from SS-P
22.74	H NEZ eP _n EZ i Z iP ₂ Z iP ₁ NEZ i NE eS _n N eS ₂ NE iS ₁	12 48 12 48 58 49 00 02.5 05.2 07.5 33 39.5 45.5	$\Delta = 325$ km from S ₁ -P ₁ Felt near Bangor, Maine. NESA= 44° 45' N 68° 50' W
22.	NZ iS ₁	20 46 16	local
23.15	H NE eP _n NEZ iP ₂ N iS _n ? NE iS ₂ E iS ₁	03 36 33 37 20.4 26.4 38 09.0 12.4 22.4	$\Delta = 360$ km from S ₂ -P ₂ Felt near Trenton, N.J. NESA= 40° 15' N 74° 15' W

1938 August		WESTON, MASS.		No. 20 (contin)
23.21	H		05 04 54	$\Delta = 360$ km. from S_2-P_2 felt near Trenton, N.J. aftershock of 23.15 NESA= same epicenter as 23.15
NZ	iP _n		05 42.7	
NZ	iP ₂		50.4	
NZ	iP ₁		54.4	
E	eS _n		06 23.2	
NZ	iS ₂		30.4	
NZ	i		07 26.4	
23.	NEZ	i	05 29 46	Felt in Westchester, N.Y.
	NEZ	i	52	
23.30	H		07 05 27.5	$\Delta = 360$ km from S_2-P_2 aftershock of 23.15 and 23.21 NESA= same epicenter.
NEZ	iP ₂		04 23.9	
NEZ	iP ₁		26.9	
Z	i		47.2	
NEZ	i	05	03.9	
NEZ	iS ₂		06.9	
EZ	iS ₁		11.4	
23.	Z	i	07 12 11	Felt in Westchester, N.Y.
	Z	i	15	
	Z	i	18	
23.	NEZ	i	11 12 08.4	Aftershock of Trenton quake.
	Z	i	45.5	
	Z	i	48.5	
24.	Z	iP	16 03 26	Dilatation (P_2)= 30 mm to North= 3 mm to West= 0.5 mm Rest of quake disturbed by microseisms.
	NEZ	iP ₂	03 28	
	Z	e	17 25	
25.06	H		01 25 37	$\Delta = 143^\circ$ from PP-P' Dilatation= 3 mm Strasbourg= $5^\circ S, 100^\circ E$
Z	iP'		47 22	
Z	ePP		50 45	
Z	eSKP		51 15	
NE	ePS	02	02 11	
N	L		40 00	
26.83	H		19 55 32	$\Delta = 197$ km from S_1-P_1 Compression to East local or quarry blast
NEZ	iP ₁		56 04.6	
E	i		27	
N	iS		28	
NZ	iS ₁		29.1	
27.	NEZ	eP	22 37 24.5	Aftershock of Trenton quakes
	NEZ	i	28	
	EZ	iS	38 04.2	
	EZ	i	07	
	EZ	i	12.5	
27.	NEZ	iS	22 38 50	Same location as previous quake. Preliminaries confused in previous disturbance.
	EZ	i	51.5	
	EZ	i	53	
	EZ	i	55.5	
28.	Z	eP	03 11 30	
29.64	H		15 22 12	$\Delta = 125^\circ$ from PP-P' USCGS= $12^\circ N, 124^\circ E$ Destructive in Philippines
Z	eP'		41 22	
NZ	iPP		43 03	
N	eSKP		45 31	
NE	ePS		53 01	
Z	ePPS		54 31	
NE	eSS	16	00 21	
N	eSSS		05 40	

$\phi = 42^\circ 23' 00''$ N
 $\lambda = 71^\circ 19' 20''$ W

h = 65 meters
Gabbrodiorite.

WESTON, MASS.

BULLETIN

of the Weston College Seismological Observatory

Wiechert 80k NE Benioff 100k (long and short period) NEZ Bosch-Omori 25k NE

1938
September

No. 21

01.	N EZ	e iS ₁	02 26 03.5 45	local
01.	EZ NE E	iP ? i iS ₁	02 28 46 29 13 29 17	local
01.	E	iS ₁	02 47 45	local
01.	N N NE	e e eM	03 24 25 38 01 56 00	
01.	E Z	iS ₁ i	20 29 40 54	local
01.	E E	e iS ₁	20 34 41 48	local
01.95	Z Z Z NZ N N EZ	H eP iP i ePP ePPP eS eL	22 48 30 55 05 55 06 55 14 56 12 56 29 23 00 27 04 41	$\Delta = 33^\circ$ from S-P Compression= 13 mm USCGS= 13.1°N, 89.4°W
04.	Z Z	iP ? eM	20 35 46 21 18 00	
04.	Z Z	iP i	21 24 28 24 41	
04.	N N	e e	22 29 20 31 40	
05.	N N	eS ? eSS	15 12 12 18 58	
06.	Z Z NZ	iP i eL	20 50 31 58 43 21 38 00	Strasbourg= 47°N, 147°E
07.	Z Z NZ	iP' iP'2 iSKP	02 15 49 14 04 17 02	
07.17	Z N N N	H ePP ePS ePPS eL	04 03 24 22 44 32 12 33 20 56 40	$\Delta = 111^\circ$ from PS-PP Formosa USCGS= 24°N, 121.5°E
07.	Z Z	iP ipP ?	13 17 06 17 47	Compression= 5 mm
07.	NE E EZ	iS i iS ₁	23 20 34.7 36.7 46.2	local or quarry blast

1938 September		WILSTON, MASS.		No. 21 (contin)	
09.	Z Z N	iP i e	17 36 06 36 19 43 24		
10.60		H eP iP ₁ i iS ₁	14 26 30 27 02.7 04.2 27.4 30.3	Δ= 201 km from S ₁ -P ₁ Quarry blast, Hudson, N.Y.	
11.	NEZ	i	04 09 36	local	
11.	NEZ	i	04 13 23	local	
11.	NEZ	i	04 30 27	local	
11.	Z EZ	i iS ₁	23 27 10 16	local	
12.26		H iP ePP eS eSS eL eM	06 10 17 18 13 19 45 24 19 27 12 30 00 33 30	Δ= 40° from S-P Dilatation Pasadena= 40°N, 124.5°W	
14.75		H iP ₁ iP ₁ P ₁ iS ₁ iS ₁ S ₁	18 01 35 55 57.4 02 09.8 14.5	Δ= 122 km from S ₁ -P ₁ Quarry blast ?	
14.	Z Z	eP i	23 12 51 13 10		
15.	N NEZ N	i i	18 22 10.7 11.2 15.9	local	
16.	N NE	eSS eL	04 29 00 47 00		
17.15		H iP iP iPR ₁ ePR ₂ eX ? iS iSR ₁ L	03 34 23.8 38 15.9 38 16.1 38 30.6 38 33.9 41 17.7 41 28.4 42 03.6 42 48	Δ= 16.6° from P-H Quake felt in Arkansas. Z short-period not in operation. Grams read at St. Louis. cf. JSA #33, 1938. JSA= 90° 20.4' W 35° 27.8' N	
17.	N N NE	e iL eM	17 35 42 36 13 38 37	Felt in Ariz. and N. Mex. USCGS= 33°N, 109°W	
17.	N	eM	21 35 30	Aftershock of the above.	
18.	NZ N N	iP e e	04 01 34 11 00 18 08	Felt in Greece Strasbourg= 38°N, 23.5°E	
20.13		H iP iS eL	03 03 20 12 13 19 01 26 40	Δ= 47° from S-P	
30.	Z	i	15 40 00	disturbed by microseisms.	

1938
September

WESTON, MASS.

No. 21
(contin)

Other seismic phases:

Short period: 01.32; 01.69; 01.90; 02.60; 03.05; 03.30;
03.65; 04.15; 06.81; 07.19; 08.06; 08.53;
08.84; 08.98; 09.90; 10.33; 10.74; 12.32;
12.55; 12.76; 12.97; 13.22; 13.73; 14.68;
14.75; 14.90; 15.28; 15.80; 16.22; 18.11;
19.63; 20.11.

Long period: 03.02; 03.27; 04.85; 05.52; 10.98; 11.76;
16.27; 19.01 19.53; 19.84; 20.60.

Strong microseismic activity on the following dates:

Day and hr.	to	Day and hr
01st 00		03rd 05
05th 02		07th 05
08th 03		10th 20
13th 06		15th 00
30th 18		

Notice: The New England Hurricane of September 21st, 1938, disrupted the power service at the Weston College Observatory during the interval from the 21st to the 29th. Seismic records are lacking for this period.

Daniel Linchan, S.J.

The Department of Seismology gratefully acknowledges the receipt of the following Station Bulletins and publications from January to June, 1938.

Apia	July to December, 1937; January to March 1938
Berkeley	July to September 1937
Bucarest	December 1937; February to April 1938
Cape Town	November and December 1937
Copenhagen	Year 1934; April to December 1938
	"Determination of Instrumental Constants of the Galitzin Seismometer" - Rybuor
Denver	January to June 1937
Florissant	June 1937
Fordham	January to April 1938
Granada	July to December 1937
Hamburg	August to December 1937; January to April '38
Hawaii	Volcano Letter January 1938
J.S.A.	Prelim. Bull. Septombct to December 1937; January 1938
Kew	December 1937; January to May 1938
Ksara	October to December 1937; January to March 1938
La Plata	January to March 1938
Leipsig	Publication
	"Das Horizontaldoppelpendel" -Lottau
Little Rock	May 1937
Manila	November and December 1937
Martinique	January to March 1938
Melbourne	July to December 1937; January to March 1938
	October to December 1937; January and February 1938
Messina	Bulletin for 1937
Ottawa	December 1937; January to April 1938
	"Bibliography of Seismology" Vol VII
Parc Saint-Haur	March to April 1938
Pasadena	March to April 1938
Penn. State	July to November 1937
Rathfarnam	December 1937; January to April 1938
Riverview	January to March 1938
Rome	Bollettino Sismico 1933 - Microsismi " " 1935 - Macrosismi
St. Louis	June 1937
San Salvador	Bulletin for 1936
Stara Dala	January to December 1937
Strasbourg	
Bureau Central	October to December 1937; Jan. to April 1938
Institut	" " " " " "
Union Internationale	" " " " " "
Tananarive	March to May 1937
Uccle	July to August 1937
USCGS	June to July 1936; January and February 1937
	"Earthquakes of the Western Mountain Region" -Heck
	"Some Unsolved and Partially Solved Seismic Problems" - Heck (B.S.S.A. Jan. 1938)
Wellington	November and December 1937; Jan to March 1938
	"Seismic Aspects of Buller Earthquake" -Bastings
	"Pahiatua Earthquake of March 5. 1934" -Hayes
	"Phase S in New Zealand Quakes" - Bullen
	"Analysis of Hawke's Bay Earthquake, Feb. 1931" -Bullen
Williamstown	June to September 1937
Zinsen	January to December 1935; January to April, October to December 1937.

G.A. O'Donnell, S.J.
Director

M.J. Ahern, S.J.
Chairman

$\phi = 42^{\circ} 23' 00''$ N
 $\lambda = 71^{\circ} 19' 20''$ W

$h = 65$ meters
 Gabbrodiorite.

WESTON, MASS.

BULLETIN

of the Weston College Seismological Observatory

Wiechert 80k NE

Benioff 100k (long and short period) NEZ

Bosch-Omori 25k NE

 1938
 October

No. 22

02.	NZ	i	10 36 28	Local with probably the same location as the following.
	NZ	iS ₁	36 55	
02.44		H	10 39 50.5	$\Delta = 384$ km from S ₁ -P ₁
	EZ	eP ₂	40 05	
	N	eP ₁	08	
	E	i	47	
	NE	eS ₂ ?	49.5	
	NZ	iS ₁	56.5	
02.	N	eSS	16 55 30	
	NE	eM	17 02 00	
04.	Z	i	09 05 22	
	N	eL	20 00	
	E	eM	34 40	
07.	Z	e	16 47 00	
	N	e	17 02 02	
	E	eL	20 00	
09.	Z	eP' ?	16 56 22	Compression= 5 mm to East= 0.5 mm
	EZ	iP' ?	56 27	
	N	i	17 13 41	
	N	iSS	27 19	
10.	N	eSS	03 13 44	
	N	eL	23 00	
10.87		H	20 48 00	$\Delta = 135^{\circ}$ ca. from PP-P' Dilatation= 7 mm $h = 250$ km USCGS= 1° N, 125° E
	Z	eP'	21 07 18	
	Z	iP'	07 25	
	Z	i	07 42	
	Z	ipP'	08 34	
	Z	isP'	08 54	
	NZ	i	09 24	
	NZ	iPP	09 39	
	NZ	iPP	09 45	
	NZ	i	10 11	
	NZ	iSKP	10 49	
	N	iPKS	11 09	
	N	eSKKS	16 17	
	Z	iSKKP	19 54	
	NZ	eSP	20 06	
	E	ePS	20 39	
	N	eSPP	21 38	
	E	eSS	27 14	
	E	eSSS	33 14	
10.92		H	22 01 53	$\Delta = 114$ km from S ₁ -P ₁ local or quarry blast
	NZ	iP ₁	02 10.5	
	NEZ	iP ₁ P ₁	11.1	
	Z	i	22.5	
	NE	iS ₁	24.2	
	NE	iS ₁ S ₁	25.6	
11.	E	e	09 41 29	local
	E	eS ₁	42 16	

1938
October

WESTON, MASS.

No. 22
(contin)

12.02		H	00 54 20	$\Delta = 94^\circ$ from SKKS-P
	Z	eP	47 41	Dilatation
	Z	i	47 45	
	Z	i	48 15	
	Z	i	48 20	
	N	eSKS	58 14	
	E	iSKKS	58 37	
	Z	eS ?	59 43	
	Z	iPS	59 58	
	E	i	01 07 59	
	NE	eSS	08 44	
	E	eL	16 00	
13.	Z	i	17 33 45.4	local
	Z	i	54 00.9	
	Z	iS ₁	09.4	
13.64		H	15 26 04	$\Delta = 125^\circ$ measured
	N	e	55 00	Strasbourg= 13°N, 122°E
	NE	eL	16 21 00	
14.66		H	15 51 30	$\Delta = 45^\circ$ from PP-P
	NEZ	iP	16 00 10	Compression= 1.5 mm
	N	iPP	01 56	to East= trace
	N	eSS	10 00	to South= trace
	NE	eM	17 40	
16.10		H	02 19 45	$\Delta = 46^\circ$ from PPP-P
	Z	iP	28 25	Felt in Bilbao, Spain
	Z	i	28 29	Strasbourg= 43.5°N, 3°W
	N	iPcP	29 49	No surface waves.
	N	ePPP	30 48	
17.	Z	iP	15 39 27	$\Delta = 92^\circ$ ca. measured
	Z	i	39 53	Strasbourg= 40°N, 143°E
	Z	i	40 15	
	Z	i	40 39	
	N	i	49 32	
	NEZ	iS	49 53	
	NZ	i	50 54	
17.	Z	i	20 27 57.5	local
	Z	i	28 00	
	Z	i	04	
	Z	i	09	
	NE	iS ₁	12.5	
19.	Z	i	01 43 50.9	local
	Z	i	58.4	
	NE	i	44 02.9	
	NZ	iS ₁	04.4	
19.18		H	04 13 52	$\Delta = 88^\circ$ from S-P
	Z	iP	26 13	Dilatation= 2 mm
	Z	ePcP	26 16	
	Z	i	27 01	
	Z	i	27 50	
	N	ePP	29 42	
	NE	iS	36 54	
	N	iPPS	37 50	
	NE	eSS	43 04	
	E	eG	51 24	
	NE	eL	53 45	
	E	eM	59 50	

1938
October

WESTON, MASS

No. 22
(contin)

20.10	H	02 19 30	$\Delta = 146^\circ$ from PP-P
Z	eP'	58 55	Dilatation= 6 mm
NZ	iP'	58 56	to North= 2.5 mm
NZ	ipP'	39 05	h= 100 km ca.
NZ	i	39 48	Maximum amplitude of
Z	i	40 28	P' group= 35 mm
Z	i	40 46	
Z	i	41 44	
Z	iPP	42 32	The short period phases
E	i	42 42	at 03 01 14 and 03 02 01
Z	iPPP	45 54	may be preliminaries of
Z	eSKS	46 02	another quake without
NE	eSKKS	48 42	surface waves.
Z	eSPP	54 44	
Z	ePSP	55 14	JSA= 9.5° S, 122.8° E
N	eSS	03 00 58	
Z(sp)	e	01 14	
Z "	e	02 01	
N	eSSS	06 36	
20.	Z	10 12 20	Dilatation= 2 mm
	Z	15 52	
	NE	11 41 40	
20.	NEZ	21 40 25.4	local
	NEZ	30.6	
21.30	H	07 18 55	$\Delta = 210$ km from S ₁ -P ₁
NZ	eP ?	19 26	Dilatation to South West
NEZ	iP ₁	26.6	NESA= $41^\circ 10'$ N
N	i	27.5	$73^\circ 40'$ W
E	i	42.2	
NEZ	iS	49.2	
NEZ	iS ₁	52.2	
NEZ	i	55.3	
21.	Z	06 58 36	Compression= 3 mm
	Z	07 00 37	
21.	Z	23 54 54	
22.	N	00 07 34	
	NZ	11 30	
22.67	H	16 10 25	$\Delta = 193$ km from S ₁ -P ₁
NEZ	iP	11 06.4	Quarry blast ?
NEZ	iP ₁	08.3	NESA= $42^\circ 31'$ N
NE	i	29.5	$73^\circ 51'$ W
NEZ	iS ₁	31.8	
23.21	H	04 58 40	$\Delta = 46^\circ$ from S-P
Z	eP	05 07 26	
Z	ePP	09 12	
NZ	eS	14 08	
E	eSS	18 55	
NE	eL	21 00	
NE	eM	25 00	
23.	NE	15 52 30	
	NEZ	16 04 00	
24.	NEZ	19 44 42.6	local
	NZ	52.3	
29.55	H	13 08 30	$\Delta = 99^\circ$ measured
N	e	35 12	Strasbourg= 34° N, 142° E
N	e	41 08	
NEZ	eM	14 03 00	

1938
October

WESTON, MASS.

No. 22
(contin)

29.95	H	22 52 40	$\Delta = 151^\circ$ from PP-P'
Z	iP'	23 12 30	Compression= 3,5 mm
Z	i	12 57	Strasbourg= 8° S, 117.5° E
NZ	ePP	16 00	
30.	Z	08 58 04	Compression= 3 mm
Z	i	58 23	
Z	i	38 27	

Other seismic phases:

Short period: 01.71; 02.13; 03.44; 03.86; 04.01; 04.49;
 04.86; 04.97; 05.41; 05.87; 05.88; 05.92;
 05.93; 06.31; 06.55; 07.00; 07.43; 07.62;
 07.73; 07.81; 08.24; 08.94; 09.17; 09.81;
 10.46; 10.68; 11.10; 11.21; 11.74; 11.86;
 11.90; 12.19; 12.59; 13.37; 13.37; 13.54;
 13.71; 13.82; 13.86; 14.28; 14.30; 14.81;
 15.09; 15.85; 17.47; 17.75; 17.78; 17.82;
 17.84; 17.86; 17.88; 18.10; 18.40; 18.68;
 18.71; 18.75; 18.78; 18.87; 18.90; 19.04;
 19.06; 19.61; 19.72; 19.85; 19.89; 19.89;
 19.90; 20.19; 20.74; 20.86; 21.31; 21.75;
 21.77; 22.19; 22.64; 22.69; 23.14; 24.36;
 25.40; 25.89; 26.01; 26.41; 26.61; 27.34;
 27.79; 28.24; 29.19; 29.64; 29.85; 30.20;
 31.62; 31.63; 31.85.

Long period: 04.04; 05.58; 10.06; 17.98; 18.32; 21.90;
 23.14.

Strong microseismic activity on the following dates:

Day and hr	to	Day and hr.
		03rd 00
24th 23		28th 06
30th 00		31st 23

Daniel Linehan, S.J.

The Department of Seismology gratefully acknowledges the receipt of the following station Bulletins and publications from July 1 to December 31, 1938.

Adelaide	January to December 1934
Africa (Occ. Fr.)	Bulletin for 1935 and 1936
Apia	April to September 1938.
Argentina (San Miguel)	Publications
	"El Eclipse de Sol del 29 de Mayo de 1938"
	"El Planetario Zeiss"
	"Los Rayos Cosmicos"
Belgium (Obs Royal)	January to December 1937
Bergen	January to December 1937
Bucarest	May to November 1938
Brazil (Min. de Agricul.)	Bulletins # 18-22; #25-27
Cape Girardreau	February to May 1938
Cape Town	March to June 1938
Carnegie Inst. of Wash.	Annual Report of Dir. on Ter. Magn.
Dakar	March to May 1937
De Bilt	January to December 1935
Denver	October to December 1937
Florissant	July to December 1937
	January to May 1938
Granada	January to May 1938
Hamburg	April to July 1938
Hawaii	Volcano Letter, March to July 1938
Jesuit Scis. Asso.	Prelim. Bull. August to Sept. 1938
Karlsruhe	January to June 1938
Kow	June to October 1938
Ksara	April to September 1938
La Plata	April to September 1938
Little Rock	November to December 1937
	January to May 1938
Manila	May to September 1938
Martinique	April to September 1938
Melbourne	April to September 1938
Ottawa	May to August 1938
Parc Saint-Maur	June to September 1938
Pasadena	January to March 1938
	Prelim. September to October 1938
	"On Focal Points of SKS" - B. Gutenberg
	"P' and the Earth's Core"- Gutenberg and Richter
	"Observed Times of the Montana Earthquake of 1935"
	- Gutenberg and Richter.
	"The Velocity of Sound Waves from Gun Fire in Southern California" - Gutenberg
	"The Determination of the Extent of Faulting With Application to the Long Beach Earthquake"
	- H. Benioff.
Rathfarnham	July to October 1938
Riverview	April to September 1938
Saint Louis	July to December 1937
	January to May 1938
Strasbourg	
Bureau Central	May to September 1938
L'Institut	May to September 1938
Union International	May to September 1938
Stuttgart	October to November 1938
Uccle	January to March 1938
U.S. Naval Obs.	May to November 1938
Wellington	April to August 1938
	Publication #134
	"Tables for Reduction of Apparent Travel-Times of the Seismic Pulses PKP, PKP ₂ , SKS"
Williamstown	April to June 1938
Zinson	May to September 1938

G.A. O'Donnell, S.J.
Director

M.J. Ahern, S.J.
Chairman

NOTICE

The Instrumental Bulletin of the Weston College Observatory is not intended to be a complete list of earthquake phases recorded, but rather, a list of those phases which might assist in the determination of epicenter. A more complete list for each quake recorded is kept on file at the Observatory.

Time is given according to Greenwich Central Time, and readings have been interpreted to the nearest second, with the possible exception of 'L' and 'M' phases. These latter are given to the nearest half minute. Phases of disturbances of local origin are given to the nearest 0.1 second.

Clock corrections are made automatically four times daily, and at intervals of six hours, from the U.S. Naval Observatory Time Signal Service. These signals, on the 113 kc frequency, are recorded directly on the seismogram. The continuous Time Signal Service from the Dominion Observatory, Ottawa, Canada, ~~are~~ likewise employed several times daily for coincidence comparisons.

Local disturbances and quarry blasts, when interpretable, are reported for the use of Stations in the New England area.

Insignificant and undecipherable disturbances are included at the end of the Bulletin according to the date and its decimal part.

Single amplitudes of record traces for 'iP' and earth movements for the same phase will be given. These characteristics will be included for other phases only when their significance seems to warrant such notation.

Instrumental constants will be included at various times during the year.

In as much as we are forced to revise our mailing list, we are requesting that those interested in the receiving the Bulletin inform us as soon as possible. The Bulletin will be mailed to those on the present list for the next few months pending the compilation of a new list.

We would appreciate our address being added to the mailing list of your Station.

Kindly address all communications to

Seismological Observatory
Weston College
Weston, Mass.
U.S.A.

G. A. O'Donnell, S. J.
Director

M. J. Ahern, S. J.
Chairman, Dept.
of Seismology

Pasadena	April to August 1938
Praha	Preliminary Bulletin Jan. to April 1939 October and November 1938
Rathfarnham	Annuaire 1930 - 1938
Riverview	November 1938 to April 1939
St. Louis	October 1938 to April 1939
Strasbourg	September and August 1938
Bureau Central	May 1938 to March 1939
L'Institute	June 1938 to March 1939
Union International	March 1938 to March 1939
Stuttgart	December 1938 to May 1939 Bulletin 1937
Upsala	July 1937 to June 1938
U.S. Naval Observatory	December 1938 to February 1939
U.C.C.L.E.	March 1937 to December 1938
U.S.C.G.	November to May 1937
Wellington	October 1938 to March 1939 Earthquakes in New Zealand On the Epicenter of the 1934 Pahiatua Earthquake, Bullen.
Wien	January to December 1937
Williamstown	July to September 1938
Zinson	January 1936 to December 1937

M. J. Ahern, S.J.
Director

The Department of Seismology gratefully acknowledges the receipt of the following station Bulletins and publications from January 1 to July 1, 1939.

Apia	January to December 1938
Acrireale	Bolletino Meteorico Mensile
Batavia	October 1937 to March 1938
	Sea-Surface Temperatures ... in
	Netherlands India, M.W.F. Schregardus
Belgium (Uccle)	January to June 1938
Bergen	January to December 1937
Brazil (Min. de Agricul.)	Notas Preliminares - April, May, June
	1937; March 1938. Meteoric Annual do
	Director, 1935 and 1936. Bulletins
	21, 1937: 24, 25, 27, 28, 1938. Avulso
	29, 29, 30, 31 32, 33. Bulletins 75, 76,
	89, 1938
Bucarest	December 1938 to January 1939
Cape Girardeau	June to October 1938
Capetown	July 1938 to January 1939
Collenberg	February and March 1939
De Bilt	January to December 1936
Denver	January to July 1938
Florissant	June to September 1938
Fordham	October 1938 to March 1939
Hamburg	August to December 1938
Harvard	Roots of Volcanos, Daly
	Elasticity and Internal Friction in a
	Long Column of Granite, Birch, Bancroft.
	Thorium and Uranium Ratios of Rock
	and their Relations to Lead Ore Genesis,
	Loenl. High Pressure Behavior of Mis-
	cellaneous Minerals, Bridgman.
	Elasticity of Certain Rocks and Massive
	Minerals, Birch, Bancroft. Experiments
	Bearing on the Orientation of Quartz
	in Deformed Rocks, Griggs, Bell.
	Effects of Pressure on the Rigidity of
	Rocks, Birch, Bancroft. Effect of
	Pressure on the Viscosity of Boric
	Anhydride Glass, Dane, Birch.
	New Hampshire Earthquakes of Nov. 4, 1936,
	Collins, Travel Times for Shear Waves
	in a Granite Layer, Birch. Earthquakes
	in Northeastern America, July - Dec.
	1937, Leet. Longitudinal Velocities in
	Some weathered and Unweathered Rocks,
	Leet. The Velocity of Sound in Rocks etc.
	Ide. Deformation of Single Calcite
	Crystals etc., Griggs.
Hawaii	December 1938 to February 1939.
India	Meteorological Survey, April and June 1938
Italy	Societa Sismologica Italiana
Real Collegio Carlo Alberto	January to December 1938
Jesuit Seis. Ass.	Preliminary Bulletin Sept. 1938 to March
	1939
Karlsruhe	July to December 1938
Kew	December 1938 to May 1939
Ksara	January to December 1935 and 1936
Ia Plata	October 1938 to January 1939
Leipsig	February to March 1939
Little Rock	September to December 1938
Lwow	September to December 1938
Manila	October 1938 to March 1939
Martinique	October 1938 to March 1939
Melbourne	October 1938 to April 1939
Messina	Geofisica Pura E Applicatta.
Ottawa	September 1938 to February 1939
	Earthquake Correlation Table
Parc Saint-Maur	November 1938 to February 1939