SEISMOLOGICAL LABORATORY

CARNEGIE INSTITUTION OF WASHINGTON
CALIFORNIA INSTITUTE OF TECHNOLOGY
220 NORTH SAN RAFAEL AVENUE
PASADENA, CALIFORNIA

REVISED
JANUARY 1, 1935

BULLETIN

The SEISMOLOGICAL LABORATORY, Pasadena, California, is maintained and operated by the Carnegie Institution of Washington and the California Institute of Technology as a coöperative undertaking. This laboratory is the **central station** of a coördinated group. Auxiliary stations in southern California are maintained and operated as follows: At the Mount Wilson Observatory on Mount Wilson (a Department of the Carnegie Institution of Washington); at Riverside (in coöperation with the City of Riverside); at Santa Barbara (in coöperation with the Santa Barbara Museum of Natural History); at La Jolla (in coöperation with the Scripps Institution of Oceanography of the University of California); at Tinemaha, and at Haiwee, in the Owens Valley (in coöperation with the Department of Water and Power of the City of Los Angeles).

TIME: At all these stations the minute-marks on the seismograms are coördinated directly by means of auxiliary records written at each station on which the minute-marks are registered closely parallel with recorded dot-and-dash radiotelegraphic signals sent in ordinary course from a powerful transmitting station. This permits direct correlation of the minute-marks at all the stations of the group at practically all times with an accuracy of one second, and usually of one-fifth second.

Standard time is determined at Pasadena by comparing the station clock with automatically recorded radio time signals, sent from Annapolis (NSS), three to five times daily.

The constants of these stations follow.

PASADENA SEISMOLOGICAL LABORATORY Central Station

$\Phi = 34° 08.9'$ N., $\lambda = 118° 10.3'$ W., h = 295 m., Deeply weathered granite rock, with inclusions of gneiss and schist.

Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"
E — W	6 sec.	800	0.8-0.9

Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

The constants of the short-period instruments do not undergo any significant changes. The constants of the instruments of longer period will be given from time to time when deviations from the values given are significant.

Experimental seismographs of various kinds are in process of development from time to time, and are used for intervals of variable duration. Information concerning these will be given when necessary.

AUXILIARY STATIONS

Each of the auxiliary stations has equipment as follows:

Apparatus: two horizontal-component torsion seismometers with magnetic damping and optical recording;

Instruments and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"

one vertical component seismometer with galvanometric-optical recording;

inertia-mass 100 kg. T_o=1.0 or 0.5 sec. Damping critical or slightly less;

galvanometer: T_1=0.2 sec. h=4.

The Station Constants follow.

Coördinates are geodetic positions referred to the North American Datum.

Mount Wilson Seismologic Station
$\Phi = 34° 13.5' N., \lambda = 118° 03.4' W., h = 1742 m.$, Weathered granite.

Riverside Seismologic Station
$\Phi = 33° 59.6' N., \lambda = 117° 22.5' W., h = 250 m.$ approx., Weathered granite.

Santa Barbara Seismologic Station
$\Phi = 34° 26.5' N., \lambda = 119° 42.9' W., h = 100 m.$ approx., Heavy, boulder-laden alluvium.

La Jolla (Scripps Institution Seismologic Station)
$\Phi = 32° 51.8' N., \lambda = 117° 15.2' W., h = 7.7 m.$ approx., Consolidated detrital material.

Tinemaha Seismologic Station
$\Phi = 37° 05.7' N., \lambda = 118° 15.5' W., h = 1180 m.$ approx., Basalt.

Haiwee Seismologic Station
$\Phi = 36° 08.2' N., \lambda = 117° 57.9' W., h = 1100 m.$ approx., Loosely cemented tuff.

SYMBOLS AND NOTATION: in general the symbols and notation conform with the usual international practice. For the phases of deep-focus earthquakes the notation of F. J. Scrase is adopted. c, d are abbreviations for compression and dilatation.

When measurements referring to **local** earthquakes are included P and S will be used without index or subscript, as no attempt will be made in these bulletins to distinguish between $\overline{P}$, P*, and P_n, although such complications are often clearly indicated and are the subject of study.

AMPLITUDES, (half-ranges), are measured in millimeters of the seismographic trace.

SPECIAL SYMBOLS indicating the stations of this coördinated group are as follows:

PASADENA SEISMOLOGICAL LABORATORY

For routine instruments of period 0.8 second . . . . . P
For routine instruments of period 6 seconds . . . . . P_6
For instruments of different period analogous notation will be employed.
For routine instruments, galvanometer period 0.2 second . . . . . P
For routine instruments, galvanometer period 10 to 14 seconds . . . . . PX

Mount Wilson Seismologic Station . . . . . MW
Riverside Seismologic Station . . . . . R
Santa Barbara Seismologic Station . . . . . SB
La Jolla (Scripps Institution Seismologic Station) . . . . . LJ
Tinemaha Seismologic Station . . . . . T
Haiwee Seismologic Station . . . . . H

In general detailed measurements will be given only for the records of the Seismological Laboratory: those for records of the other stations will be given only to supplement the information.

Pasadena, California

We wish to acknowledge with thanks receipt of the following bulletins during December, 1934:

Adelaide	October and November, 1934
Batavia	July-September, 1934, No. 37-54
Capetown	July-October, 1934, No. 44-55
Chiufeng	October, 1934, No. 37-38
Denver	March 24-July 30, 1934, No. 5
Florissant	September, 1934, No. 17
Georgetown	November, 1934, No. 215
Göttingen	July-September, 1934,
Helwan	October, 1934
J. S. A.	November 5, 1934, No. 36
Kew	November, 1934
Little Rock	October, 1934, No. 6
Manila	October, 1934, No. 38-39
Mizusawa	Year, 1933
Osaka	September 1-November 8, 1934, No. 162-167
Ottawa	November, 1934
Perth	July 25-September 8, 1934, No. 17-19
Riverview	October, 1934, No. 10
St. Louis	October, 1934, No. 20-21
San Fernando	September-October, 1934, No. 5
Strasbourg	
Inst. Phys. du Globe	October, 1934
Bureau Centrale	October, 1934, No. 44
Parc St. Maur	October, 1934
Union Geophysique	October, 1934, No. 189-191
Sydney	August-October, 1934
Taihoku	October-November, 1934, Preliminary
Toledo	2 Trimestre
Wellington	October, 1934, No. 74
Zagreb	January-March, 1934
Zi-ka-wei	August 14-31, 1934, No. 15

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Jan 1	P	iPNEZ	13	32	02			d	deep	Surface waves small
		ipPZ		33	20					
		isPZ			38					Δ = 8300 km (75°)
		iZ		34	47					h = 0.05
		iSNEZ		41	11					
		eZ			52					USCGS: 17° S, 174° W
	MW	iPNEZ		32	03			d		O = 13:20:56
		iSN		41	09					
	R	ePNEZ		32	04					
		iSNE		41	09					
	SB	iPNE		31	58					
		iSNE		40	59					
	LJ	iPNEZ		32	03			d		
		iSNE		41	13					
	T	iPNEZ		32	12			d		
		iSNE		41	29					
	H	iPNEZ		32	10			d		
		iSNE		41	25					
Jan 1	P	iPNEZ	23	02	49			d	deep	
		iZ		05	35					
	MW	iPNEZ		02	50			d		
		iZ		05	36					
	R	iPEZ		02	51			d		
		eZ		05	37					
	SB	ePN		02	44					
	LJ	iPNEZ			48					
	T	iPNEZ		02	58			d		
	H	iPNEZ			56			d		
Jan 2	P	ePZ	22	43	04				normal	
		iPNEZ			06					
	PX	eLZ		46	00					
	MW	ePNEZ		43	06					
	SB	ePNE		42	50					
		eLN		44	54					
	T	iPNEZ		42	39			d		
		iNEZ			41					
		iSEZ		44	12					
	H	iPNEZ		42	49					
		eSN		44	28					
Jan 3	P	eZ	02	08	43					31°5 N, 88° E
		eZ		09	19					Strasbourg, according to
	MW	eZ		08	41					Kew and Zürich
		eZ		09	22					
	R	eZ		08	43					
		eZ		09	20					
	LJ	eZ		08	43					
		eZ		09	32					
	T	eZ		08	39					
	H	eZ			40					
		eZ		09	08					
Jan 3	P	eZ	02	19	45				normal	May belong with preceding
	P6	eLE		44						
	MW	eZ		19	34					
	R	eZ			43					
	T	eZ		20	08					
Jan 4	P	eZ	14	55	13				normal	40°8 N, 28°3 E
	P6	eLE	15	32						Strasbourg, according to Kew
Jan 4	P	eZ	16	58	02				Normal	Same as preceding
	P6	eLE	17	11						

Date	Station	Phase	G.C.T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Jan 7	P	eZ	21	41	16					
Jan 8	P	iPNEZ	23	10	19			d		
	MW	iPZ			20					
	R	iPZ			22					
	LJ	iPEZ			19					
	T	iPEZ			27					
Jan 12	P	iPZ	04	11	55					
	MW	eZ			52					
	R	iPZ			51					
	T	iPNEZ			57					
Jan 12	P	iPNZ	20	33	02			d		
	MW	iPZ			01					
	R	iPZ		32	58					
	T	iPNEZ		33	13			d		
		iZ			29					
	H	iPZ			09					
Jan 14	P	eZ	15	15	38					
		iEZ			47					
	MW	eZ			40					
	R	iZ			49					
	LJ	eZ			42					
		iZ			52					
	T	iZ			35					
		iZ			43					
	H	eZ			39					
		iZ			45					
Jan 15	P	iPNZ	11	37	17			c	deep?	
	MW	iPNZ			18					
	R	iPZ			19					
	SB	iPZ			13					
	LJ	iPEZ			18					
	T	iPNEZ			23					
	H	iPE			23			c		
Jan 17	P	iPNEZ	02	21	02			c	normal?	Surface waves small, depth probably slightly greater than normal
		iPPZ		24	44					
	P6	eSE?		32	18					
		iPSE		33	08					
	P	eP'P'Z		47	00					
	PX	eLZ		48.5						Δ = 9650 km (87°) approx.
	MW	iPNEZ		21	02			c		
	R	iPNEZ			04			c		New Hebrides region, O = 02:08.3
		ePPZ		24	48					
	SB	iPNEZ		20	57			c		
		ePPZ		24	42					Using Adelaide and Riverview
		eE		32	46					
	LJ	iPNEZ		21	04					
		eE		33	12					
	T	iPNEZ		21	08			c		
		eN		32	09					
	H	iPNEZ		21	08					
Jan 17	P	eZ	03	16	05					
	MW	eZ			07					Associated with preceding ?
Jan 18	P	iPNEZ	11	15	45			c	normal?	Surface waves doubtful
		eZ		19	14					
	MW	iPEZ		15	46					
		eZ		19	16					
	R	iPNEZ		15	45					
	SB	iPZ			42					
	LJ	iPZ			45					
	H	ePNE			50					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Jan 20	P	iZ	00	10	56					
		iZ		11	07					
	R	iZ		10	58					
		iZ		11	09					
	H	eE			08					
Jan 21	P	iPNEZ	15	42	36			d	deep?	
		iZ		44	33					
	R	iPZ			33					
	LJ	iPZ			29			d		
Jan 22	P	iPZ	07	55	47					
	R	ePZ			47					
Jan 23	P	iPNEZ	07	31	45			d	normal	Felt, Dutch Harbor, Aleutian Islands
		eSN		37	49					Δ = 4550 km (41°)
		iSNE			54					
	PX	iLNZ		40	56					USCGS: 52° N, 170° W
	R	ePNEZ		31	48					O = 07:24:07
		eSN		38	01					
	LJ	ePNEZ		31	55					Strasbourg: 55° N, 171° W
		eSE		38	16					Zurich: 51°5 N, 174° W
	H	ePE		31	33					
		eSE		37	28					
Jan 23	P	iPZ	08	01	58					Aftershock?
	R	ePZ			55					
	LJ	eE		02	01					
Jan 23	P	iPZ	08	06	00					Aftershock?
	R	ePZ			06					
		eZ		08	04					
	LJ	ePZ		06	12					
	H	ePE		05	51					
Jan 23	P	ePZ	09	59	40					
		iZ			48					
	R	ePZ			47					
	LJ	ePZ			50					
		iZ	10	00	22					
	H	ePE	09	59	40					
Jan 23	P	eZ	12	42	23					
Jan 26	P	iPZ	07	30	39			c	deep?	
		iEZ			48					
	MW	iPZ			39					
		iZ			49					
	R	ePZ			42					
		iZ			51					
	LJ	iPZ			49					
		iZ			59					
	H	ePNEZ			30					
Jan 26	P	iPZ	15	23	49					
	MW	iPZ			50					
	H	ePE			57					
Jan 26	P	iPZ	17	51	46					
	MW	iPZ			46					
	R	ePZ			46					
	LJ	iPZ			56					
	H	ePN			32					
Jan 27	P	iPZ	16	11	18					
	MW	iPZ			19					
	R	ePZ			20					
		eZ			35					
Jan 28	P	ePZ	06	10	37					
	MW	ePZ			36					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Jan 28	P	iPEZ	10 02 03			c		
	MW	iPZ	04					
	R	iPZ	07					
		eZ	29					
	H	ePNE	01 59					
Jan 28	P	iPZ	14 40 31					
	MW	iPZ	34					
		eZ	41 13					
	R	iZ	40 37					
Jan 29	P	iPNZ	00 22 19					
	MW	iPZ	20					
Jan 30	P	eZ	00 48 25					
Jan 31	P	eZ	17 58 16				normal	
	PX	eLZ	18 24					
	R	eZ	17 58 26					

Harry O. Wood
Research Associate in Charge
C. F. Richter
Assistant

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Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

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Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

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Coördinates are geodetic positions referred to the North American Datum.

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Riverside Seismologic Station . . . . . R
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La Jolla (Scripps Institution Seismologic Station) . . . . . LJ
Tinemaha Seismologic Station . . . . . T
Haiwee Seismologic Station . . . . . H

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We acknowledge with thanks receipt of the following bulletins during the month of February, 1935:

Adelaide	January, 1935
Catania	Years 1931-1933, inc.
Chiufeng	December, 1934, Nos. 42-45
Christchurch	December, 1934
Florissant	October, 1934, No. 18
Georgetown	January, 1935, No. 217
Hamburg	August 1-December 31, 1934, No. 18-26
Helwan	November, 1934
Hong Kong	November, 1934
Hukuoka	June-December, 1934
J. S. A.	December 4, 1934, No. 40
Kew	January, 1935
Konigsberg	Year 1931
Little Rock	November, 1934, No. 7-8
Manila	November, 1934, No. 41-44
Montecassino	September, 1934
Oosaka	July-September, 1933
Oosaka	November-December, 1934, No. 168-170
Ottawa	January, 1934, No. 1-2
Palau	August-December, 1934, No. 14-21
Praha	January-May, 1934
Praha	October-December, 1934
Riverview	December, 1934, No. 12
Riverview	January, 1935, No. 1
St. Louis	November, 1934, No. 22-23
San Fernando	November-December, 1934, No. 6
Strasbourg	
Inst. Phys. du Globe	December, 1934
Parc St. Maur	December, 1934
Bureau Centrale	December, 1934
Union Geodesique	December, 1934
Toledo	3rd Trimestre, 1934
Tortosa	April-June, 1934, No. 4-6
Wellington	December, 1934, No. 76

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Feb 1	P	iPZ	06	27	00					
	MW	iPZ			02					
	R	iPZ			03					
	SB	iPNZ			08					
Feb 2	P	eZ	10	40	04					
		iZ			11					
	MW	iZ			12					
	R	eZ			08					
		eZ			14					
Feb 2	P	ePZ	19	08	28					
	MW	eZ			27					
		iZ			33					
Feb 3	P	eZ	02	29	30					
	MW	eZ			27					
		iZ			34					
Feb 4	P	iPZ	03	15	46					
		eZ		16	07					
	MW	ePZ		15	47					
		eZ		16	10					
	R	iPZ		15	50					
		eZ		16	11					
Feb 4	P	eZ	08	06	53					
	MW	eZ			52					
Feb 4	P	iPNEZ	17	36	16			c	normal	
	PX	eLZ		59.1						
	MW	iPZ		36	18					
	R	ePZ			18			c		
	SB	ePZ			12					
	LJ	ePZ			24					
	H	ePNEZ			25					
Feb 6	P	iPZ	02	04	26				normal	Baffin Bay?
	PX	eLZ		27.5						
	MW	ePZ		04	25					
	R	ePZ			22					
	SB	ePZ			34					
	T	ePNEZ			19					
	H	eE			23					
Feb 7	P	iPZ	02	01	43					
	MW	iPZ			42					
	T	iPZ			54					
Feb 9	P	iPZ	19	33	18			d		
	MW	ePZ			17					
	R	ePZ			20					
	T	iPNEZ			10					
Feb 10	P	iPZ	10	18	30			d		
		iZ			43					
	MW	iPZ			30			d		
	R	ePZ			33					
		eZ		19	18					
	T	iPEZ		18	15			d		
		iZ			35					
Feb 10	P	iPNEZ	18	41	08			d	deep	
	MW	iPZ			08			d		
	R	iPZ			11			d		
	T	iPNEZ			01			d		
		eZ		42	49					
Feb 10	P	eZ	20	04	23					
	MW	eZ			21					
	T	eZ			45					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Feb 13	P	iPNEZ	17	33	39			d	deep	
		iZ		34	05					
		iZ			16					
	MW	iPEZ		33	38					
	R	ePNZ			34					
		iZ		34	02					
		iZ			12					
	T	iPEZ		33	49					
		iZ		34	14					
		iZ			27					
	H	iPNEZ		33	47					
Feb 15	P	iPNEZ	19	05	54			c		
		eZ		06	23					
	MW	iPZ		05	55			c		
Feb 16	P	iPZ	15	01	53					
		eZ		02	18					
	MW	ePZ		01	53					
		eZ		02	19					
	T	iPZ		01	38					
		iZ			55					
		eZ		,02	43					
Feb 17	P	iPZ	01	21	09			d		
	R	iPZ			06					
	T	iPNEZ			20			d		
Feb 17	P	eZ	14	25	32					
	MW	eZ			33					
	T	eZ			44					
Feb 18	P	iPZ	10	44	07					
	T	iPZ			17			d		
Feb 18	P	iPZ	13	14	16					
		eZ		17	10					
	T	iPZ		14	30					
		iZ		17	02					
Feb 18	P	eZ	20	20	07					
		iZ			11					
		iZ			23					
	MW	iZ			12					
	R	eZ			13					
	SB	eZ			03					
	LJ	iZ			15					
		iZ			31					
	T	eZ			04					
		iZ			13					
		iZ			22					
Feb 19	P	iPNEZ	11	07	43			c		
	R	iPZ			45					
	SB	ePZ			39					
	LJ	iPZ			43					
	T	iPEZ			49			c		
		eZ		08	19					
Feb 19	P	iPZ	19	31	41					
	R	ePZ			35					
	LJ	ePZ			32					
	T	eNE			57					
Feb 19	P	iPZ	20	22	24					
	R	ePZ			27					
	SB	ePZ			19					
	LJ	ePZ			31					
	T	ePZ			15					
	H	iZ			20					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Feb 20	T	iPZ	04	51	22					
Feb 20	P	iPNEZ	11	32	12			c	normal	
	PX	eSNZ		36	52					
		eLN		40.9						
	MW	iPZ		32	12					
	R	iPNZ			06			c		
	LJ	iPNZ		31	59					
	T	iPNEZ		32	31					
		eSN		37	20					
	H	iPNEZ		32	23					
Feb 22	P	iPNZ	09	05	44			d		
	MW	iPZ			43			d		
	R	iPNZ			39					
	T	iPNEZ			56					
		eZ		08	55					
	H	iPEZ		05	50					
Feb 22	P	iPZ	16	00	27					
	MW	ePZ			27					
	R	iPZ			25					
	T	iPZ			31					
Feb 22	P	iPZ	16	47	15					
	MW	iPZ			16					
	R	ePZ			12					
	LJ	ePZ			11					
	T	iPZ			35					
Feb 22	P	iPNEZ	17	14	51			c	normal	JSA: 50°5 N, 176°6 E
	PX	eSN		22	16					0 = 17:05:59
	P6	eSE			33					
		eLE		27	29					USCGS: 52 N, 175 E
	MW	iPNZ		14	52					0 = 17:06.2
		eSN		22	13					
	R	ePNZ		14	55					
		eSN		22	33					
	LJ	ePNZ		15	03					
		eSN		22	49					
	T	iPNEZ		14	37					
		eSNE		21	58					
	H	ePNE		14	45					
		eSE		22	03					
Feb 22	P	eZ	17	45	39					May be P'P' of preceding shock
Feb 22	P	ePZ	19	46	37					
	MW	ePZ			38					
	T	ePZ			20					
Feb 23	P	ePNEZ	03	46	28			d	normal	
		iNEZ			30					
	P6	eSE?		56	01					
	PX	eLZ	04	11						
	MW	iPZ	03	46	30					
	R	iPZ			32					
	LJ	ePZ			30					
	T	iPNEZ			37					
	H	iPNE			37					
Feb 24	P	ePNEZ	01	45	55			c	normal	Felt in Imperial and San Diego Counties, Calif
		iSNE		46	38					
	MW	ePNEZ		45	56					
	R	iPNEZ			47					Approx 32°0 N, 115°2 W
	SB	ePNEZ		46	17					0 = 01:45:03
	LJ	iPNEZ			37					
	T	ePNEZ			31					
	H	ePEZ			19					

PASADENA and auxiliary stations 1935

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Feb 25	P	eZ	03 09 45					Strasbourg: 35°5 N, 24° E
	MW	eZ	04					Zurich: 36°5 N, 24° E
	T	iZ	05 05					
		iZ	35					
		eZ	07 58					
		eE	09 35					
Feb 25	P	iZ	08 11 25					
	MW	iZ	25					
	R	eNZ	19					
	T	eE	10 49					
Feb 25	P	ePZ	15 18 56					
	MW	iPZ	53					
	T	iPZ	50					
Feb 27	P	eZ	09 28 20				normal	
	PX	eLZ	10 04					
	MW	eZ	28 15					
		eZ	19					
	R	eZ	22					
	T	eZ	14					
Feb 27	P	iPZ	15 35 05					
	MW	ePZ	05					
	R	ePZ	34 59					
	T	ePZ	35 17					
Feb 28	P	iPZ	01 05 03					
	R	ePZ	06					
	T	iPZ	04 49					
Feb 28	P	iPNEZ	07 21 51			d	deep	South America
		iZ	22 57					
	P6	iSNE	31 04					
		eE	35					
	MW	iPNEZ	21 51					
	R	iPNZ	46					
		iZ	22 51					
	SB	ePZ	21 57					
	LJ	iPZ	44					
	T	iPNEZ	22 02			d		
		iZ	58					
		iZ	23 11					
		iSNEZ	,31 29					
	H	iPNEZ	21 58					
		iZ	22 45					

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SEISMOLOGICAL LABORATORY

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PASADENA, CALIFORNIA

REVISED
JANUARY 1, 1935

BULLETIN

The SEISMOLOGICAL LABORATORY, Pasadena, California, is maintained and operated by the Carnegie Institution of Washington and the California Institute of Technology as a coöperative undertaking. This laboratory is the **central station** of a coördinated group. Auxiliary stations in southern California are maintained and operated as follows: At the Mount Wilson Observatory on Mount Wilson (a Department of the Carnegie Institution of Washington); at Riverside (in coöperation with the City of Riverside); at Santa Barbara (in coöperation with the Santa Barbara Museum of Natural History); at La Jolla (in coöperation with the Scripps Institution of Oceanography of the University of California); at Tinemaha, and at Haiwee, in the Owens Valley (in coöperation with the Department of Water and Power of the City of Los Angeles).

TIME: At all these stations the minute-marks on the seismograms are coördinated directly by means of auxiliary records written at each station on which the minute-marks are registered closely parallel with recorded dot-and-dash radiotelegraphic signals sent in ordinary course from a powerful transmitting station. This permits direct correlation of the minute-marks at all the stations of the group at practically all times with an accuracy of one second, and usually of one-fifth second.

Standard time is determined at Pasadena by comparing the station clock with automatically recorded radio time signals, sent from Annapolis (NSS), three to five times daily.

The constants of these stations follow.

PASADENA SEISMOLOGICAL LABORATORY Central Station

$\Phi = 34° 08.9'$ N., $\lambda = 118° 10.3'$ W., h = 295 m., Deeply weathered granite rock, with inclusions of gneiss and schist.

Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"
E — W	6 sec.	800	0.8-0.9

Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

The constants of the short-period instruments do not undergo any significant changes. The constants of the instruments of longer period will be given from time to time when deviations from the values given are significant.

Experimental seismographs of various kinds are in process of development from time to time, and are used for intervals of variable duration. Information concerning these will be given when necessary.

AUXILIARY STATIONS

Each of the auxiliary stations has equipment as follows:

Apparatus: two horizontal-component torsion seismometers with magnetic damping and optical recording;

Instruments and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"

one vertical component seismometer with galvanometric-optical recording;

inertia-mass 100 kg. T_o=1.0 or 0.5 sec. Damping critical or slightly less;

galvanometer: T_1=0.2 sec. h=4.

The Station Constants follow.

Coördinates are geodetic positions referred to the North American Datum.

Mount Wilson Seismologic Station
$\Phi = 34° 13.5' N., \lambda = 118° 03.4' W., h = 1742 m.$, Weathered granite.

Riverside Seismologic Station
$\Phi = 33° 59.6' N., \lambda = 117° 22.5' W., h = 250 m.$ approx., Weathered granite.

Santa Barbara Seismologic Station
$\Phi = 34° 26.5' N., \lambda = 119° 42.9' W., h = 100m.$ approx., Heavy, boulder-laden alluvium.

La Jolla (Scripps Institution Seismologic Station)
$\Phi = 32° 51.8' N., \lambda = 117° 15.2' W., h = 7.7 m.$ approx., Consolidated detrital material.

Tinemaha Seismologic Station
$\Phi = 37° 05.7' N., \lambda = 118° 15.5' W., h = 1180 m.$ approx., Basalt.

Haiwee Seismologic Station
$\Phi = 36° 08.2' N., \lambda = 117° 57.9' W., h = 1100 m.$ approx., Loosely cemented tuff.

SYMBOLS AND NOTATION: in general the symbols and notation conform with the usual international practice. For the phases of deep-focus earthquakes the notation of F. J. Scrase is adopted. c, d are abbreviations for compression and dilatation.

When measurements referring to **local** earthquakes are included P and S will be used without index or subscript, as no attempt will be made in these bulletins to distinguish between $\overline{P}$, P*, and P_n, although such complications are often clearly indicated and are the subject of study.

AMPLITUDES, (half-ranges), are measured in millimeters of the seismographic trace.

SPECIAL SYMBOLS indicating the stations of this coördinated group are as follows:

PASADENA SEISMOLOGICAL LABORATORY

For routine instruments of period 0.8 second . . . . . $\overline{P}$
For routine instruments of period 6 seconds . . . . . P_g
For instruments of different period analogous notation will be employed.
For routine instruments, galvanometer period 0.2 second . . . . . P
For routine instruments, galvanometer period 10 to 14 seconds . . . . . PX

Mount Wilson Seismologic Station . . . . . MW
Riverside Seismologic Station . . . . . R
Santa Barbara Seismologic Station . . . . . SB
La Jolla (Scripps Institution Seismologic Station) . . . . . LJ
Tinemaha Seismologic Station . . . . . T
Haiwee Seismologic Station . . . . . H

In general detailed measurements will be given only for the records of the Seismological Laboratory: those for records of the other stations will be given only to supplement the information.

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Mar 1	P	iZ	13	31	10					
	T	iPZ			23					
Mar 2	P	iZ	07	18	00					
		iZ			08					
	MW	iZ			00					
	R	eZ		16	55					
		iZ		18	04					
		iZ			10					
	LJ	eZ			04					
	T	iZ		17	10					
		iZ		18	04					
		iZ			10					
	H	iZ			11					
Mar 2	MW	ePZ	13	13	29					
	R	ePZ			31					
	T	iPNEZ		12	55					
	H	ePNZ		13	00					
		eZ			53					
Mar 2	P	iPNZ	18	51	10					
	MW	iPZ			11					
	R	iPZ			08					
	SB	iPZ			14					
	T	iPNEZ			14					
	H	iPZ			13					
Mar 4	P	iZ	03	32	22					
	T	iPZ			30					
Mar 5	P	iPZ	09	37	06					
	MW	iPZ			07					
	R	iPZ			05					
	T	iPZ			14					
	H	ePZ			12					
Mar 5	P	ePZ	10	38	56					
	MW	iPZ			58					
	R	iPZ		39	00					
	T	iPEZ		38	48					
Mar 6	P	iPZ	11	40	35					
	MW	iPZ			36					
		eZ			55					
	T	iPZ			36					
Mar 6	P	iPNEZ	12	30	52			d	deep?	
		eZ		31	12					
	MW	iPZ		30	53					
	T	iPZ		31	01			d		
		iZ			07					
		iZ			27					
Mar 6	P	ePZ	15	14	36					
	MW	iPZ			37					
		eZ		15	28					
	T	iPEZ		14	41					
		eZ		15	33					
	H	iPEZ		14	40					
Mar 7	P	eZ	00	33	00					
		iZ			17					
	MW	eZ			00					
		iZ			22					
	LJ	iZ			19					
		iZ			38					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Mar 7	P	iPNEZ	06	38	24			d	deep	
		iZ		39	50					
	MW	iPZ		38	26					
		iZ		39	50					
	R	iPZ		38	27					
		eZ		39	52					
	SB	ePZ		38	17					
	T	iPZ			33					
		iZ		39	59					
Mar 7	P	iPNEZ	10	38	38			c	deep?	
	MW	iPNEZ			39			c		
	R	iPNZ			41			c		
	SB	iPZ			30			c		
	LJ	iPNZ			46					
	T	iPNZ			23			c		
	H	iPNEZ			31					
Mar 7	P	iPZ	12	15	34					
	T	iPZ			29					
Mar 8	P	iPZ	12	08	22				deep?	
		iZ			46					
		iZ		09	02					
		iZ			49					
		iZ			56					
	MW	iPZ		08	23					
		iZ			48					
		iZ		09	30					
		iZ			56					
	LJ	iZ		08	11					
	T	iPNZ			36					
		iZ		09	01					
		iZ		10	03					
Mar 9	P	iPZ	03	04	32					
	MW	iPZ			32					
		iZ		05	16					
	R	iPZ		04	27					
	T	iPNEZ			44					
		iZ		05	22					
Mar 9	P	iPZ	19	42	25					
	T	eZ			00					
		iZ		43	21					
		iZ		44	09					
		eZ		47	07					
Mar 10	P	iZ	10	16	28					
	T	iPZ			15					
		iZ			30					
Mar 10	P	iPNEZ	20	14	22					
		eZ		18	50					
Mar 11	P	iZ	22	19	41				deep?	
		iZ		20	10					
	MW	iZ		19	42					
		eZ		20	11					
	R	eZ			07					
	SB	eZ			02					
	T	iPZ		19	54					
		iZ		20	23					
Mar 12	P	iZ	13	34	37					
		eZ			53					
	MW	eZ			35					
		eZ		36	51					
	R	eZ		34	38					
	T	eZ			39					
		eZ		37	08					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Mar 13	P	iPNEZ	18 50 06			c	deep	
	MW	iPZ	07					
	SB	iPZ	00					
	LJ	iPNZ	08					
	T	iPNEZ	07			c		
	H	iPEZ	07					
Mar 14	P	eZ	11 48 20					
		iZ	25					
	MW	eZ	22					
	R	eZ	23					
	SB	eZ	17					
	T	iZ	27					
		iZ	31					
Mar 14	P	ePZ	12 16 30				normal	
	PX	eLZ	45.3					
	MW	ePZ	16 28					
	R	ePZ	26					
	T	ePZ	42					
Mar 14	P	iPZ	13 52 37					
		iZ	42					
	MW	iPZ	38					
	R	ePZ	39					
	LJ	iPZ	44					
	T	iPZ	43					
		iZ	47					
		eZ	59					
	H	ePNE	45					
Mar 14	P	ePZ	15 44 50				normal	
	PX	eLZ	16 11					
	MW	iPZ	15 44 52					
	R	iPZ	51					
	SB	eZ	47					
	LJ	ePZ	50					
	T	iPNZ	45 00					
		iZ	31					
	H	ePN	44 54					
Mar 15	P	ePZ	12 35 16					
	R	iPZ	17					
	LJ	eZ	19					
	T	iPEZ	10					
		iZ	20					
Mar 17	P	iPZ	08 48 15					
	MW	ePZ	16					
	T	iPZ	24					
Mar 17	P	iPZ	10 02 41			c		
	MW	ePZ	43					
	T	iPZ	51					
		iNEZ	09 37					
Mar 17	P	iPNEZ	21 39 37			c	deep?	Depth slightly greater than normal (0.02)
		ipPNEZ	57					△ = 3550 km (32°) approx.
		isPNEZ	40 14					
		iPPNZ	31					
		iPcPZ	42 28			d		JSA: 13°0 N, 91°5 W
		iZ	43 11					h = 100 km
		iSE	44 39					0 = 21:33:18
		iSN	44					
		iScPZ	46 03					
		iSSN	50 01					
	MW	iPNZ	39 35					

Continued

Date	Station	Phase	G. C. T. h m s	T A sec mm	c d	Focal depth	Remarks
Mar 17				Continued			
	R	iPNZ	21 39 29				
		iPcPZ	42 25				
		eScPZ	46 00				
	SB	ePNZ	39 45				
		iPcPZ	42 30				
	LJ	iPNZ	39 23				
		iPcPZ	42 23				
		eSN	44 24				
		eScPZ	46 00				
		eSSN	49 56				
	T	iPNEZ	39 51		c		
		ipPZ	40 13				
		isPZ	32				
		eE	41 39				
		iPcPNEZ	42 31		d		
		eSE	44 59				
		eSN	45 08				
		iScPZ	46 09				
		iSSNE	50 10				
		eNE	53				
	H	iPNEZ	39 43				
		iPcPZ	42 29				
		eSN	44 52				
		eSSN	50 07				
Mar 18	P	ePZ	08 58 45				
	MW	eZ	49				
	LJ	iPZ	58				
Mar 19	T	iPZ	22 40 21				
Mar 20	MW	ePZ	08 25 36				
		eZ	43				
		eZ	27 10				
	T	iPZ	25 28				
Mar 20	P	iPNEZ	23 10 27		d	normal	
	PX	eLEZ	40.8				
	MW	iPNEZ	10 29				
	SB	eZ	20				
	LJ	iPNZ	31				
	T	iPNEZ	30				
	H	iPNEZ	32				
Mar 21	T	ePZ	03 50 29				
		iZ	31				
		eZ	51 09				
Mar 26	P	iPZ	20 05 21		d	deep?	
		iZ	53				
		iZ	06 06				
		iZ	08 31				
	MW	iPEZ	05 21				
	R	iPZ	16				
		eZ	07 02				
	LJ	ePZ	05 10				
	T	iPZ	33				
	H	ePE	29				
Mar 26	P	iPEZ	21 39 14		c		
	MW	iPZ	14				
	R	iPZ	08				
	SB	iPNZ	26				
	LJ	iPNZ	05		c		
	T	iPNZ	25				
	H	ePNE	20				

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Mar 27	P	iPZ	14	33	33			c	deep	
		iNEZ			36			d		
		iZ		36	37					
	MW	iPZ		33	34					
		iNEZ			36					
		iZ		36	39					
	SB	iPNZ		33	31					
	LJ	iPZ			36					
	T	iPNEZ			44					
		iNEZ			47					
		iZ			55					
	H	ePEZ			39					
		iZ			42					
		iZ		34	08					
Mar 28	P	iPNEZ	22	49	45					
	T	iPNEZ			30					
	H	iPNEZ			35					
Mar 28	P	iPZ	23	59	06			c	deep	
29		iNZ	00	01	03					
		iZ		02	01					
		eZ			22					
		iSNE		08	26					
28	MW	iPNEZ	23	59	07					
29		eSNE	00	08	28					
28	R	iPNEZ	23	59	09			c		
29		iNEZ	00	01	07					
		eZ		02	04					
		eSNE		08	19					
28	SB	ePNEZ	23	59	01					
29		iZ	00	00	59					
		eZ		02	05					
28	LJ	iPNZ	23	59	13			c		
29		iNZ	00	01	13					
		iSN		08	42					
28	T	iPNEZ	23	58	56			c		
29		iZ	00	00	54					
		eSNE		08	08					
28	H	iPNEZ	23	58	59			c		
29		iNZ	00	00	57					
		eN		02	47					
		eSNE		08	13					
Mar 29	P	iPNEZ	12	36	54			c	normal	
	PX	eN		47	39					
	P30	eLN		59.5						
	R	iPNEZ		36	54					
		eN		47	26					
	SB	ePZ		36	51					
	LJ	ePNZ			52					
	T	iPNEZ		37	04					
		eN		47	49					
	H	ePNEZ		37	01					
		eN		47	21					
Mar 30	P	iPZ	02	20	30					
	MW	ePZ			32					
	R	ePZ			32					
	SB	ePZ			27					
	LJ	ePZ			29					
	T	iPNEZ			40					
	H	ePNE			39					

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PASADENA, CALIFORNIA

REVISED
JANUARY 1, 1935

BULLETIN

The SEISMOLOGICAL LABORATORY, Pasadena, California, is maintained and operated by the Carnegie Institution of Washington and the California Institute of Technology as a coöperative undertaking. This laboratory is the **central station** of a coördinated group. Auxiliary stations in southern California are maintained and operated as follows: At the Mount Wilson Observatory on Mount Wilson (a Department of the Carnegie Institution of Washington); at Riverside (in coöperation with the City of Riverside); at Santa Barbara (in coöperation with the Santa Barbara Museum of Natural History); at La Jolla (in coöperation with the Scripps Institution of Oceanography of the University of California); at Tinemaha, and at Haiwee, in the Owens Valley (in coöperation with the Department of Water and Power of the City of Los Angeles).

TIME: At all these stations the minute-marks on the seismograms are coördinated directly by means of auxiliary records written at each station on which the minute-marks are registered closely parallel with recorded dot-and-dash radiotelegraphic signals sent in ordinary course from a powerful transmitting station. This permits direct correlation of the minute-marks at all the stations of the group at practically all times with an accuracy of one second, and usually of one-fifth second.

Standard time is determined at Pasadena by comparing the station clock with automatically recorded radio time signals, sent from Annapolis (NSS), three to five times daily.

The constants of these stations follow.

PASADENA SEISMOLOGICAL LABORATORY Central Station

$\Phi = 34° 08.9'$ N., $\lambda = 118° 10.3'$ W., h = 295 m., Deeply weathered granite rock, with inclusions of gneiss and schist.

Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"
E — W	6 sec.	800	0.8-0.9

Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

The constants of the short-period instruments do not undergo any significant changes. The constants of the instruments of longer period will be given from time to time when deviations from the values given are significant.

Experimental seismographs of various kinds are in process of development from time to time, and are used for intervals of variable duration. Information concerning these will be given when necessary.

AUXILIARY STATIONS

Each of the auxiliary stations has equipment as follows:

Apparatus: two horizontal-component torsion seismometers with magnetic damping and optical recording;

Instruments and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"

one vertical component seismometer with galvanometric-optical recording; inertia-mass 100 kg. T_o=1.0 or 0.5 sec. Damping critical or slightly less; galvanometer: T_1=0.2 sec. h=4.

The Station Constants follow.

Coördinates are geodetic positions referred to the North American Datum.

Mount Wilson Seismologic Station
$\Phi = 34° 13.5'$ N., $\lambda = 118° 03.4'$ W., h = 1742 m., Weathered granite.

Riverside Seismologic Station
$\Phi = 33° 59.6'$ N., $\lambda = 117° 22.5'$ W., h = 250 m. approx., Weathered granite.

Santa Barbara Seismologic Station
$\Phi = 34° 26.5'$ N., $\lambda = 119° 42.9'$ W., h = 100m. approx., Heavy, boulder-laden alluvium.

La Jolla (Scripps Institution Seismologic Station)
$\Phi = 32° 51.8'$ N., $\lambda = 117° 15.2'$ W., h = 7.7 m. approx., Consolidated detrital material.

Tinemaha Seismologic Station
$\Phi = 37° 05.7'$ N., $\lambda = 118° 15.5'$ W., h = 1180 m. approx., Basalt.

Haiwee Seismologic Station
$\Phi = 36° 08.2'$ N., $\lambda = 117° 57.9'$ W., h = 1100 m. approx., Loosely cemented tuff.

SYMBOLS AND NOTATION: in general the symbols and notation conform with the usual international practice. For the phases of deep-focus earthquakes the notation of F. J. Scrase is adopted. c, d are abbreviations for compression and dilatation.

When measurements referring to **local** earthquakes are included P and S will be used without index or subscript, as no attempt will be made in these bulletins to distinguish between $\overline{P}$, P*, and P_n, although such complications are often clearly indicated and are the subject of study.

AMPLITUDES, (half-ranges), are measured in millimeters of the seismographic trace.

SPECIAL SYMBOLS indicating the stations of this coördinated group are as follows:

PASADENA SEISMOLOGICAL LABORATORY

For routine instruments of period 0.8 second . . . . . P
For routine instruments of period 6 seconds . . . . . P_6
For instruments of different period analogous notation will be employed.
For routine instruments, galvanometer period 0.2 second . . . . . P
For routine instruments, galvanometer period 10 to 14 seconds . . . . . PX

Mount Wilson Seismologic Station . . . . . MW
Riverside Seismologic Station . . . . . R
Santa Barbara Seismologic Station . . . . . SB
La Jolla (Scripps Institution Seismologic Station) . . . . . LJ
Tinemaha Seismologic Station . . . . . T
Haiwee Seismologic Station . . . . . H

In general detailed measurements will be given only for the records of the Seismological Laboratory: those for records of the other stations will be given only to supplement the information.

Pasadena, California
April, 1935

We wish to acknowledge with thanks receipt of the following bulletins during the month of March, 1935:

Capetown	December, 1934
Chiufeng	January, 1935, No. 1-4
Christchurch	January, 1935
Florissant	November, 1934, No. 19
Georgetown	February, 1935, No. 218
Graz	August 31-December 31, 1934, No. 5-6
Helwan	December, 1934
Helwan	January, 1935
Hong Kong	December, 1934
Hong Kong	January, 1935
Ithaca	October-December, 1934, No. 199-200
J.S.A.	June 29, 1934, No. 25a
J.S.A.	December 22-30, 1934, No. 41-42
Karlsruhe	Year 1934
Kew	February, 1935
Koti	July-December, 1933
Little Rock	December, 1934, No. 9-11
Lwow	February 25-August 31, 1934, No. 2-3
Manila	December, 1934, No. 45-48
Melbourne	October-December, 1934, No. 28
Ottawa	February, 1935, No. 3
Perth	December 15-31, 1934, No. 24
St. Louis	December, 1934, No. 24-26
Strasbourg	
Union Geodesique	January, 1935, No. 1-9
Inst. Phys. du Globe	January, 1935
Bureau Centrale	January, 1935, No. 1-4
Parc St. Maur	January, 1935
Sydney	December, 1934
Sydney	January, 1935
Taihoku	January and February, 1935; Preliminary
Toronto	December, 1934
Toronto	January, 1935
Trieste	April-September, 1934
Uccle	August 7-December 31, 1934, No. 5-6
USCGS	January-March, 1934
Victoria	December, 1934
Vladivostok	January, 1935
Wellington	January, 1935
Wien	June 29-November 30, 1934, No. 7-11
Zi-ka-wei	June 24-July 18, 1934, No. 11
Zi-ka-wei	November 16-December 31, 1934, No. 18-20
Zurich	January, 1935, No. 56

SEISMOLOGICAL LABORATORY

CARNEGIE INSTITUTION OF WASHINGTON
CALIFORNIA INSTITUTE OF TECHNOLOGY
220 NORTH SAN RAFAEL AVENUE
PASADENA, CALIFORNIA

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Santa Barbara Seismologic Station . . . . . SB
La Jolla (Scripps Institution Seismologic Station) . . . . . LJ
Tinemaha Seismologic Station . . . . . T
Haiwee Seismologic Station . . . . . H

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Pasadena, California
May, 1935

We wish to acknowledge with thanks receipt of the following bulletins during the month of April, 1935:

Adelaide	January 31-February 24, 1935
Batavia	October-December, 1934, No. 55-69
Capetown	January and February, 1935
Cartuja	April, 1934, No. 4-6
Cheb	Year of 1934
Chiufeng	February, 1935, No. 5-7
Christchurch	February, 1935
Colaba	Year of 1934
Florissant	December, 1934, No. 20-21
Florissant	January, 1935, No. 1
JSA	March 17, 1935
Kew	March, 1935
La Plata	September-December, 1934, No. 9-12
La Plata	January-February, 1935, No. 1-2
Little Rock	January-February, 1935, No. 1-3
Manila	January, 1935, No. 1-3
Montecassino	October-November, 1934
Nanking	July-September, 1934
Nagoya	July-December, 1934, Vol V No. 2
Osaka	January-March, 1935, No. 171-3
Ottawa	March, 1935
Perth	January, 1935, No. 1
Phu-Lien	June-October, 1934
Riverview	February, 1935, No. 2
San Fernando	January-February, 1935, No. 1
St. Louis	January-February, 1935, No. 1-3
Strasbourg	
Bureau Centrale	February, 1935
Parc St.Maur	February, 1935
Union Geodesique	February, 1935
Inst. Phys. du Globe	February, 1935
Taihoku	February 28-March 30, 1935, Preliminary
Tananarive	September-October, 1934
Tokyo Earthquake Research Inst.	Part 2, 1934
Toronto	February, 1935
USCGS	April, 1934
Wellington	February, 1935, No. 78
Zi-ka-wei	January 1-23, 1935, No. 1
Zinsen	October-December, 1934, No. 13-15

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Apr 1	P	ePZ	02	31	28				normal	
	PX	iZ			42					
		eLZ		58						
	MW	eZ		31	42					
	R	eZ			42					
	T	ePNE			52					
	H	eN			44					
Apr 1	P	ePZ	09	20	49				normal	
	PX	iZ		24	16					
	P30	eLN		25.6						
	MW	eZ		20	46					
	R	ePNZ			40					
	SB	eZ		21	14					
	LJ	ePNZ		20	29					
	T	ePNEZ		21	16					
Apr 2	P	iPZ	00	02	39				normal	
	P30	eLN		22.8						
	T	ePNE		03	01					
	H	ePNE		02	48					
Apr 2	P	iPZ	12	39	43					
	T	iPZ			53					
Apr 2	P	eZ	16	35	26					
		eZ			41					
	R	eZ			43					
	T	eE			56					
	H	eNE			55					
Apr 3	P	iPZ	03	55	25					
		iZ			53					
	R	iPZ			20					
		iZ			48					
	T	eZ			38					
		iZ		56	06					
Apr 3	P	eZ	08	47	08					
		eZ			38					
	MW	eZ			09					
		eZ			39					
	R	eZ			02					
		iZ			07					
		eZ			31					
	T	ePZ			25					
		eZ			54					
	H	eE			46					
Apr 3	P	iZ	11	30	40					
	MW	eZ			23					
		eZ			42					
	R	eZ			14					
		iZ			45					
	T	eEZ			15					
		eEZ			48					
Apr 3	P	iPZ	12	12	54				normal	
	P30	eLN		22						
	MW	ePZ		12	55					
	R	ePNEZ			59					
	SB	ePZ			46					
	LJ	iPZ		13	07					
	T	iPEZ		12	39					
	H	ePNE			46					
Apr 3	P	iPZ	16	53	20					
	MW	iPZ			21					
	R	iPZ			22					
	LJ	ePZ			20					
Apr 3	P	ePZ	20	40	31					
	MW	ePZ			32					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Apr 3	P	iPZ	21	00	44				normal	
	PX	eLZ		29						
	MW	ePZ			46					
	R	ePZ			43					
Apr 3	P	eZ	23	30	21					
	MW	eZ			27					
	T	eZ			03					
Apr 4	P	eZ	09	58	40					
		iZ	10	01	11					
	MW	eZ	09	58	44					
	R	eZ			41					
	T	eZ			49					
Apr 4	P	eZ	16	30	54					
Apr 5	P	iPNEZ	03	06	59			d	normal?	Surface waves very small
	P6	eSE?		11	29					
	MW	iPZ		07	01					
	R	iPZ			01			d		
	SB	ePZ		06	55					
	LJ	iPZ			59					
	T	iPNEZ		07	10					
		iZ			29					
		eN		11	43					
		iNE		17	17					
Apr 5	P	iPNZ	05	54	54				normal?	Surface waves doubtful
	MW	ePZ			57					
	R	ePZ			55					
	T	ePNEZ		55	17					
Apr 5	P	ePZ	08	20	51					
	T	iPZ			51					
Apr 5	P	iPNEZ	17	53	39			c	normal	
	P6	iSNE		58	42					
	P30	eLN	18	00.3						
	MW	iPNEZ	17	53	39			c		
	R	iPNZ			32					
	SB	iPZ			52					
	LJ	iPNZ			25					
	T	iPNEZ		54	00			c		
		eSE		58	23					
	H	iPZ		53	54					
Apr 6	P	iPZ	10	45	31					
	T	iPZ			41					
Apr 9	P	iPZ	01	58	27					
	MW	iPZ			30					
	R	iPZ			30					
	T	iPEZ			37					
Apr 9	P	iPZ	10	07	28					
	MW	iPZ			29					
	R	ePZ			32					
	T	iPNEZ			13					
		iZ			19					
		iZ			48					
	H	iPZ			18					
Apr 9	P	iPNEZ	10	59	54			c		
	MW	iPNEZ			55					
	R	iPZ			57			c		
	SB	eZ			50					
		iZ			59					
	T	iPNEZ	11	00	02					
	H	iPZ			02					
Apr 10	P	iPZ	06	46	58			c		
	MW	iPNEZ			58					
	R	iPZ			42					
	T	iPNEZ		47	11			c		

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Apr 10	P	eZ	19	57	27					
	T	eZ			14					
		iZ			20					
Apr 10	P	iPZ	21	10	12					
	R	ePZ			04					
	T	ePNEZ			21					
Apr 10	P	iPNEZ	22	42	01			c		
	P6	eSE?		50	42					
	MW	ePE		42	02					
	R	iPNEZ		41	57					
	SB	ePNE		42	12					
	LJ	iPZ		41	55					
	T	iPNEZ		42	07			c		
		eSNE?		49	52					
	H	iPZ		42	04					
Apr 10	P	iPZ	23	12	17					
	T	iPZ			16					
Apr 11	P	iPNEZ	00	30	19					
		iZ			35					
	R	iPNZ			23					
	SB	iPZ			13					
	LJ	iPZ			33					
	T	iPNEZ		29	56					
		iZ		30	15					
Apr 11	P	iPZ	10	24	52					
	T	iPZ		25	03					
Apr 11	P	iPNEZ	15	36	53			d		
		iZ		37	16					
	MW	iPEZ		36	57			d		
		iZ		37	19					
	R	iPNZ		36	56			d		
		iZ		37	19					
	SB	iPNZ		36	47					
		iZ		37	09					
	LJ	iPNZ			01					
		iZ			24					
	T	iPNEZ		36	44			d		
		iZ		37	07					
	H	iPZ		36	49			d		
Apr 11	P	iPZ	20	03	32			d		
	T	iPZ			41					
Apr 11	P	iNEZ	23	33	47				normal	
	P6	iNE		43	19					
Apr 12		eLE	00	22						
Apr 11-	MW	iZ	23	33	48					
	R	eN			52					
	SB	eZ			47					
	LJ	eZ		34	02					
		eN		43	20					
	T	eN		32	08					
		eN			52					
		eN		42	53					
Apr 12	P	eNZ	00	51	11					
	R	eZ		50	54					
	LJ	eZ			23					
		iZ			34					
	T	eNE		49	35					
Apr 12	P	iPZ	02	06	26					
Apr 12	P	ePZ	13	03	33					
Apr 12	P	eZ	22	50	55					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Apr 13	P	iPZ	20	37	51					
		iZ		41	19					
	MW	ePZ		37	52					
	T	ePZ			50					
		eZ		39	02					
Apr 14	P	eZ	23	31.8						
		iZ		32	26					
Apr 15	P	iPNZ	07	07	43				normal?	
		iNEZ			52					
		iZ		14	24					
	PX	eLNZ		30.8						
	MW	eZ		07	44					
	R	eNZ			36					
		eZ		14	28					
	SB	eZ		07	57					
	LJ	iNZ			32					
	T	iEZ		08	03					
		eN		13	12					
	H	eZ		07	56					
Apr 15	P	iPNEZ	11	26	51			d		
		eZ		27	56					
		eZ		29	55					
	MW	iPEZ		26	51					
	R	iPNEZ			53			d		
		eZ		27	58					
	SB	iPZ		26	45			d		
		eZ		27	19					
		eZ			49					
	LJ	iPNZ		26	58			d		
	T	iPNEZ			42					
	H	iPZ			45					
Apr 17	P	iPZ	01	10	58			d		
	T	iPEZ		11	01					
		iZ			19					
Apr 17	P	iZ	04	46	16					
		iZ			44					
	P6	eE		47	14					
	MW	iZ		46	16					
		iZ			46					
	R	iZ			11					
		iZ			42					
	LJ	iZ			07					
	T	iPEZ			28					
		iZ			59					
Apr 18	P	iPNEZ	02	52	09			d		
		eZ			23					
	R	iPZ			12			d		
	T	iPEZ			53					
Apr 18	P	iNEZ	09	37	55					
	MW	eZ			40					
		iNEZ			55					
	R	eZ			42					
		iZ			58					
	T	eZ			43					
		iZ			59					
Apr 18	P	eZ	10	11	14					
	MW	eZ			16					
	T	eZ		10	48					
Apr 18	P	iPNZ	22	03	45					
	LJ	ePZ			47					
	T	iPZ			45					

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Apr 18	P	iPNEZ	22	23	41				normal	
	PX	ePPZ		25	23					
	P6	eLE		37.9						
	MW	iPZ		23	42					
	SB	ePZ			43					
Apr 19	P	iPNZ	08	14	07			c		
	MW	iPNEZ			07			c		
	R	iPNZ			11			c		
	LJ	iPZ			19					
	T	iPEZ		13	50			c		
	H	iPZ			57					
Apr 19	P	eZ	10	39	45					
	R	eZ			46					
	T	eZ			50					
Apr 19	P	iPZ	15	37	18				normal	Δ = 11,400 km (103°)
		iPPEZ		41	31					0 = 15:23:18
		iPPPZ		43	28					
	P6	eSKSNE		47	55					USCGS: 28° N, 12° E
		iSKSNE		48	09					0 = 15:23.4
	PX	eSZ		49	17					
		iPSZ		50	25					
		eScSPN			54					
		iPPSN		51	20					
		iSSN		54	49					
		eLZ	16	04.3						
	MW	ePZ	15	37	19					
		eSKSE		48	10					
	R	eZ		37	28					
		eSKSE		47	43					
	T	eE		37	37					
		iPSEZ		50	03					
Apr 20	P	eZ	05	28	39				normal	
	PX	eNZ			57					
		eZ		37	14					
		eZ		41	22					
		eLZ		52	12					
	MW	eZ		29	00					
	R	eZ		25	05					
		eZ		28	55					
	T	eEZ		24	48					
Apr 20	P	iPNEZ	09	47	23				deep?	
		iZ		50	52					
	MW	iPZ		47	24					
		eZ		50	52					
	R	ePZ		47	24					
		eZ		50	49					
	SB	iPNZ		47	22					
	LJ	eZ			21					
	T	ePZ			32					
		eZ		49	28					
	H	iPZ		47	34					
Apr 20	P	eZ	11	18	43					
		eZ		20	19					
	MW	eZ		18	48					
	R	eZ			37					
		eZ		24	04					
	T	eZ		18	42					
		eZ		20	43					
Apr 20	P	ePZ	22	15	41				normal	Δ = 11,400 km (103°)
	P6	iSKSNE		26	22					0 = 22:01.7
		iSN		27	17					
		iPSE		28	55					Destructive in Formosa (Taiwan)

Continued

Date	Station	Phase	G. C. T. h	m	s	T A sec	mm	c d	Focal depth	Remarks
Apr 20						Continued				
	P6	iSSNE	22	34.0						
		eLN		42						
	MW	ePZ		15	41					
	SB	ePZ			45					
	T	ePEZ			41					
		eE		19	47					
		iSKSNE		26	13					
Apr 20	P	eZ	22	40	10					
	T	eZ			00					
Apr 21	P	iZ	07	44	54					
	MW	eZ			55					
	T	eZ			53					
Apr 24	P	iPNEZ	08	43	13			c		
	MW	iPZ			15					
	R	iPZ			14			c		
	T	iPZ			23			c		
Apr 24	P	iPNEZ	16	11	54			c	deep?	
		iZ		15	04					
	MW	iPNZ		11	53					
		iZ		15	08					
	R	iPNZ		11	54			c		
	LJ	iPNZ		12	00			c		
		iNZ		15	05					
	T	ePE		11	46					
Apr 24	P	iPNZ	18	57	47				normal	
		eNZ	19	02.4						
	PX	eLZ		07.6						
	MW	eZ	18	57	41					
		iNEZ			48					
	LJ	iZ			45					
	T	eNZ			57					
Apr 25	P	iZ	04	43	07					
	MW	eZ			07					
	T	eZ			09					
Apr 25	P	iPZ	04	57	54					
	MW	iPZ			54					
		eZ		58	31					
	R	iPZ		57	57					
	T	iPEZ			59					
		eZ		58	34					
Apr 26	P	iPZ	01	51	38					
		iZ			55					
	MW	ePZ			39					
	T	iPZ			47					
		iZ		52	04					
Apr 29	P	iPZ	11	57	19					
	MW	ePZ			19					
	R	ePZ			20					
	T	iPZ			19					

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SEISMOLOGICAL LABORATORY

CARNEGIE INSTITUTION OF WASHINGTON
CALIFORNIA INSTITUTE OF TECHNOLOGY
220 NORTH SAN RAFAEL AVENUE
PASADENA, CALIFORNIA

REVISED
JANUARY 1, 1935

BULLETIN

The SEISMOLOGICAL LABORATORY, Pasadena, California, is maintained and operated by the Carnegie Institution of Washington and the California Institute of Technology as a coöperative undertaking. This laboratory is the **central station** of a coördinated group. Auxiliary stations in southern California are maintained and operated as follows: At the Mount Wilson Observatory on Mount Wilson (a Department of the Carnegie Institution of Washington); at Riverside (in coöperation with the City of Riverside); at Santa Barbara (in coöperation with the Santa Barbara Museum of Natural History); at La Jolla (in coöperation with the Scripps Institution of Oceanography of the University of California); at Tinemaha, and at Haiwee, in the Owens Valley (in coöperation with the Department of Water and Power of the City of Los Angeles).

TIME: At all these stations the minute-marks on the seismograms are coördinated directly by means of auxiliary records written at each station on which the minute-marks are registered closely parallel with recorded dot-and-dash radiotelegraphic signals sent in ordinary course from a powerful transmitting station. This permits direct correlation of the minute-marks at all the stations of the group at practically all times with an accuracy of one second, and usually of one-fifth second.

Standard time is determined at Pasadena by comparing the station clock with automatically recorded radio time signals, sent from Annapolis (NSS), three to five times daily.

The constants of these stations follow.

PASADENA SEISMOLOGICAL LABORATORY Central Station

$\Phi = 34° 08.9'$ N., $\lambda = 118° 10.3'$ W., h = 295 m., Deeply weathered granite rock, with inclusions of gneiss and schist.

Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"
E — W	6 sec.	800	0.8-0.9

Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

The constants of the short-period instruments do not undergo any significant changes. The constants of the instruments of longer period will be given from time to time when deviations from the values given are significant.

Experimental seismographs of various kinds are in process of development from time to time, and are used for intervals of variable duration. Information concerning these will be given when necessary.

AUXILIARY STATIONS

Each of the auxiliary stations has equipment as follows:

Apparatus: two horizontal-component torsion seismometers with magnetic damping and optical recording;

Instruments and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"

one vertical component seismometer with galvanometric-optical recording; inertia-mass 100 kg. T_o=1.0 or 0.5 sec. Damping critical or slightly less; galvanometer: T_1=0.2 sec. h=4.

The Station Constants follow.

Coördinates are geodetic positions referred to the North American Datum.

Mount Wilson Seismologic Station
$\Phi = 34° 13.5' N., \lambda = 118° 03.4' W., h = 1742 m.$, Weathered granite.

Riverside Seismologic Station
$\Phi = 33° 59.6' N., \lambda = 117° 22.5' W., h = 250 m.$ approx., Weathered granite.

Santa Barbara Seismologic Station
$\Phi = 34° 26.5' N., \lambda = 119° 42.9' W., h = 100 m.$ approx., Heavy, boulder-laden alluvium.

La Jolla (Scripps Institution Seismologic Station)
$\Phi = 32° 51.8' N., \lambda = 117° 15.2' W., h = 7.7 m.$ approx., Consolidated detrital material.

Tinemaha Seismologic Station
$\Phi = 37° 05.7' N., \lambda = 118° 15.5' W., h = 1180 m.$ approx., Basalt.

Haiwee Seismologic Station
$\Phi = 36° 08.2' N., \lambda = 117° 57.9' W., h = 1100 m.$ approx., Loosely cemented tuff.

SYMBOLS AND NOTATION: in general the symbols and notation conform with the usual international practice. For the phases of deep-focus earthquakes the notation of F. J. Scrase is adopted. c, d are abbreviations for compression and dilatation.

When measurements referring to **local** earthquakes are included P and S will be used without index or subscript, as no attempt will be made in these bulletins to distinguish between $\overline{P}$, P*, and P_n, although such complications are often clearly indicated and are the subject of study.

AMPLITUDES, (half-ranges), are measured in millimeters of the seismographic trace.

SPECIAL SYMBOLS indicating the stations of this coördinated group are as follows:

PASADENA SEISMOLOGICAL LABORATORY

For routine instruments of period 0.8 second . . . . . P
For routine instruments of period 6 seconds . . . . . P_6
For instruments of different period analogous notation will be employed.
For routine instruments, galvanometer period 0.2 second . . . . . P
For routine instruments, galvanometer period 10 to 14 seconds . . . . . PX

Mount Wilson Seismologic Station . . . . . MW
Riverside Seismologic Station . . . . . R
Santa Barbara Seismologic Station . . . . . SB
La Jolla (Scripps Institution Seismologic Station) . . . . . LJ
Tinemaha Seismologic Station . . . . . T
Haiwee Seismologic Station . . . . . H

In general detailed measurements will be given only for the records of the Seismological Laboratory: those for records of the other stations will be given only to supplement the information.

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
May 3	R	eZ	05	58	45					
	T	eEZ		59	19					
May 3	P	iPNEZ	07	28	15			d		
	MW	iPZ			15					
	R	iPZ			16			d		
	SB	eZ			10					
	T	iPNEZ			20			d		
May 3	P	iPZ	16	45	37			d		
	T	iPEZ			46			d		
May 5	R	eZ	09	25	15					
	T	ePZ			19					
May 5	P	ePZ	18	24	12				normal?	
	MW	ePZ			13					
	R	ePZ			14					
	T	ePZ			08					
	H	eE			10					
May 6	P	iPZ	03	24	09					
	T	iPZ			28					
May 6	P	iPZ	05	36	16					
	R	iPZ			13					
	T	iPEZ			28			d		
May 6	P	ePZ	20	02	46					
	T	ePZ			49					
	H	ePE			50					
May 7	P	eZ	10	55	15					
	R	ePZ			01					
	T	ePZ		54	50					
May 7	P	ePNZ	15	00	07					
	R	ePZ			04					
	LJ	ePZ	14	59	52					
	T	iPEZ	15	00	32					
May 7	P	iPZ	16	53	16			c	deep?	
	MW	ePNZ			17					
	R	iPZ			17					
	LJ	iPZ			19					
	SB	ePZ			14			c		
	T	iPZ			15					
May 8	P	iPNZ	17	13	28			c	deep?	
	R	ePZ			30					
	T	iPEZ			36			c		
May 8	P	ePNZ	21	08	58					
		eZ		10	10					
	R	iPZ		08	54					
		eZ		09	16					
	T	iPZ			09					
		eZ		10	03					
May 9	P	eZ	07	27	06					
	R	ePZ			09					
	T	ePZ			16					
May 9 -	P	iPZ	09	28	34					
	R	iPZ			37					
	SB	ePZ			30					
	T	iPEZ			26					
May 11	P	ePZ	19	02	43					
	T	eZ			59					
May 11	P	ePZ	19	25	29					
	T	ePEZ			10					
May 12	P	eZ	13	17	05					
	T	eZ		16	49					
May 12	P	iPNZ	19	58	39					
	MW	ePZ			39					
	R	ePZ			42					
	T	ePEZ			49					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
May 13	P	iPZ	05	35	21				normal	Small surface waves recorded
		eZ		37	45					
	T	iPZ		35	43					
		eZ		37	54					
From May 13 to May 17 Time at auxiliary stations uncertain										
May 13	P	ePZ	08	20	12					
	T	iPZ			32					
May 13	P	iPZ	23	46	13					
	T	iPEZ			25					
May 13	P	iPZ	23	55	01				normal	
	PX	eLN	24	22						
	T	ePEZ	23	55	11					
May 14	P	iP'NEZ	23	41	47				deep?	Surface waves small in proportion to preliminaries. Possibly h = 0.02. Distance about 13,300 km (120°). South Atlantic?
		ipPZ?		43	12					
		iPPNEZ			39					
		iZ		45	13					
	PX	eSKSN		48	27					
	P	ipPKKPZ?		51	59					
		iPKKPZ		52	31					
	PX	iPSZ			43					
		iSSNEZ		59	24					
	MW	iP'Z		41	47					
		iPPZ		43	34					
	R	iP'Z		41	46					
		iZ		43	09					
		iPPEZ		43	37					
		iZ		52	03					
		iPKKPZ			35					
	SB	eP'Z		41	49					
	LJ	eP'Z			45					
	T	iP'EZ			51					
		iZ		43	27					
		iPPEZ			56					
		iZ		45	18					
		i		51	51					
		eZ		55	16					
May 16	P	iPZ	17	09	03			c		
	R	iPZ			03			c		
	T	iPEZ			10					
May 16	P	iPZ	20	54	33				normal	
	P6	eLE	21	22						
	R	ePZ	20	54	27					
	T	ePEZ			47					
May 16	P	iPZ	21	32	18					
	R	ePZ			19					
	T	iPEZ			04					
May 17	P	iPNZ	12	34	54			c	normal	
	P6	iLE		39.5						
	T	ePEZ		34	23					
Following this, time at auxiliary stations dependable										
May 18	P	iPNEZ	17	28	30			d		Surface waves doubtful
	MW	iPEZ			30					
	R	iPZ			33					
	LJ	iPNZ			46					
	T	iPEZ			09					
May 18	P	iPNEZ	19	24	56			d		
	R	iPZ			58			d		
	T	iPEZ		25	05					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
May 18	P	iPNEZ	21	44	27			c		
		iZ			36					
		iZ		48	09					
	MW	ePZ		44	28					
	R	ePZ			29					
	SB	ePZ			32					
	T	iPEZ			34					
		eE		47	55					
May 19	P	iPNEZ	10	41	12			d	deep?	
	MW	iPZ			13					
	R	iPZ			15			d		
	LJ	iPZ			12			d		
	T	iPEZ			23			d		
May 19	R	iPZ	11	38	19					
	T	iPZ			35					
May 19	PX	eLZ	17	18					normal	
	T	iPZ		13	29					
May 20	P	iPZ	11	35	22					
	R	ePZ			21					
	T	ePZ			27					
May 21	P	ePZ	04	41	38					
	T	ePZ			24					
May 21	R	eZ	04	51	45					
	T	iZ			56					
May 21	P	ePZ	07	05	14			c	deep?	Surface waves small, perhaps h = 0.02
		iNEZ			17			d		
		iZ			43					
		iZ		06	04					
	PX	eZ		09	36					
		iNE		15	49					
		iNE		16	20					
		eLNEZ		38						
	R	iPNEZ		05	19					
		eZ		09	28					
	SB	iPZ		05	12					
	T	iPEZ			18			d		
		iZ		06	02					
		eZ			47					
		eZ		09	38					
May 21	P	iZ	12	49	28				normal	
	PX	eLNZ	13	18						
May 21	P	iPNEZ	13	19	39			c		
	R	ePZ			41					
	T	iPEZ			40					
		eZ		20	36					
		eZ		21	28					
May 23	P	iPZ	08	07	10					
	R	iPZ			06					
	T	eZ			00					
		iZ			22					
May 23	P	iPZ	18	09	35				normal?	Surface waves small
	PX	eLZ		34						
	MW	iPZ		09	34					
	R	iPZ			34					
	SB	ePZ			44					
	LJ	ePZ			33					
	T	eZ			33					
	H	ePNE			33					
May 24	P	ePZ	05	51	05				normal	Surface waves large with beginning indefinite
		eP'Z		53	55					
		ePPZ		55	01					
		ePKKPZ	06	06	48					

Continued

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
May 24						Continued				
	R	ePZ	05	50	57					Δ = 11,600 km (106°)
		eP'Z		53	43					0 = 05:36:43
		ePPE		55	01					
		ePKKPZ	06	06	42					Philippines
	SB	eP'Z	05	54	06					
		ePPZ		55	00					
	T	ePZ		50	36					
		iZ		51	12					
		iPPZ		54	52					
		ePKKPZ	06	06	43					
May 24	P	ePZ	22	41	18					
	R	ePZ			20					
	SB	ePZ			23					
	T	eE			23					
May 25	P	iPZ	03	01	03					
	T	iPZ		00	59					
		iZ		01	20					
May 26	P	eZ	17	45	17					
	T	eZ			14					
		iZ			26					
May 27	P	iPNEZ	03	23	57				normal	
	PX	eLNZ		50						
	MW	ePZ		23	58					
	R	ePZ			57					
	SB	ePZ			56					
	T	ePZ		24	03					
		iZ			11					
	H	ePNE			05					
May 27	P	iPNZ	07	57	27			c		
	R	iPZ			28			c		
	LJ	iPEZ			27					
	T	iPEZ			35			c		
May 28	P	iPNEZ	12	20	52			c	deep?	
		iZ		21	37					
	MW	iPNEZ		20	51					
	R	iPNEZ			49			c		
		eZ		21	36					
	SB	iPNEZ		20	58					
	LJ	iPNEZ			43			c		
		iZ		21	33					
	T	iPEZ			03			c		
		iZ			53					
	H	iPNE			01					
May 28	P	iPZ	17	10	12					
	MW	iPZ			13					
	T	iPZ			00					
May 29	P	iPZ	11	56	37					
	T	iPZ			47					
May 30	P	eP'Z	21	51	49				normal	Δ = 12,900 km (116°)
		iNZ		52	33					0 = 21:33.0
		iPPNZ			47					
		ePPPZ		55	20					USCGS: 28°5 N, 65°5 E
	PX	eSKSZ		58	35					0 = 21:33.0
		eSZ	22	00	49					
	P6	iPSE		02	25					Extremely destructive in
	P	ePKKPZ			28					Baluchistan
	PX	ePPSZ		04	00					
		eLZ		22.9						
	T	eP'EZ	21	51	34					
		ePPZ		52	30					
		ePKKPZ	22	02	29					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
May 31	P	iPNZ	08 30 09			c	deep	
		iNEZ	10			d		
		iZ	31 49					
	MW	iPNEZ	30 08					
		iZ	31 50					
	R	iPNZ	30 09					
	SB	iPZ	04					
	LJ	iPZ	17					
	T	iPEZ	29 59			c		
		iZ	31 40					
		iZ	32 18					
	H	iPNE	30 03					
May 31	P	iPNEZ	10 50 07			c	deep	
	MW	iPNEZ	08					
	R	iPZ	09					
	T	iPEZ	16					
	H	iPNE	14					
May 31	P	iPNEZ	20 19 57			c	deep	
		iZ	21 34					
		iZ	23 01					
	R	iPZ	19 58					
	SB	iPZ	52					
	T	iPEZ	20 05					

ADDENDUM TO PREVIOUS REPORT No. 14

Mar 31	P	ePZ	23 02 25					
	MW	ePZ	24					
	R	eZ	31					
	T	ePN	33					
	H	eN	28					

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Pasadena, California
June, 1935

We wish to acknowledge with thanks receipt of the following bulletins during May, 1935:

Adelaide	March, 1935
Apia	January-March, 1935, No. 1
Azores	March-April, 1935
"	Earthquake of April 27, 1935, Preliminary
Capetown	March, 1935
Chiufeng	March, 1935, No. 8-11
Chiufeng	January-June, 1933, Vol. 3, No. 1
Christchurch	March, 1935, No. 3-4
Copenhagen	October-December, 1932, No. 24
Copenhagen	January-September, 1933, No. 25-27
Georgetown	March-April, 1935, No. 219
Göttingen	October-December, 1934, No. 1-4
Kong Kong	February and March, 1935
Kew	April, 1935
La Paz	January 1-June 8, 1934, No. 1-22
La Plata	March, 1935, No. 3
Manila	February and March, 1935, No. 4-11
Melbourne	January-March, 1935
Numadu	Year 1934, No. IV
Oosaka	October-December, 1933, No. 65-75
"	March 29-May 5, 1935, No. 175-177
Ottawa	April, 1935, No. 5-6
Praha	January-March, 1935
Riverview	March, 1935, No. 3
Strasbourg	
Parc St. Maur	March, 1935, No. 1-2
Inst. Phys du Globe	March, 1935
Bureau Centrale	March, 1935, No. 9-11
Union Geodesique	March, 1935
Toledo	4th Trimestre, 1934
Torbosa	July-September, 1934, No. 7-9
USCGS	May, 1934
Vulkanische Ereignisse	1934
Wellington	March, 1935, No. 79
Zi-ka-wei	January 31-March 11, 1935, No. 2-3

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BULLETIN

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TIME: At all these stations the minute-marks on the seismograms are coördinated directly by means of auxiliary records written at each station on which the minute-marks are registered closely parallel with recorded dot-and-dash radiotelegraphic signals sent in ordinary course from a powerful transmitting station. This permits direct correlation of the minute-marks at all the stations of the group at practically all times with an accuracy of one second, and usually of one-fifth second.

Standard time is determined at Pasadena by comparing the station clock with automatically recorded radio time signals, sent from Annapolis (NSS), three to five times daily.

The constants of these stations follow.

PASADENA SEISMOLOGICAL LABORATORY Central Station

$\Phi = 34° 08.9' N., \lambda = 118° 10.3' W., h = 295 m.,$ Deeply weathered granite rock, with inclusions of gneiss and schist.

Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"
E — W	6 sec.	800	0.8-0.9

Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

The constants of the short-period instruments do not undergo any significant changes. The constants of the instruments of longer period will be given from time to time when deviations from the values given are significant.

Experimental seismographs of various kinds are in process of development from time to time, and are used for intervals of variable duration. Information concerning these will be given when necessary.

AUXILIARY STATIONS

Each of the auxiliary stations has equipment as follows:

Apparatus: two horizontal-component torsion seismometers with magnetic damping and optical recording;

Instruments and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"

one vertical component seismometer with galvanometric-optical recording;

inertia-mass 100 kg. T_o=1.0 or 0.5 sec. Damping critical or slightly less;

galvanometer: T_1=0.2 sec. h=4.

The Station Constants follow.

Coördinates are geodetic positions referred to the North American Datum.

Mount Wilson Seismologic Station
$\Phi = 34° 13.5' N., \lambda = 118° 03.4' W.$, h = 1742 m., Weathered granite.

Riverside Seismologic Station
$\Phi = 33° 59.6' N., \lambda = 117° 22.5' W.$, h = 250 m. approx., Weathered granite.

Santa Barbara Seismologic Station
$\Phi = 34° 26.5' N., \lambda = 119° 42.9' W.$, h = 100m. approx., Heavy, boulder-laden alluvium.

La Jolla (Scripps Institution Seismologic Station)
$\Phi = 32° 51.8' N., \lambda = 117° 15.2' W.$, h = 7.7 m. approx., Consolidated detrital material.

Tinemaha Seismologic Station
$\Phi = 37° 05.7' N., \lambda = 118° 15.5' W.$, h = 1180 m. approx., Basalt.

Haiwee Seismologic Station
$\Phi = 36° 08.2' N., \lambda = 117° 57.9' W.$, h = 1100 m. approx., Loosely cemented tuff.

SYMBOLS AND NOTATION: in general the symbols and notation conform with the usual international practice. For the phases of deep-focus earthquakes the notation of F. J. Scrase is adopted. c, d are abbreviations for compression and dilatation.

When measurements referring to **local** earthquakes are included P and S will be used without index or subscript, as no attempt will be made in these bulletins to distinguish between $\overline{P}$, P*, and P_n, although such complications are often clearly indicated and are the subject of study.

AMPLITUDES, (half-ranges), are measured in millimeters of the seismographic trace.

SPECIAL SYMBOLS indicating the stations of this coördinated group are as follows:

PASADENA SEISMOLOGICAL LABORATORY

For routine instruments of period 0.8 second . . . . . P
For routine instruments of period 6 seconds . . . . . P_6
For instruments of different period analogous notation will be employed.
For routine instruments, galvanometer period 0.2 second . . . . . P
For routine instruments, galvanometer period 10 to 14 seconds . . . . . PX

Mount Wilson Seismologic Station . . . . . MW
Riverside Seismologic Station . . . . . R
Santa Barbara Seismologic Station . . . . . SB
La Jolla (Scripps Institution Seismologic Station) . . . . . LJ
Tinemaha Seismologic Station . . . . . T
Haiwee Seismologic Station . . . . . H

In general detailed measurements will be given only for the records of the Seismological Laboratory: those for records of the other stations will be given only to supplement the information.

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
June 1	P	iPZ	15	09	41					
	R	ePZ			38					
	T	ePZ			48					
June 2	P	eZ	09	36	08					
		iZ			20					
	MW	eZ			21					
	R	eZ			18					
	T	eZ		35	47					
June 2	P	iPNEZ	10	01	34					
		iZ			44					
	MW	iPZ			33					
	R	ePZ			36					
	SB	eN			42					
	LJ	ePZ			45					
	T	iPZ			19					
		iZ			34					
	H	eNE			26					
June 2	P	iZ	11	55	28					
	T	iPEZ			39					
June 3	P	iPZ	02	49	30					
June 3	P	eZ	17	10	26					
		iSNZ		12	06					
	T	iPZ		10	13					
		iSE		11	32					
	H	eNE		10	22					
		eSNE		11	47					
June 4	P	iPZ	16	36	39					
	MW	iPZ			40					
	R	iPZ			42					
June 4	P	iPZ	18	58	20					
	MW	iPZ			19					
		eZ			48					
	T	iPZ			33					
June 5	P	eZ	06	30	33					
		iZ			50					
	MW	iPZ			32					
	R	eN			28					
		eN			44					
	SB	eZ		31	08					
	LJ	eZ		30	21					
		eZ			36					
	T	eE			51					
		eE		31	06					
	H	eN		30	46					
		eN		31	09					
June 6	P	iPZ-	06	27	13					
	MW	iPZ			14					
	R	ePZ			17					
	T	ePE			44					
June 6	P	iPZ	07	26	11					
		iZ			41					
	MW	iPZ			10					
	R	iPZ			06					
		iZ			37					
June 6	P	iPZ	20	18	53					
	MW	iPZ			54					
	T	iPEZ			39					
June 7	MW	eZ	12	32	31					
	R	eZ			27					
	T	eZ			35					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
June 7	R	eZ	13	00	40					
	T	iZ			49					
June 7	P	iZ	15	41	50					
	MW	iZ			50			d		
		iZ		42	13					
	R	iNZ		41	47			d		
		iZ		42	09					
	T	iEZ			03					
		iZ			22					
	H	eE		41	59					
June 10	P	iPZ	07	03	56					
	MW	iPZ			57					
	R	ePZ			59					
June 11	P	iPZ	22	04	13				normal	Small Surface waves recorded
	MW	iPZ			11					
	R	ePZ			07					
	SB	ePZ			05					
	T	ePE			27					
June 12	P	iPZ	01	56	59					
	MW	iPZ			59					
	R	iPZ			54					
June 12	P	iPZ	13	16	38			c		
	MW	iPZ			38			c		
	R	iPZ			33					
	T	ePE			51					
June 12	P	ePZ	23	46	32					
	R	iZ			27					
	LJ	eZ			23					
June 14	P	iPZ	21	21	30					
	R	iPZ			34					
	SB	ePZ			25					
	T	iPEZ			23					
	H	iPEZ			27					
June 16	P	iPNZ	06	32	06					
	R	iPZ			08					
	H	ePZ			07					
June 18	P	eZ	18	39	17					
	R	eZ			21					
	T	eZ			49					
June 18	P	ePZ	23	55	30				normal	
	PX	eLN	24	00	21					
	R	ePZ	23	55	27					
	SB	ePZ			45					
	LJ	ePNZ			13					
	H	iPNEZ			55					
June 19	P	iPNEZ	22	27	48			c	normal	$\Delta \leq$ 9900 km (89°)
	P6	eSKSE		38	13					0 = 22:14:51
		iSNE			30					
		eLE		56						
	MW	iPNEZ		27	49					
	R	iPZ			51					
	SB	ePNEZ			43					
	LJ	iPNE			51					
	T	iPNEZ			52					
		eSNE		38	40					
	H	ePEZ		27	52					
June 20	P	iPNEZ	00	37	07			c		
	MW	iPZ			08					
	R	iPZ			10					

Date	Station	Phase	G. C. T. h m s	T A sec mm	c d	Focal depth	Remarks
June 22	P	iPZ	05 39 22				
	MW	iPZ	24				
	R	ePZ	25				
	T	iPZ	32				
June 22	P	iPEZ	16 07 24				
	MW	ePZ	24				
	R	ePZ	28				
	H	ePZ	27				
June 23	P	iPZ	14 09 06				
	MW	ePZ	06				
	R	ePZ	08				
June 24	P	iPNEZ	07 50 54				
	MW	iPZ	54				
	R	iPZ	55				
	LJ	iPZ	54				
	T	iPZ	51 03				
	H	iPZ	02				
June 24	P	iPNEZ	23 35 43		c	deep	△ = 9550 km (86°)
		ipPNEZ	36 14				h = 0.02
		iPPNEZ	39 05		c		0 = 23:23.1
	PX	iPSNEZ	46 59				New Hebrides
		iNE	47 19				
		iE	57				JSA: 19° S, 168°5 E
		iP'P'Z	24 01 51				0 = 23:23:06
		eLNEZ	02.2				
	MW	iPNEZ	23 35 42				
	R	iPEZ	42		c		
		ipPEZ	36 19				
		iPPEZ	39 09				
	SB	iPNEZ	35 38				
		ipPZ	36 11				
		iPPNEZ	38 56				
	LJ	iPEZ	35 46		c		
		ipPEZ	36 21				
		iPPEZ	39 10				
	T	iPNEZ	35 48		c		
		ipPNEZ	36 20				
		iPPZ	39 15				
		eN	46 16				
		eN	47 17				
	H	ePZ	35 44				
		ipPZ	36 21				
		iPPZ	39 12				
		eN	46 59				
June 25	P	iPNEZ	07 36 32		d		
	MW	iPZ	33				
	R	iPZ	35				
	LJ	iPZ	36				
	T	iPNEZ	39				
		iZ	50				
June 25	P	iPZ	12 05 16				
	MW	iPZ	17				
	R	ePZ	20				
June 25	P	iPNEZ	12 44 35			normal	Small surface waves recorded
	MW	ePZ	36				
	R	ePZ	39				
	SB	ePZ	34				
	LJ	ePZ	45				
	T	ePNEZ	25				

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
June 28	P	iPNEZ	02	12	42				normal	
	PX	eLN		41.5						
	R	iPNEZ		12	39					
	LJ	iPEZ			36					
	SB	ePZ			49					
	T	ePNEZ			55					
	H	iPNEZ			49					
June 28	P	iPZ	19	09	56					
	R	ePZ			59					
	SB	ePZ		10	01					
	LJ	iPEZ			04					
	T	ePNEZ		09	47					
	H	ePEZ			51					
June 28	P	iPNEZ	19	37	07			d	normal	S readings uncertain
	PX	eSN		42	47					Hawaii, damage at Hilo, etc.
		eLNEZ		45	20					
	R	ePZ		37	12					
	LJ	ePEZ			13					
	T	ePNEZ			14					
		eSE		43	05					
	H	ePN		37	19					
June 29	P	iPNEZ	06	53	31			c	normal	USCGS: 18°2 N, 103°3 W
		eSNZ		57	28					O = 06:48.9
		iLN		58	29					West coast of Mexico. Felt
	MW	iPNZ		53	32			c		sharply at Acapulco. Strong
	R	iPNEZ			26			c		on board vessel at 18° 16' N,
		eSE		56	17					103° 35' W.
	SB	iPNEZ		53	44					
	LJ	iPEZ			15					JSA: 18°2 N, 103°3 W
	T	iPNEZ			55			c		O = 06:48:53
	H	iPNEZ			46			c		
		iSN		57	52					

Harry O. Wood
Research Associate in Charge
C. F. Richter
Assistant

Pasadena, California
June, 1935

We wish to acknowledge with thanks receipt of the following bulletins during May, 1935:

Adelaide	March, 1935
Apia	January-March, 1935, No. 1
Azores	March-April, 1935
"	Earthquake of April 27, 1935, Preliminary
Capetown	March, 1935
Chiufeng	March, 1935, No. 8-11
Chiufeng	January-June, 1933, Vol. 3, No. 1
Christchurch	March, 1935, No. 3-4
Copenhagen	October-December, 1932, No. 24
Copenhagen	January-September, 1933, No. 25-27
Georgetown	March-April, 1935, No. 219
Göttingen	October-December, 1934, No. 1-4
Kong Kong	February and March, 1935
Kew	April, 1935
La Paz	January 1-June 8, 1934, No. 1-22
La Plata	March, 1935, No. 3
Manila	February and March, 1935, No. 4-11
Melbourne	January-March, 1935
Numadu	Year 1934, No. IV
Oosaka	October-December, 1933, No. 65-75
"	March 29-May 5, 1935, No. 175-177
Ottawa	April, 1935, No. 5-6
Praha	January-March, 1935
Riverview	March, 1935, No. 3
Strasbourg	
Parc St. Maur	March, 1935, No. 1-2
Inst. Phys du Globe	March, 1935
Bureau Centrale	March, 1935, No. 9-11
Union Geodesique	March, 1935
Toledo	4th Trimestre, 1934
Tortosa	July-September, 1934, No. 7-9
USCGS	May, 1934
Vulkanische Ereignisse	1934
Wellington	March, 1935, No. 79
Zi-ka-wei	January 31-March 11, 1935, No. 2-3

SEISMOLOGICAL LABORATORY

CARNEGIE INSTITUTION OF WASHINGTON
CALIFORNIA INSTITUTE OF TECHNOLOGY
220 NORTH SAN RAFAEL AVENUE
PASADENA, CALIFORNIA

REVISED
JANUARY 1, 1935

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Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
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galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
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For routine instruments, galvanometer period 0.2 second . . . . . P
For routine instruments, galvanometer period 10 to 14 seconds . . . . . PX

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Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Aug 1	P	iPZ	11	14	37					
	MW	iPZ			38					
	T	iPZ			21					
Aug 1	PX	eLZ	15	17					normal	
Aug 1	P	iPNEZ	16	15	38				normal	USCGS: 10° N, 86° W
	P6	eLE		27						0 = 16:08.3
	MW	iPZ		15	38					
	R	iPZ			32					JSA: 11?1 N, 86?1 W
	SB	ePNZ			55					0 = 16:08:17
	LJ	ePNEZ			28					
	T	ePZ			51					
		eSN		22	35					
Aug 3	P	eP'Z	01	29	08				normal	Distant approximately 14,500
	PX	ePPZ		31	11					km. (130°)
		iZ		32	33					
		ePKSZ		33	21					USCGS: In region of 5° N,
		eZ		41.9						96° E. 0 = 01:10.1
	P30	eLN	02	04.4						
	MW	eP'Z	01	29	08					JSA: In vicinity of 4?7 N,
		iZ		32	29					97° E. 0 = 01:10:09
	R	eP'Z		29	12					
	SB	eZ			14					
	LJ	eZ			17					
		eEZ		32	38					
	T	eP'Z		29	06					
		eN		32	12					
Aug 4	P	ePEZ	02	29	47				normal	
	P30	eLN		38.0						
	MW	ePZ		29	48					
	R	iPNEZ			42					
	SB	ePZ		30	00					
	LJ	iPNEZ		29	34					
	T	ePNZ		30	05					
	H	ePN		29	59					
Aug 4	P	iPZ	09	43	08					
		iNZ			20					
	MW	iPZ			08					
		iZ			20					
		iZ		46	03					
	R	iPZ		43	11					
		iNEZ			23					
		iZ		46	02					
	SB	iPZ		43	01					
		iZ			13					
	LJ	iPZ			21					
	T	ePZ		42	46					
		iZ			58					
		eN		47	36					
	H	ePN		42	54					
Aug 4	P	eZ	16	59	01					
	MW	iZ			02					
	SB	eZ		58	50					
	LJ	eZ			56					
		iZ		59	09					
Aug 4	P	iPZ	18	35	47					
	MW	iPZ			48					
	R	iPZ			49					
	T	ePZ			49					
Aug 4	P	iPNEZ	21	36	42			c	deep?	
	MW	iPEZ			44			c		
	R	iPZ			45			c		
	T	iPZ			43			c		

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Aug 5	P	eZ	04	04	04					
	MW	eZ			07					
	T	iZ			20					
Aug 5	P	ePZ	13	49	26					
	MW	ePZ			29					
	R	ePZ			31					
	LJ	ePZ			28					
	T	ePZ			40					
Aug 5	P	iZ	19	08	18					
		iZ		10	50					
	MW	eZ		08	19					
	T	eZ			01					
Aug 5	P	iZ	20	44	23					
	MW	iZ			39					
	T	eZ			56					
Aug 5	P	iZ	21	43	10					
	MW	iZ			11					
	R	iZ			12					
	T	iZ			18					
Aug 6	P	iZ	00	02	47				normal	
		iZ		03	52					
	PX	eLN		30.0						
	MW	eZ		02	27					
		iZ			47					
	R	eZ			28					
		iZ			44					
	LJ	eZ			43					
		iZ		04	10					
	T	eZ		02	44					
		eZ			59					
		iZ		03	54					
Aug 6	P	ePNZ	17	01	34					
	MW	ePZ			33					
	R	ePNEZ			19					
	LJ	ePNE		00	43					
Aug 6	P	iPNZ	21	55	42			d	deep?	
	MW	iPZ			40			d		
		iZ		56	34					
	R	iPNEZ		55	38			d		
	T	iPNEZ			53			d		
Aug 7	P	iPZ	08	36	27					
	MW	iPZ			29					
	R	ePZ			29					
	LJ	ePZ			28					
	T	iPZ			38					
Aug 7	P	iPEZ	09	11	12				normal?	Surface waves small Damage in Colombia USCGS: 1° N, 77° W 0 = 09:02.1 JSA: 1° N, 77°5 W 0 = 09:02:18
	MW	ePEZ			14					
	R	iPZ			09					
	LJ	ePNEZ			05					
	T	iPNEZ			27					
	H	ePN			27					
Aug 8	P	iPZ	14	31	17					
	MW	iPZ			17					
Aug 10	P	iPZ	17	50	51					
		iZ		52	49					
	MW	ePZ		50	52					
	R	ePZ			49					
Aug 11	P	eZ	19	45	33					
	MW	eZ			35					
Aug 11	P30	iLN	07	51.5					normal	

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Aug 14	P	iPZ	00	13	41					
	MW	iPZ			41					
	T	iPZ			50					
Aug 15	P	iZ	04	59	25					
		iZ	05	00	38					
	MW	iZ	04	59	25					
		iZ	05	00	40					
	LJ	iZ	04	59	53					
	T	iZ			05					
	H	iZ			12					
Aug 15	MW	eZ	15	00	45					Disturbed by microseisms
	LJ	eZ		01	00					
	T	eZ		00	05					
	H	eN			38					
Aug 15	P	iZ	15	02	59					
		iZ		03	27					
	MW	iZ		02	59					
		iZ		03	27					
	T	iZ			10					
	H	eZ			07					
Aug 16	P	iPNEZ	15	51	04			d	deep?	
	MW	iPEZ			05			d		
	LJ	ePNEZ			03					
	T	iPNEZ			14			d		
	H	iPNEZ			11			d		
Aug 17	P	iPNEZ	01	57	19				normal?	Possibly somewhat deeper than usual; but surface waves large
	PX	iPPN	02	01	14					
	P6	eSKSE		07	49					
		iSE		08	08					
	P30	iGN		21	03					USCGS: Probably in region of 20° S, 172° E
	P6	eLE		25	02					
	MW	iPNEZ	01	57	20					0 = 01:44.7
	SB	ePNZ			16					
	LJ	ePEZ			20					
		eSKSE	02	07	50					JSA: Near 20° S, 171°5 E
		iSN		08	10					0 = 01:44:57
	T	iPNEZ	01	57	26					h = 120 km
		eSKSE	02	08	00					
		iSN			13					
	H	ePZ	01	57	24					
		eSKSE	02	07	57					
		iSN		08	08					
Aug 17	P	eZ	07	25	52					
		eZ		26	12					
	MW	eZ		25	53					
		eZ		26	12					
	T	iZ		25	59					
		eZ		26	20					
Aug 17	P	eZ	07	34	16					
		eZ			50					
	MW	eZ			53					
	H	eZ			48					
		iZ		35	00					
Aug 17	P	eZ	09	59	28					
	MW	eZ			32					
	T	eZ			18					
Aug 18	P	iZ	22	47	17					
	MW	iZ			19					
	T	eZ			28					
	H	iZ			27					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Aug 19	P	iPZ	07	01	57					
	MW	iPZ			58					
	T	ePNE		02	14					
	H	iPZ			06					
Aug 19	P	iPZ	07	38	11					
	MW	iPZ			12					
	T	iPEZ			19					
	H	iPZ			18					
Aug 20	P	eZ	00	05	02				normal?	
		iZ		07	01					
	P30	eLN?		15	27					
	MW	eZ		05	12					
		iZ		06	54					
	LJ	eZ		05	06					
	T	ePNEZ			31					
		iZ			41					
		iZ		07	12					
	H	ePZ		05	23					
		eZ		20	59					
Aug 20	P	iPZ	12	44	48					
		iZ		46	57					
	MW	iPZ		44	49					
		eZ		46	54					
	T	iPZ		44	57					
		eZ		47	07					
Aug 20	P	eZ	23	40	55					
		iZ		41	02					
	MW	eZ		40	55					
		iZ		41	00					
	T	eN		40	28					
Aug 21	P	iPZ	00	01	16					
	MW	iZ			16					
	T	iPZ			12					
Aug 21	P	eZ	09	41	05					
		iZ			12					
	MW	eZ			03					
	T	eZ		40	34					
Aug 21	P	iPNEZ	14	00	03			d	deep	
	P6	eE		09	45					
	MW	iPNEZ		00	04			d		
		iZ		01	02					
	SB	iPNZ		00	00					
	LJ	iPNEZ			03			d		
	T	iPNEZ			13			d		
	H	iPZ			11					
Aug 22	P	iPNEZ	20	39	18			c	normal	USCGS: 73°5 N, 66° W
	PX	eSZ		45	48					O = 20:30.8
	P30	eLN		54	53					
	MW	iPNEZ		39	17					
	SB	iPZ			20					
	LJ	iPNZ			26					
	T	iPNEZ		38	56					
	H	iPNZ		39	03					
Aug 23	P	iPZ	10	15	07			c	deep?	
	MW	iPZ			07			c		
	LJ	iPNEZ			20			c		
	T	iPNEZ		14	45					
	H	ePN			55					
Aug 23	P	ePZ	10	31	21				deep?	
	MW	ePZ			20					
	LJ	ePZ			26					
	T	ePEZ			23					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Aug 23	P	ePZ	11	12	03					
		eZ		13	04					
	MW	iPZ		12	06					
	T	ePE			06					
Aug 23	P	iPZ	11	58	34				normal	
	P30	eL	12	19	10					
	MW	iPZ	11	58	34					
Aug 23	P	iPZ	12	37	50					
	MW	ePZ			50					
Aug 23	P	iP'Z	14	16	59				normal?	Δ = 14,600 km approx (132°)
	PX	ePPZ		19	25					Possibly deeper than normal
		iPKSNEZ		20	27					
		eLZ	15	06.7						
	MW	eP'Z	14	16	59					
		ePKSNZ		20	25					
	T	eP'Z		16	56					
		iPKSZ		20	19					
		iZ			35					
Aug 24	P	ePZ	09	37	06				normal	Gulf of California, about 25° N
		eSNEZ		38	23					
		iSZ		38	36					
	MW	iPZ		36	38					
		iSZ		38	31					
	LJ	ePZ		36	37					
		eSNEZ		37	45					
	T	eZ		40	00					
Aug 24	P	iSZ	10	07	05				normal	Aftershock of preceding
	MW	eSZ			03					
	LJ	ePZ		05	07					
		eSZ		06	14					
Aug 24	P	eSZ	11	10	55				normal	Aftershock
	LJ	eSNEZ			13					
Aug 24	P	eZ	13	35	11					
	MW	eZ			13					
Aug 25	P	iPNZ	05	18	14				normal	
	P30	eLN		42.2						
	MW	ePZ		18	16					
	SB	eN			35					
	LJ	eZ			25					
		eNEZ			34					
	T	iPNZ		17	59					
Aug 25	P	eZ	20	27	38					
	T	eZ			53					
Aug 26	P	ePZ	12	33	59			c		
	MW	iPZ		34	00			c		
	SB	ePZ		33	54					
	T	ePZ		34	02					
Aug 27	P	iPZ	07	36	44			c	deep?	
		iZ		37	44					
	MW	iPZ		36	44					
	LJ	iPZ			52					
	T	iPNEZ			34					
Aug 27	P	iPZ	13	41	10					
	MW	iPZ			10					
	LJ	iPZ			23					
	T	ePZ		40	48					
Aug 28	P	eZ	02	09	53					
	MW	eZ			46					
		eZ			54					
	T	eZ		10	10					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Aug 29	P	iZ	02 36 07					
	MW	eZ	35 16					
		iZ	36 06					
	T	eE	35 45					
		eZ	36 17					
Aug 30	P	iZ	00 45 01					
	MW	iZ	01					
	R	iZ	04					
	T	iZ	02					
Aug 30	P	iPNEZ	03 20 40			d	deep?	
	MW	iPZ	41					
	R	iPNZ	42			d		
	SB	iPZ	38					
	LJ	ePZ	39					
	T	iPNEZ	50					
Aug 31	P	eZ	17 50 59					
	MW	eZ	51 00					
	R	eZ	05					
	T	eZ	50 51					

Harry O. Wood
Research Associate in Charge
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Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Sept 1	P	iPZ	00 55 35					
		iZ	58 06					
		iZ	20					
	MW	ePZ	55 36					
		iZ	58 05					
	R	ePZ	55 30					
		iZ	58 05					
	LJ	ePZ	55 43					
		eZ	57 03					
	T	ePE	55 51					
Sept 2	P	iPZ	07 29 01					
		eZ	33 05					
Sept 3	P	iPZ	11 13 13					
		iZ	51					
	MW	iPZ	13					
	T	iPEZ	18					
Sept 3	P	iPZ	16 39 31					
	MW	iPZ	31					
	LJ	iPNEZ	17					
	T	iPNEZ	54					
Sept 4	P	iPNEZ	01 34 49				normal	USCGS: 65° N, 152° W
		iSEZ	40 35					O = 01:27.7
	P6	eLE	48.8					
	MW	iPNEZ	34 49					
		eSE	40 33					
	SB	iPNZ	34 43					
	LJ	iPNEZ	35 01					
		eSE	40 57					
	T	iPNEZ	34 27					
		eSN	39 55					
	H	iPZ	34 32					
Sept 5	P	ePNZ	01 39 18					
	MW	iZ	31					
	LJ	eZ	37 28					
		iZ	38 45					
Sept 5	P	iZ	13 59 56					
	MW	iPZ	57					
Sept 6	P	iPZ	08 12 02					
	MW	ePZ	00					
Sept 8	P	iPZ	11 17 33					
	MW	iPZ	33					
	R	iPZ	35					
	T	iPZ	40					
Sept 9	P	iPZ	06 25 08					
	MW	iPZ	09					
	R	ePNZ	10					
	SB	ePZ	07					
	LJ	iPZ	13					
	T	ePEZ	06					
	H	ePZ	07					
Sept 9	P	iPNEZ	06 30 58					Interpretation somewhat
		iZ	31 09					doubtful. Distance about
		iPPZ	34 33					95°? May belong with pre-
		iZ	56					ceding.
	P6	iSKSE	41 38					
		iSE	42 18					
		eLN	56.4					
	MW	iPZ	30 58					
	R	iPZ	31 00					
	SB	iPNZ	30 52					
	LJ	iPZ	31 02					
	T	iPZ	30 55					
	H	iPZ	57					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Sept 9	P	iPNEZ	09	12	16			c	deep?	
	MW	iPNEZ			18			c		
	R	iPNEZ			18					
	SB	iPZ			12					
	LJ	iPNEZ			14					
	T	ePNE			27					
	H	iPZ			25			c		
Sept 9	P	iPZ	13	44	15					
	MW	iPZ			16					
	R	ePZ			18					
Sept 9	P	iPZ	15	33	20			c		
	MW	iPZ			20					
	R	ePZ			17					
	T	ePNEZ			32					
	H	ePZ			28					
Sept 10	P	ePNEZ	06	34	36				normal	
	P30	eSN		37	47					
		iLN		39.5						
	MW	iPNEZ		34	36					
	R	iPZ			30					
	LJ	ePN			19					
	T	ePEZ		35	03					
	H	ePZ		34	57					
Sept 10	P	iPZ	07	09	49				normal	
	P30	eSN		13.6						
		eLN		14.7						
	MW	iPZ		09	47					
	R	iPNZ			41					
	LJ	ePN			29					
	T	ePNEZ		10	14					
Sept 10	P	ePNEZ	07	39	16				normal	
	P30	eLN		44.0						
	MW	ePZ		39	15					
	R	ePNEZ			09					
	T	ePNEZ			44					
Sept 10	P	iPZ	11	25	37					
	MW	iPZ			38					
	R	ePZ			39					
	T	ePZ			47					
Sept 10	P	iPZ	17	03	32					
	MW	iPZ			31					
	R	ePZ			34					
	LJ	iPZ			31					
	T	iPZ			39					
Sept 11	P	iPNZ	11	58	06				normal	
	PX	eLN	12	21.5						
	MW	iPZ		58	07					
	LJ	iPZ			08					
	T	ePNEZ			16					
		eSN?	12	09	04					
	H	ePZ	11	58	14					
Sept 11	P	iPNEZ	14	15	16			c	normal	△ = 7800 km (70°2)
		iSNEZ		24	28					0 = 14:04:00
		iE			56					
	P30	eN		32.5						USCGS: 45° N, 146° E
		iLN		36.6						0 = 14:04:00
	P	iP'P'Z		43	06					
	MW	iPNEZ		15	17			c		JSA: 44°5 N, 147° E
		iSNEZ		24	29					0 = 14:04:12.2
		iP'P'Z		43	03					
	R	iPNEZ		15	20			c		
		iSNEZ		24	36					
		eP'P'Z		42	58					

Continued

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Sept 11						Continued				
	SB	iPNZ	14	15	10					
		eSN		24	18					
	LJ	ePNZ		15	23					
		iSE		24	41					
		eP'P'Z		43	01					
	T	iPNEZ		15	06			c		
		iSEZ		24	05					
		eP'P'Z		43	13					
	H	iPZ		15	10			c		
		eSZ		24	36					
		eP'P'Z		43	14					
Sept 11	P	iPNEZ	14	36	19					Possibly PKKP of preceding shock
	MW	iPNEZ			18					
	R	iPNEZ			13					
	LJ	iPNEZ			05					
	T	iPNEZ			38					
	H	iPZ			31					
Sept 11	P	iPZ	22	28	33					
	MW	iPZ			33					
	T	iPEZ			42					
	H	iPZ			40					
Sept 12	P	iPZ	03	32	07					
	MW	iPZ			05					
	R	iPZ			10					
	T	iPNEZ		31	45					
	H	ePZ			54					
Sept 12	P	iPZ	11	15	03					
	MW	ePZ			03					
Sept 12	P	iPNEZ	16	12	32			c	deep	
		eZ		14	37					
		iZ		15	39					
	PX	eSN		21	43					
	MW	iPNEZ		12	33			c		
	R	iPZ			34					
		eZ		14	41					
	SB	iPZ		12	28					
	LJ	iPNEZ			33			c		
	T	iPNEZ			40					
		iSNE		22	00					
Sept 13	P	iPZ	05	41	04					
	MW	iPZ			04					
	R	iPZ			00					
	T	iPZ			16					
Sept 14	P	iPZ	08	40	04			c	deep?	
		iZ			29					
		iZ			51					
	MW	iPZ			04					
	R	iPZ			06			c		
		iZ			31					
	SB	iPZ		39	58					
	LJ	iPZ		40	10					
		eZ			35					
	T	iPZ		39	56					
		iZ		40	21					
	H	iPZ			00					
Sept 14	P	iZ	14	27	00					
		iZ		31	30					
	MW	eZ		27	00					
		eZ		31	31					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Sept 14	P	iPNEZ	20	55	27				normal	
		eZ		57	52					
	PX	eLN	21	10						
	MW	iPZ	20	55	27					
	R	ePZ			21					
	T	ePZ			39					
		iZ		57	56					
Sept 14	P	eZ	23	09	53					
	T	eZ			38					
Sept 15	P	iPZ	02	11	12					
	MW	iPZ			13					
	R	iPZ			16					
	LJ	iPZ			24					
	T	iPNEZ		10	57					
Sept 15	P	ePZ	04	10	25				normal	
	PX	eLN		27.8						
	MW	ePZ		10	25					
	R	ePZ			20					
	LJ	ePZ			19					
	T	ePNEZ			28					
Sept 15	P	eZ	06	28	19					
	MW	ePZ			22					
	R	ePZ			23					
	T	ePZ			31					
Sept 15	P	iPNEZ	11	28	39			c	normal	
	P6	eSE?		39	28					
	PX	eLNZ		58.5						
	MW	iPNEZ		28	39					
	R	iPNEZ			41					
	SB	iPZ			33					
	LJ	iPNEZ			41					
	T	iPNEZ			40			c		
		eSE		39	16					
	H	iPZ		28	40					
Sept 15	P	iPNEZ	14	19	13			d	normal	Δ = 6600 km (59?5) 0 = 14:09:07
	P30	eSN		27	22					
		eLN		35.0						USCGS: 29° S, 114° W
		iLN		37.5						0 = 14:08.9
	MW	ePNEZ		19	14					
	R	iPNZ			12					JSA: 28° S, 113?3 W
		eSNE		27	35					0 = 14:09:10
	SB	ePZ		19	19					
	LJ	iPNEZ			06					
		eSE		27	34					
	T	iPNEZ		19	34					
	H	iPZ			27					
Sept 15	P	iPNZ	14	26	53					
	MW	iPZ			54					
	R	ePZ			51					
	LJ	iPZ			43					
	T	ePZ		27	13					
Sept 15	P	iPZ	14	54	14			d		
	MW	iPNEZ			15					
	R	iPNZ			11					
	LJ	iPNEZ			04					
	T	iPNEZ			34			d		
	H	iPZ			27					
Sept 15	P	eZ	15	10	40					
	MW	iZ			41					

SEISMOLOGICAL LABORATORY

CARNEGIE INSTITUTION OF WASHINGTON
CALIFORNIA INSTITUTE OF TECHNOLOGY
220 NORTH SAN RAFAEL AVENUE
PASADENA, CALIFORNIA

REVISED
JANUARY 1, 1935

BULLETIN

The SEISMOLOGICAL LABORATORY, Pasadena, California, is maintained and operated by the Carnegie Institution of Washington and the California Institute of Technology as a coöperative undertaking. This laboratory is the **central station** of a coördinated group. Auxiliary stations in southern California are maintained and operated as follows: At the Mount Wilson Observatory on Mount Wilson (a Department of the Carnegie Institution of Washington); at Riverside (in coöperation with the City of Riverside); at Santa Barbara (in coöperation with the Santa Barbara Museum of Natural History); at La Jolla (in coöperation with the Scripps Institution of Oceanography of the University of California); at Tinemaha, and at Haiwee, in the Owens Valley (in coöperation with the Department of Water and Power of the City of Los Angeles).

TIME: At all these stations the minute-marks on the seismograms are coördinated directly by means of auxiliary records written at each station on which the minute-marks are registered closely parallel with recorded dot-and-dash radiotelegraphic signals sent in ordinary course from a powerful transmitting station. This permits direct correlation of the minute-marks at all the stations of the group at practically all times with an accuracy of one second, and usually of one-fifth second.

Standard time is determined at Pasadena by comparing the station clock with automatically recorded radio time signals, sent from Annapolis (NSS), three to five times daily.

The constants of these stations follow.

PASADENA SEISMOLOGICAL LABORATORY Central Station

$\Phi = 34° 08.9'$ N., $\lambda = 118° 10.3'$ W., h = 295 m., Deeply weathered granite rock, with inclusions of gneiss and schist.

Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"
E — W	6 sec.	800	0.8-0.9

Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

The constants of the short-period instruments do not undergo any significant changes. The constants of the instruments of longer period will be given from time to time when deviations from the values given are significant.

Experimental seismographs of various kinds are in process of development from time to time, and are used for intervals of variable duration. Information concerning these will be given when necessary.

AUXILIARY STATIONS

Each of the auxiliary stations has equipment as follows:

Apparatus: two horizontal-component torsion seismometers with magnetic damping and optical recording;

Instruments and Constants (approximate);

	T_0	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"

one vertical component seismometer with galvanometric-optical recording; inertia-mass 100 kg. T_0=1.0 or 0.5 sec. Damping critical or slightly less; galvanometer: T_1=0.2 sec. h=4.

The Station Constants follow.

Coördinates are geodetic positions referred to the North American Datum.

Mount Wilson Seismologic Station
$\Phi = 34° 13.5' N., \lambda = 118° 03.4' W., h = 1742 m.$, Weathered granite.

Riverside Seismologic Station
$\Phi = 33° 59.6' N., \lambda = 117° 22.5' W., h = 250 m.$ approx., Weathered granite.

Santa Barbara Seismologic Station
$\Phi = 34° 26.5' N., \lambda = 119° 42.9' W., h = 100 m.$ approx., Heavy, boulder-laden alluvium.

La Jolla (Scripps Institution Seismologic Station)
$\Phi = 32° 51.8' N., \lambda = 117° 15.2' W., h = 7.7 m.$ approx., Consolidated detrital material.

Tinemaha Seismologic Station
$\Phi = 37° 05.7' N., \lambda = 118° 15.5' W., h = 1180 m.$ approx., Basalt.

Haiwee Seismologic Station
$\Phi = 36° 08.2' N., \lambda = 117° 57.9' W., h = 1100 m.$ approx., Loosely cemented tuff.

SYMBOLS AND NOTATION: in general the symbols and notation conform with the usual international practice. For the phases of deep-focus earthquakes the notation of F. J. Scrase is adopted. c, d are abbreviations for compression and dilatation.

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For routine instruments of period 0.8 second . . . . . P
For routine instruments of period 6 seconds . . . . . P_6
For instruments of different period analogous notation will be employed.
For routine instruments, galvanometer period 0.2 second . . . . . P
For routine instruments, galvanometer period 10 to 14 seconds . . . . . PX

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CARNEGIE INSTITUTION OF WASHINGTON
CALIFORNIA INSTITUTE OF TECHNOLOGY
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PASADENA, CALIFORNIA

REVISED
JANUARY 1, 1935

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The constants of these stations follow.

PASADENA SEISMOLOGICAL LABORATORY Central Station

$\Phi = 34° 08.9'$ N., $\lambda = 118° 10.3'$ W., h = 295 m., Deeply weathered granite rock, with inclusions of gneiss and schist.

Apparatus: horizontal-component torsion seismometers with electromagnetic damping and optical recording. (Cf.Bull.Seis.Soc.Am.,XV,1,1925).

Instruments, and Constants (approximate);

	T_o	V	h
N — S	0.8 sec.	2,800	0.8-0.9
E — W	"	"	"
E — W	6 sec.	800	0.8-0.9

Seismometers with electromagnetic damping and galvanometric-optical recording. (Cf.Bull.Seis.Soc.Am.,XXII,156,1932).

Horizontal: inertia-mass 100 kg. T_o=0.5 sec. h=1.
galvanometer: T_1=14 sec. h=1.

Vertical: inertia-mass 100 kg. T_o=1.0 sec. Damping critical.
galvanometers: (1) T_1=0.2 sec. h=4.
(2) T_1=10 sec. h=1.

The constants of the short-period instruments do not undergo any significant changes. The constants of the instruments of longer period will be given from time to time when deviations from the values given are significant.

Experimental seismographs of various kinds are in process of development from time to time, and are used for intervals of variable duration. Information concerning these will be given when necessary.

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Pasadena, California
October, 1935

We wish to acknowledge with thanks receipt of the following bulletins during September, 1935:

Adelaide	July, 1935
Capetown	May, 1935, additional
Capetown	June-July, 1935
Cartuja	March, 1935, No. 11-14
Christchurch	July, 1935
Firenze	January-March, 1935, No. 1-4
Graz	January-June, 1935, No. 1-3
Helwan	May, 1935, No. 1-2
Hongkong	July, 1935
Hukuoka	January-June, 1935, Vol 2, No. 1
Gov. of India, Weather Review	Year 1933
JSA	June-August, 1935, No. 13-19
Kew	August, 1935
Ksara	July, 1935
La Plata	July, 1935, No. 7
La Paz	December, 1934, No. 45-49
La Paz	January-May, 1935, No. 1-17
Little Rock	March 26-June 2, 1935, No. 4-7
Lwow	January-April, 1935, No. 1-2
Melbourne	April-June, 1935
Mizusawa	Year 1934
Quito (Meteorological only)	September-October, 1934
Riverview	July, 1935, No. 7
San Fernando	July-August, 1935, No. 4
St. Louis	June and July, 1935, No. 9-13
State College, Pennsylvania	January-June, 1935, No. I
Strasbourg	
Bureau Centrale	July, 1935
Inst. Phys. du Globe	July, 1935
Parc St. Maur	July, 1935
Union Geophysique	July, 1935
Sydney	June and July, 1935
Taihoku	July, 1935, Preliminary
Toronto	June-July, 1935
Tortosa	October-December, 1934
Vladivostok	July, 1935
Vulkanische Ereignisse	1934-1935
Wellington	July, 1935
Wien	December, 1934, No. 12
Wien	January-March, 1935, No. 1-2
Zi-ka-wei	June 18-July 7, 1935, No. 10
Zinsen	April-June, 1935, No. 4-6

MONTHLY BULLETIN OF THE SEISMOLOGICAL LABORATORY

CARNEGIE INSTITUTION OF WASHINGTON
CALIFORNIA INSTITUTE OF TECHNOLOGY

Earthquake investigation by the Carnegie Institution of Washington was begun in southern California in 1921. Instrumental registration of earthquakes was begun with experimental apparatus in January, 1923, with temporary installations at the office of the Mount Wilson Observatory in Pasadena, and a short time later at the Norman Bridge Laboratory of Physics at the California Institute of Technology. From 1923 until 1927 such registration with experimental instruments was continued, with numerous interruptions and many changes in the instrumental assemblies. During this interval, notwithstanding these conditions, many interesting and valuable records of earthquakes were secured.

In April, 1927, instrumental assemblies of more permanent design were installed in the present Seismological Laboratory at Pasadena and within a few months thereafter the experimental recording at the temporary stations was discontinued. The Seismological Laboratory is maintained and operated by the Carnegie Institution of Washington and the California Institute of Technology as a coöperative undertaking.

In October, 1926, the first of the routine auxiliary stations was established at Riverside, California. Others were put in operation at Santa Barbara in May, 1927; at La Jolla in May, 1927; on Mount Wilson in April, 1928; at Tinemaha, and at Haiwee, in September, 1929. All these stations are in southern and southeastern California. At all of them the Seismological Laboratory acts in coöperation with the local agencies named in the following Bulletin.

The immediate purpose of this program of research is the study of local earthquakes—shocks originating in or near the southern California province, within a distance of about three hundred kilometers from Pasadena. More distant earthquakes are recorded, of course, but study of these is only incidental, and long-period seismometers are installed only at the Seismological Laboratory in Pasadena.

Because of uncompleted developments, and the extended task of installing and completing the adjustment of the instrumental equipment at the several stations, it has not seemed advisable hitherto to undertake the circulation of regular reports on the measurement of the seismograms, especially since the majority of the shocks registered, local in origin and small in energy, are not recorded elsewhere. However, a considerable number of teleseismic disturbances have been recorded as well, not only at Pasadena, but also at the auxiliary stations. Consequently it appears desirable, and it is now practicable, to issue partial reports, following the end of each month. These reports will begin with that for January, 1931.

These monthly bulletins will include, in general, measurements for earthquakes which originate at distances greater than three hundred kilometers from Pasadena; and for nearer shocks of sufficient energy to be registered at stations beyond the local group. In selecting shocks for report no hard and fast line will be drawn.

A complete report including the numerous small shocks recorded only at one or more of the stations of the local group is neither feasible nor desirable in these bulletins.

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Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Oct 1	P	ePZ	21	51	02					
	MW	ePZ			01					
	R	ePZ		50	59					
	T	ePZ			47					
Oct 1	P30	eLN	23	12.8					normal	
Oct 1	P	iPNZ	10	34	37				normal	
	P30	eLN		43.7						
	MW	ePZ		34	38					
	R	ePZ			40					
	LJ	ePZ			37					
	T	ePZ			47					
Oct 1	P	iPNEZ	10	47	12					
	MW	iPZ			13					
	R	ePZ			15					
	T	iPEZ			21					
Oct 1	P	ePZ	11	44	32					
	MW	ePZ			32					
	R	ePZ			29					
	T	ePZ			17					
Oct 2	P	iPNEZ	05	44	13			c	deep?	Small surface waves recorded.
		ipPZ			32					Δ = 6390km. (71°)
	PX	iSNEZ		53	23					O = 05:32:58
		isSNEZ			55					h = 0.01 - 0.02
		eN		55	53					J.S.A. 43.8°N. 146.5°E.
	P	iP'P'Z	06	12	05					O = 05:33:06
		eSKPP'Z		16	15					h = 80 km.
	MW	iPNEZ	05	44	12			c		
		eSNE		53	26					
		iP'P'Z	06	12	03					
		eSKPP'Z		16	14					
	R	iPEZ	05	44	14			c		
		ipPZ			30					
		eSE		53	24					
		eP'P'Z	06	11	51					
		eSKPP'Z		16	16					
	SB	iPZ	05	44	05			c		
		eSNEZ		53	10					
		iP'P'Z	06	12	10					
	LJ	iPNEZ	05	44	19					
		ipPZ			34					
		iSNE		53	40					
		eP'P'Z	06	12	00					
	T	iPEZ	05	44	01					
		ipPZ			26					
		eSE		53	05					
		eP'P'Z	06	12	07					
	H	ePN	05	44	06					
		eSN		53	12					
Oct 2	P	iPNEZ	08	24	09			d		
	MW	iPZ			10					
	R	ePZ			10					
	LJ	iPZ			07					
	T	iPEZ			18			d		
	H	ePN			17					
Oct 2	P	iPEZ	11	16	59					
	MW	iPZ			59					
		iZ		17	12					
	T	iPZ		16	46					
Oct 4	P	eZ	05	16	29					
	MW	iZ			31					
	T	eZ			34					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Oct 18	P	iPNEZ	15	05	31				normal	
	P6	iSE		06						
		eLE		25	42					
	MW	iPNE		05	32					
	R	iPZ			34					
	LJ	ePEZ			40					
	T	ePNEZ			21					
		eSN		14	38					
	H	ePN		05	31					
Oct 18	P	iPZ	22	03	05					
	MW	ePZ			06					
	T	ePEZ		02	56					
Oct 19	P	iPEZ	00	53	54				normal	Small surface waves recorded.
		eZ	01	03	20					
	MW	iPNEZ	00	53	54					
	R	ePEZ			50					
	LJ	ePZ			51					
	T	iPNEZ			47					
		eZ		03	03					
		eZ		06	53					
	H	ePN		53	49					
Oct 19	P	eZ	02	50	38				normal	
	PX	eLN	03	10.7						
	MW	ePZ	02	50	38					
	R	ePZ			40					
	T	ePZ			28					
Oct 19	P	eZ	03	10	45					
	MW	eZ			51					
	T	eZ		09	25					
	H	eN		09	52					
Oct 19	P	iPNEZ	04	51	17			c	normal	Destructive at Helena, Montana.
	P30	eZ		53.8						U.S.C.G.S. 46.6°N. 112.0°W.
		iL		55	06					0 = 04:48:03
	MW	iPNEZ		51	17			c		
	R	ePEZ			18					
	SB	ePNZ			19					
	LJ	ePNZ			33					
	T	ePNEZ		50	40					
	H	ePN			51					
Oct 20	P	iPNZ	03	36	09				deep?	
	MW	ePNE			09					
	R	iPEZ			05			d		
		iZ			38					
	SB	iPZ			16					
	LJ	iPNEZ			01					
	T	iPNEZ			20			d		
Oct 20	P	iPZ	17	58	13					
Oct 21	P	eZ	06	10	57					
	R	eZ			39					
	LJ	eNEZ			14					
Oct 23	P	iZ	13	32	02					
	T	ePNEZ			14					
Oct 25	P	iPZ	17	19	06					
	R	iPZ			07					
	T	iPEZ			20					
		iZ			59					
Oct 24	P	iPZ	10	28	59					
	R	ePZ			57					
	T	iPEZ			11					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Oct 25	P	iPNZ	00	05	27				normal	
	PX	eLNEZ		34.7						
	R	ePZ		05	30					
	LJ	ePZ			28					
	T	ePEZ			37					
Oct 25	P	iPZ	03	13	59					
	R	ePZ		14	04					
	T	ePZ			12					
Oct 25	P	iPZ	04	34	14					
	R	ePZ			14					
	T	ePZ			23					
Oct 25	P	iPNEZ	17	49	21					
	R	ePZ			24					
	T	ePEZ			07					
Oct 26	P	iPZ	21	01	22					
	R	ePZ			24					
	T	ePEZ			31					
Oct 27	P	iPNEZ	09	12	56			d	deep?	
		iEZ	10	13	22					
	R	iPZ		12	52					
		iZ		13	18					
	SB	eZ			39					
	T	iPZ			07			d		
		iZ			34					
	H	ePNE			06					
		iZ			30					
Oct 27	P	iPNEZ	22	13	42				deep	
		iZ		14	16					
		iZ		15	02					
		iZ			38					
	R	iPZ		13	37					
	SB	ePZ			51					
	LJ	ePN			32					
	T	iPEZ			53					
Oct 28	P	iPNEZ	10	35	50					
	MW	ePE			51					
	R	iPNEZ			55					
	SB	iPZ			42					
	LJ	ePN		36	04					
	T	iPZ		35	34			d		
	H	iPNEZ			41			d		
Oct 30	P	iPZ	02	15	39					
	R	ePZ			40					
	T	ePZ			26					
Oct 31	P	iPEZ	09	19	33					
	R	iPZ			35					
	T	iPEZ			41					
	H	iPZ			40					
Oct 31	P	iPNEZ	18	41	05			c	normal	Destructive in Helena, Montana. U.S.C.G.S. 46.6°N. 112.0°W. 0 = 18:37:8
	P30	eN		43.8						
	MW	iPNEZ		41	04					
	R	ePNEZ		41	00					
	LJ	iPNZ			17					
	T	iPNEZ		40	26					
	H	iPNEZ			37					

Correction: No. 51. For Oct. 1, 21:51:02
read 05:51:02
For 23:12.8
read 07:12.8

Harry O. Wood
Research Associate in Charge
C.F.Richter
Assistant

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Nov 1	P	ePZ	06	10	03				normal	Quake felt over a large area in Canada and North Eastern United States. USCGS: 46.4°N 79.4°W 0 = 06:03:45
	PX	eLZ		15.8						
	MW	iPZ		10	00					
	R	ePZ			02					
	T	iPNEZ		09	50					
	H	ePNEZ			53					
Nov 1	P	ePZ	13	39	13					
	MW	iPZ			17					
	R	ePZ			20					
	T	ePZ		38	46					
	H	iPNEZ			57					
Nov 1	P30	eLN	17	22					normal	
Nov 2	P	iPZ	21	14	31					
		iZ		15	00					
	MW	iPZ		14	31					
	R	iPZ			26					
	T	eE			45					
Nov 4	P	iPZ	00	14	58					
	R	iPZ		15	01					
Nov 4	P	ePZ	10	15	44				normal	
	PX	eLN		18	28					
	R	ePZ		15	34					
	LJ	ePZ			23					
	T	ePNE		16	37					
	H	ePNEZ			06					
Nov 4	P	iPNEZ	13	55	58				normal	
	PX	eLN		58	43					
	MW	ePE		56	03					
	R	ePNEZ		55	50					
	SB	ePNEZ		56	15					
	LJ	ePNEZ		55	39					
	T	ePN		56	31					
	H	iPNEZ			21					
Nov 4	P	iPNEZ	14	04	05				normal	
		eLZ		07	48					
	R	ePZ		03	56					
	SB	ePZ		04	25					
	LJ	iPZ		03	45					
	T	ePN		04	37					
	H	iPNZ			27					
Nov 5	P	iZ	02	30	50					
	MW	iZ			51					
	R	eZ		31	06					
	T	ePZ			06					
Nov 5	P	ePZ	09	42	37					
	R	iPZ			40					
	T	ePEZ			37					
Nov 5	P	iPZ	11	20	23					
	R	ePZ			17					
	T	ePEZ			35					
Nov 5	P	ePZ	13	35	47					
	R	eZ			48					
	LJ	iZ		36	11					
	T	ePEZ		35	30					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Nov 5	P	iPEZ	14	04	59					
	R	ePZ			51					
	T	ePEZ			34					
Nov 5	P	ePEZ	17	11	49					
	T	iPZ			21					
Nov 6	P	ePZ	09	39	17					
Nov 6	P	iPEZ	12	45	44					
	T	iPEZ			39					
Nov 6	P	ePEZ	13	24	56					
	R	ePZ			59					
	LJ	ePZ		25	03					
	T	iPEZ		24	52					
Nov 7	P	iPZ	02	24	34			d	deep	
		iZ		25	03					
	MW	iPZ		24	35					
	R	iPZ			31					
		iZ		25	00					
	LJ	iPZ		24	26					
	SB	ePZ		25	10					
	T	iPNEZ		24	46			d		
		iNEZ		25	16					
Nov 7	P	iPEZ	08	49	42					
	MW	iPZ			44					
	R	ePZ			45					
	T	iPZ			52					
Nov 7	P	eZ	21	20	50					
	R	ePZ			45					
	T	iPEZ			45					
Nov 9	P	iZ	03	35	50					
Nov 9	P	ePZ	05	26	18					
	R	ePZ			20					
	T	iPEZ			28					
Nov 10	P	iPZ	09	14	58					
	R	iPZ			54					
	T	ePEZ		15	11					
Nov 10	P	iPEZ	12	25	56					
	R	iPZ		26	01					
	T	iPEZ		25	29					
Nov 10	P	iPNEZ	18	36	55			normal		USCGS: 16.7°N 62.2°W
	P6	eE		48	17					O = 18:27.5
	PX	eLZ		55.0						
	MW	ePE		36	56					
	R	ePZ			49					
	SB	ePZ		37	05					
	LJ	ePZ		36	49					
	T	ePZ			57					
	H	ePNEZ			56					
Nov 11	P	iPEZ	06	22	13					
	MW	iPZ			11					
	R	ePZ			05					
	LJ	ePZ			07					
	T	ePZ			06					
Nov 11	P	iPZ	07	03	50					
	MW	iPZ			48					
	R	ePZ			42					
	T	ePZ		04	02					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Nov 11	P	iZ	12	31	35					
	T	eZ			44					
Nov 11	P	iPEZ	13	25	05				normal	
	PX	eLZ		55.9						
	R	ePZ		25	06					
	LJ	ePNEZ			08					
	T	ePEZ			07					
Nov 11	P	iPZ	18	32	42					
	T	ePZ			59					
Nov 11	P	ePZ	19	03	06					
	R	ePZ			01					
	LJ	ePZ		02	56					
	T	ePEZ		03	17					
Nov 11	P	ePZ	19	07	27					
	T	eZ			17					
Nov 12	P	iPZ	21	47	27					
		eZ		50	37					
	MW	iPZ		47	23					
	T	ePZ			25					
Nov 13	P	iPEZ	23	29	07				normal	
	PX	eLZ		50.9						
	MW	iPZ		29	06					
	R	ePZ			09					
	T	ePZ			16					
Nov 14	P	ePZ	09	57	13					
	R	ePZ			18					
	T	ePEZ			23					
Nov 14	P	iPEZ	20	09	53				normal	
		iEZ		10	54					
	PX	eLZ		38.6						
	R	ePEZ		09	55					
	SB	ePZ			47					
	T	ePNEZ			54					
	H	ePNEZ			55					
Nov 15	P	iPZ	02	26	51					
	T	iPZ			59					
	H	ePZ			58					
Nov 15	P	iPZ	04	53	05					
	R	ePZ			05					
	T	ePZ			09					
	H	ePZ			12					
Nov 16	P	iPEZ	00	16	40			d	normal?	Surface waves small
		iZ		19	43					
	PX	eLZ		48						
	MW	iPZ		16	40					
	R	iPZ			37					
		eZ		19	39					
	SB	ePNZ		16	48					
	T	ePEZ			40					
		eZ		19	57					
	H	ePNEZ		16	39					
Nov 16	P	ePZ	04	22	50					
	MW	iPZ			49					
	R	ePZ			29					
Nov 16	P	eZ	10	14	19					
	MW	iZ			20					
	T	eEZ			04					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Nov 16	P	eZ	10	19	05					
		iZ			17					
	MW	iZ			13					
	T	eEZ		18	57					
Nov 16	P	eZ	12	48	23					
Nov 16	P	iZ	12	55	32					
	MW	iZ			34					
	T	eEZ			42					
	H	eZ			40					
Nov 16	P	iEZ	12	58	25					This and the two preceding may possibly be different phases of the same shock
	MW	iZ			26					
	R	iZ			26					
	T	iZ			34					
	H	iNEZ			32					
Nov 17	P	iPZ	07	53	11				normal	
	PX	eLZ	08	21						
	MW	iPZ		53	13					
	R	ePZ			14					
	SB	ePZ			12					
	T	ePEZ			19					
	H	ePZ			19					
Nov 19	P	iPZ	05	45	00					
	MW	iPZ			02					
	R	ePZ			02					
	T	ePZ			10					
	H	ePZ			08					
Nov 19	P	eZ	06	16	34					
	MW	eZ			36					
	T	eZ			44					
Nov 20	P	iPZ	11	56	14					
	MW	iPZ			15					
	R	ePZ			16					
	T	iPEZ			22					
	H	ePZ			2o					
Nov 21	P	iPNEZ	08	52	11			c	deep?	
	MW	iPZ			11					
	R	ePZ			13					
	T	iPEZ			00					
	H	iPZ			04					
Nov 21	P	iPNZ	11	47	59					
	MW	iPZ		48	00					
	R	iPZ			03					
	T	iPEZ			06					
Nov 22	P	iNEZ	03	38	49					
		iNZ		39	37					
	R	eZ		38	52					
	T	eNEZ			54					
		iNEZ		39	41					
	H	eZ		38	54					
		eZ		39	41					
Nov 22	P	eZ	10	50	22					
	T	eZ			31					
Nov 22	P	iPEZ	12	55	45					
	R	ePZ			49					
	T	ePZ			31					
	H	ePZ			37					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Nov 23	P	iPNEZ	08 00 47				normal	USCGS: 01°N 86°W
	PX	iSNEZ	07 33					0 = 07:52.5
		iLNEZ	14 20					
	MW	iPZ	00 46					
	R	ePNEZ	00 41					
		eSE	07 20					
	T	ePZ	01 01					
	H	ePZ	00 56					
Nov 23	P	iPZ	08 41 39					
	MW	iPZ	39					
	T	ePEZ	46					
	H	ePZ	45					
Nov 23	P	iPEZ	10 54 48					
	MW	iPZ	49					
	R	ePZ	42					
	T	ePEZ	55 03					
Nov 23	P	ePEZ	13 57 10					
		iZ	58 55					
	MW	ePZ	57 10					
		eZ	58 50					
	T	eZ	56 10					
		eZ	57 42					
	H	ePZ	56 33					
		eZ	58 06					
Nov 25	P	iPEZ	10 22 13				normal	
		iZ	25 36					
	P30	eLN	11 10					
	MW	iPZ	10 22 12					
		iZ	25 37					
	R	ePZ	22 12					
		eZ	25 35					
	SB	iZ	22 19					
	T	ePZ	08					
		eZ	24 41					
	H	ePNEZ	22 10					
Nov 25	P	iZ	22 22 00					
	MW	iZ	01					
	R	eZ	03					
	T	eEZ	21 48					
Nov 26	P	iZ	13 10 53				normal	
	PX	eLZ	59.8					
	MW	eZ	10 38					
	R	eZ	41					
	T	eZ	31					
Nov 26	P	iZ	13 54 00					
	PX	eLZ	14 37.4					
	T	eZ	55 29					
Nov 26	P	iPZ	14 34 50					
	MW	iPZ	50					
	T	ePEZ	23					
Nov 26	P	ePZ	18 52 30				normal	
	PX	eLZ	19 41					
	MW	eZ	18 52 31					
	R	ePZ	31					
	T	ePZ	25					
Nov 27	P	iPZ	18 07 40				deep?	Possibly P'
	MW	iPZ	40					
	R	iPZ	42					
	T	iPEZ	48					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Nov 28	P	iPZ	10 55 16					
	MW	ePZ	17					
	T	ePZ	33					
Nov 28	P	iPZ	14 45 05					
		iSE	48 45					
		iEZ	52					
	MW	iPZ	45 03					
		iSNEZ	48 50					
	R	ePZ	45 04					
		eSE	48 43					
	SB	eSNEZ	49 02					
	T	ePEZ	44 26					
		iSEZ	47 30					
	H	ePEZ	44 39					
		eSZ	45 44					
		iZ	46 02					
Nov 28	P	iPZ	23 54 52					
		iEZ	55 08					
	MW	iPZ	54 50					
	R	ePZ	55 02					
	T	ePZ	02					
Nov 30	P	iPNEZ	03 47 43			d	normal	Δ = 4950 km. (44.6°)
		ePPZ	49 37					O = 03:39:27
		iSNEZ	54 14					Felt in Panama
		iScSN	57 47					USCGS: 10.1°N 79.5°W
	P6	eLE	05.9					O = 03:39:45
	MW	ePNEZ	47 43					
		iSEZ	54 10					
	R	ePNEZ	47 38					
		eSE	53 55					
		eScSN	57 37					
	SB	iPNEZ	47 57					
		eSNE	54 31					
	T	ePEZ	47 55					
		eSE	54 33					
		eScSE	57 36					
	H	ePEZ	47 49					
		eSE	54 24					

Harry O. Wood,
Research Associate in Charge.
Charles F. Richter
Assistant.

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Dec 1	P	iZ	07 56 35					
	MW	iZ	33					
Dec 1	P	iPZ	09 46 12					
	MW	ePZ	12					
	R	ePZ	13					
	T	ePZ	21					
	H	ePZ	19					
Dec 1	P	iZ?	16 08 11					
		iZ	41					
	MW	iZ	40					
	R	eZ	37					
	T	eZ	48					
	H	eZ	40					
Dec 1	P	ePZ	23 58 10				normal?	
		eLZ?	24 18					
	MW	ePZ	23 58 10					
		iZ	24 01 47					
	T	ePZ	23 58 10					
Dec 3	P	eZ	01 45 01					
	MW	eZ	44 30					
		iZ	45 03					
	R	eZ	44 32					
		eZ	45 03					
	T	eZ	44 35					
Dec 3	P	ePZ	02 20 15				normal	
		iSEZ	22 08					
	PX	eLNEZ	22.3					
	MW	iZ	20 31					
		iNEZ	22 20					
	R	ePZ	20 10					
		iSNEZ	22 04					
	SB	eN	23 11					
	T	eEZ	20 47					
		eSEZ	23 48					
	H	ePE	20 35					
		iSE	23 17					
Dec 3	P	iNEZ	02 29 18					
	MW	eNEZ	16					
	R	eNEZ	02					
	T	eZ	30 42					
	H	eE	18					
Dec 3	P	ePZ	05 57 18				normal	
		iSEZ	59 21					
	PX	eLNEZ	59.3					
	MW	ePZ	57 20					
		iSNEZ	59 21					
	R	ePZ	57 18					
		iSNEZ	59 09					
	T	ePZ	58 52					
		eSEZ	06 00 51					
	H	ePE	05 57 42					
		eSE	06 00 18					
Dec 3	P	iPNEZ	17 02 05			c	deep?	
	MW	iPNEZ	08					
	R	iPZ	10					
	T	iPEZ	08			c		
	H	ePE	08					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 3	P	iPNEZ	17	55	19			c	deep?	
	MW	iPNEZ			20					
	R	iPNEZ			23					
		iZ			42					
	SB	iPZ			13					
	T	iPEZ			08					
		iZ			27					
		eZ			38					
	H	iPEZ			13					
Dec 3	P	iPZ	23	36	13					
	MW	iPZ			09					
	T	ePZ			06					
Dec 5	P	iPNEZ	05	25	15			d	deep?	
	MW	iPZ			17					
	R	ePZ			16					
	T	iPEZ			24			d		
Dec 5	P	ePZ	18	02	29				normal	
		iPNEZ			35					
		eE		04	20					
	PX	eSZ		13	02					
		eZ		14	13					
		iLZ		24.8						
	MW	iPZ		02	30					
	R	ePNEZ			32					
	SB	iPZ			29					
	LJ	ePEZ			40					
	T	ePZ			36					
		iPEZ			41					
	H	ePE			37					
Dec 5	P	eZ	21	26	07				normal	Two shocks?
		iZ			17					
		iZ			48					
		eZ		27	24					
		iZ			59					
	MW	iZ		25	57					
		iZ		27	55					
	R	eZ		25	51					
		eNEZ		26	43					
	T	eZ		25	47					
		eZ			55					
		iZ		26	33					
		eZ		27	34					
	H	eE		25	55					
		iE		26	30					
		iE			57					
		iE		27	40					
Dec 5	P	eZ	02	09	02					
	MW	iZ			02					
		iZ			11					
	R	eZ			04					
		eZ			12					
	T	eZ			04					
		iZ			13					
Dec 6	P	ePZ	07	19	11					
	MW	iPZ			07					
	R	ePZ			04					
	T	ePEZ			17					
Dec 6	P	ePZ	11	50	47					
	R	ePZ			41					
	T	ePZ			45					
Dec 6	P	eZ	21	53	55					
	MW	eZ			50					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Dec 7	P	iPZ	06 15 43					
	MW	iPZ	44					
	T	iPZ	52					
Dec 7	MW	eZ	16 27 36					
	R	iZ	25					
Dec 8	P	eZ	04 59 32					
	MW	iZ	32					
	T	eZ	12					
Dec 8	P	iPZ	17 38 18					
	MW	iPZ	20					
	R	ePZ	20					
	T	iPEZ	27					
Dec 8	P	ePZ	22 06 31				normal	
	PX	eLZ	29					
	MW	iPZ	06 31					
	R	ePZ	33					
	T	ePEZ	40					
Dec 9	P	ePZ	07 42 46				normal	
		iPEZ	51					
		iZ	43 02					
	PX	eLZ	08 14.6					
	MW	iPZ	42 46					
	R	ePZ	49					
	H	eE	43 11					
Dec 9	P	iPNEZ	21 01 45				deep?	
	MW	iPZ	45					
	R	ePZ	46					
	T	ePZ	49					
	H	ePE	50					
Dec 10	P	iPNEZ	17 31 03					
	MW	iPZ	03					
	R	ePZ	30 56					
	LJ	iPEZ	51					
	T	ePZ	31 20					
	H	ePEZ	13					
Dec 11	P	eZ	08 55.6					
	MW	iZ	55 38					
Dec 11	P	iPZ	14 36 29					
	MW	iPZ	30					
	R	ePZ	30					
	T	ePEZ	25					
Dec 11	P	iPZ	14 39 42					May be part of preceding.
	T	iPZ	35					
Dec 12	P	iPNZ	01 25 58					
	MW	iPZ	58					
	T	iPEZ	26 14					
	H	ePE	06					
Dec 14	P	iPNEZ	01 40 39			d	deep	Tentatively:
		iNEZ:	41					$\Delta = 65°$
		iPcPZ	41 13			d		0 = 01:31.1
		eZ	42 51					h = 0.10
		eZ	43 50					USCGS:
		iSNEZ	46 19					6.5°S 72.5°W
		iE	49 29					0 = 01:31:22
	PX	eSSZ?	52 46					h = 350 km.

Continued

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 14	P	eEZ	02	08	52	continued				
		iP'P'Z		09	27					
		iSKPP'Z		11	52					
	MW	iPNEZ	01	40	39			d		
		iSNEZ		48	21					
		iP'P'Z	02	09	29					
		iSKPP'Z		11	51					
	R	iPNEZ	01	40	35			d		
		eSNEZ		48	12					
		eP'P'Z	02	09	19					
	SB	ePNEZ	01	40	46					
		eSNEZ		48	36					
	LJ	iPEZ		40	32					
		eSE		48	07					
	T	iPNEZ		40	50			d		
		iNEZ!			52					
		iSNEZ		48	41					
		eZ	02	08	48					
		iP'P'Z		09	20					
	H	iPEZ	01	40	45					
		eSEZ		48	33					
		eP'P'E	02	09	24					
Dec 14	P	iPNEZ	11	30	49			c	deep	
		iZ		31	57					
	MW	iPZ		30	49			c		
	R	iPEZ			43					
	T	iPNEZ			59					
	H	iPZ			54					
Dec 14	P	ePZ	12	59	39					
		iNEZ			41			c		
	MW	iPZ			40					
	R	iPZ			42					
	SB	ePZ			34					
	LJ	iPE			46					
	T	iPNEZ			34					
		eSNE	13	09	27					
		iSN			32					
	H	iPZ	12	59	37					
Dec 14	P	iPNEZ	22	11	31			c	normal	Δ = 3400 km. (30.5°)
		ePPN		12	41					O = 22:05:16
		iPcPZ		14	32					
	P6	iSE		16	35					
		iScSE		18	20					
	P30	iLN		19	22					
	MW	iPNEZ		11	31					
		eSE		16	23					
	R	ePNEZ		11	22					
		iPcPZ		14	33					
		eSE		16	21					
	SB	ePEZ		11	42					
	LJ	iPEZ			18					
		eSE		16	08					
	T	iPEZ		11	47					
		eSNE		17	00					
	H	ePZ		11	39					
Dec 15	P	iPNZ	07	20	40			c	normal	
	P30	eSKSN		31.1						
	P6	eNE		31	26					
		iE			44					
		eLE		48.2						
	MW	iPNEZ		20	40					
	R	ePEZ			42					
		eE		31	26					
						continued				

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Dec 15				continued				
	SB	ePNEZ	20 36					
		eN	31 21					
	LJ	iPEZ	20 43					
		eE	31 44					
	T	iPNEZ	20 44					
		eE	31 34					
		eNE	46					
	H	ePZ	20 44					
Dec 15	P	iPZ	07 40 12					Possibly part of preceding
	MW	iPZ	12					
	R	iPEZ	14					
	LJ	iPEZ	14					
	T	iPEZ	15					
	H	iPZ	15					
Dec 15	P	iNZ	09 00 03				normal	
	P6	eLZ	25					
	MW	iZ	04					
	R	eZ	05					
	T	eZ	06					
Dec 15	P	eZ	10 07 15					
	MW	eZ	05 01					
		iZ	07 18					
	R	eZ	05 02					
		iNZ	07 06					
	LJ	iEZ	06 29					
Dec 15	P	iPNEZ	17 36 21					Peculiar
	MW	iPZ	21					
	R	iPZ	27					
	T	iPZ	03					
Dec 15	P	iPZ	19 18 35					
	MW	iPZ	35					
	R	ePZ	37					
	T	ePZ	38					
Dec 15	P	iPZ	19 57 33					
	MW	iPZ	33					
	R	ePZ	35					
	T	ePNEZ	38					
Dec 15	P	ePZ	21 28 42					
	MW	iPZ	42					
	T	ePZ	45					
Dec 15	P	ePZ	21 57 33					
	MW	iPZ	32					
	R	ePZ	29					
	T	ePNEZ	57					
Dec 15	P	ePNZ	22 14 25					
	MW	iPZ	25					
	R	ePZ	26					
	T	ePZ	49					
Dec 16	P	iPZ	06 21 17			c		
	MW	iPZ	17			c		
	R	ePZ	18			c		
	T	ePNEZ	19					
	H	ePZ	18					
Dec 16	P	iPZ	11 50 33					
	MW	iPZ	32					
	R	ePZ	26					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 16	P	iPNEZ	17	06	49			d	deep	After shock of Dec $14^{d}1^{h}$
		iPcPZ		07	21					
		iZ		08	53					
		iZ		09	53					
		iSNEZ		14	30					
		iP'P'Z		35	38					
		iSKPP'Z		38	17					
	MW	iPNEZ		06	49					
		iSNEZ		14	30					
		iP'P'Z		34	38					
	R	iPNZ		06	44			d		
		iPcPZ		07	18					
		iZ		08	50					
		iSN		14	23					
	SB	iPNEZ		06	57			d		
	LJ	iPEZ			41					
		iSE		14	13					
	T	iPNEZ		07	00					
		eSEZ		14	53					
	H	iPZ		06	56					
Dec 16	P	eNEZ	18	32	14					
	MW	eZ			00					
		eZ			10					
	R	eN		31	56					
	T	eZ		32	13					
		eZ			21					
Dec 17	P	eZ	03	48	07					
Dec 17	P	ePZ	13	29	39				normal	
		ePPZ		33	09					
	PX	iLZ		56.9						
	MW	iPZ		29	39					
	R	ePZ			42					
	T	ePZ			34					
		ePPZ		33	15					
	H	ePZ		29	40					
Dec 17	MW	iZ	14	49	16					
	R	eZ			09					
		eZ			17					
Dec 17	P	iPZ	19	31	07				normal	
	P6	eE		42	56					
	PX	iLNZ		57.4						
	MW	iPZ		31	13					
	R	ePZ			03					
	T	iPZ			00					
	H	ePZ			03					
Dec 18	P	ePZ	05	36	04				normal	
		eSNEZ		38	05					
	R	ePZ		35	30					
		eSNZ		37	50					
	T	ePZ		36	12					
		eSEZ		38	14					
Dec 18	MW	iZ	06	23	48					
	T	eZ		24	03					
Dec 18	P	eZ	07	29	07					
	MW	eZ		28	54					
	T	eEZ			54					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 18	P	eZ	09	05	12					
	MW	iZ			02					
Dec 18	P	iZ	11	40	52					
		iZ		42	29					
	MW	iZ		40	53					
		iZ		42	30					
	R	iZ		40	55					
		iZ		42	33					
	T	eEZ			33					
Dec 19	P	ePZ	01	59	21				normal	
		iPZ			42					
		iSNEZ	02	01	44					
	MW	iPZ	01	59	22					
		iSZ	02	01	39					
	R	eSNZ			22					
	T	ePZ	01	59	47					
		eSZ	02	01	47					
Dec 19	MW	iPZ	08	12	45					
	R	iPZ			53					
Dec 20	MW	iPZ	05	58	30					
	T	ePZ			21					
Dec 20	P	iPZ	07	46	16				normal	Epicenter about 33.2°N 115.5°W. Felt in and about the Imperial Valley.
		iNEZ			21					
		iSNE			52					
	MW	iPZ			17					
	R	iPNEZ			07					
		iSE			32					
	SB	ePZ			35					
	LJ	iPNEZ			04					
		iNE			21					
	T	ePZ			46					
Dec 20	P	iPNEZ	18	49	51			c	normal	
		iZ	19	02	53					
		eLZ		18						
	MW	iPNEZ	18	49	53					
		iZ	19	00	46					
		iZ		01	41					
		iZ		02	36					
	R	iPNEZ	18	49	54					
	LJ	ePNEZ			53					
	T	ePEZ			55					
		iEZ	19	02	39					
	H	iPZ	18	49	58					
Dec 20	P	iPZ	19	44	16					Associated with preceding?
	MW	iPZ			18					
	R	ePZ			19					
	T	ePEZ			20					
Dec 20	P	iPZ	20	17	48					
	MW	iPZ			49					
	R	ePZ			51					
	T	ePZ			51					
Dec 21	P	iPZ	05	33	56				normal	
	PX	eLZ		47						
	MW	iPZ		33	55					
	R	ePZ			40					
	T	ePZ		34	03					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 21	P	iPZ	06	33	26					
	MW	iPZ			26					
	R	ePZ			28					
	T	ePZ			29					
Dec 21	P	iPZ	07	30	02				normal	
		iZ		33	06					
	P30	eLN		41						
	MW	iPZ		30	01					
	R	ePZ		29	56					
		eZ		33	04					
	LJ	ePZ		29	50					
	T	ePEZ		30	18					
		eZ		33	12					
	H	ePZ		30	11					
Dec 21	P	iPNEZ	11	57	17				normal	
		iZ	12	00	19					
	P30	eLN		06						
	MW	iPZ	11	57	18					
	R	ePNZ			11					
		eZ	12	00	17					
	SB	ePZ	11	57	31					
	LJ	ePNEZ			05					
	T	ePEZ			34					
	H	ePZ			26					
Dec 22	P	eEZ	01	58	26					
		eZ	02	00	29					
	MW	eZ	01	57	57					
		iZ		58	28					
		iZ	02	00	24					
	T	eZ	01	58	30					
		eZ	02	00	41					
	H	eE	01	58	28					
Dec 22	P	ePZ	09	42	37					
	MW	iPZ			40					
	R	ePZ			39					
	T	ePZ			46					
Dec 22	P	iPZ	11	05	57					
	MW	iPZ			57					
	R	ePZ		06	00					
	T	ePZ		05	47					
Dec 23	P	iPZ	02	26	47					
	MW	iPZ			47					
	T	ePZ			49					
Dec 23	MW	iPZ	03	40	25					
	T	ePZ			06					
Dec 23	P	iEZ	12	32	35					
		iEZ		34	36					
	MW	ePZ		32	13					
		eZ		34	33					
	R	eZ		32	13					
		eZ			28					
		eNZ		34	20					
	LJ	eN			28					
	T	ePZ		32	41					
		eSZ		34	43					
	H	eE		32	32					
		eN		34	26					

Date	Station	Phase	G. C. T. h m s	T sec	A mm	c d	Focal depth	Remarks
Dec 23	P	iPEZ	14 53 49			c		
		iZ	54 03					
	MW	iPNEZ	49			c		
	R	iPZ	52 52					
	LJ	iPZ	53 58					
	T	ePEZ	36			c		
		iZ	50 50					
	H	eNE	53 52					
Dec 24	P	iPEZ	09 35 23					
		iZ	36 11					
	MW	iPZ	35 24					
	R	iPZ	26					
	T	ePZ	01					
Dec 24	P	ePZ	12 32 49				normal	Δ = 5740 km. (51.7°)
		iPNEZ	53			d		0 = 12:23:40
		ePcPZ	33 40					South America?
		iPPNZ	34 32					
		iSNEZ	40 07					
	PX	eSSNZ	43 54					
		iLNZ	48 03					
	MW	iPZ	32 49					
	R	ePNEZ	44					
		eSE	39 31					
	SB	ePZ	33 00					
	T	ePNEZ	01					
	H	ePNEZ	32 58					
Dec 25	P	ePZ	03 26 33					
	MW	ePZ	34					
	R	ePZ	35					
	T	ePZ	42					
Dec 25	P	iPNEZ	06 43 24			c	deep	
	MW	iPNEZ	26			c		
	R	iPNEZ	26			c		
	SB	iPNZ	19					
	LJ	iPNEZ	23					
	T	iPNEZ	34					
Dec 25	P	eZ	18 05 39					
	MW	eZ	30					
		iZ	38					
	R	eZ	33					
	T	ePNEZ	51					
Dec 26	MW	iPZ	04 04 33					
		iZ	46					
	R	ePZ	35					
		eZ	50					
Dec 26	P	iPZ	05 45 41					
	MW	iPZ	43					
	R	ePZ	44					
	T	ePZ	50					
Dec 26	P	iPNEZ	10 01 29			c		
	MW	iPZ	31			c		
	R	ePZ	31					
	T	iPZ	38			c		
	H	iPNEZ	36					
Dec 26	P	eZ	14 54 08					
		iZ	55 03					
	MW	eZ	07					
	R	eZ	54 56					
	T	eZ	55 14					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 26	P	ePZ	20	20	09				normal	
	PX	eLZ		48	.7					
	R	ePZ		19	46					
	T	ePZ		19	49					
Dec 26	P	iPZ	20	25	23					
	R	ePZ			18					
	T	ePEZ			21					
Dec 26	P	iPZ	23	36	24					
		iZ		37	03					
	T	ePZ		36	43					
Dec 27	P	iPEZ	12	29	36			c	deep?	
		iZ			53					
	MW	iPZ		39	37			c		
	T	iPZ		29	24			c		
		iZ			56					
	H	iPNEZ			27					
Dec 27	P	iPZ	15	45	57					
	MW	iPZ			59					
	R	iPZ		46	00					
	T	ePZ			00					
Dec 28	PX	ePZ	02	51	46				normal	Δ = 15000 km. (135°)
	P	iPZ		54	42					USCGS: General region of
	PX	eZ		56	40					3°S 97°E.
		iPPZ		57	08					O = 02:35.2
	P6	iPKSE		58	16					
		iSKKSE	03	04	02					
		eSE?		06	48					
	P	iSKSPZ		07	28					
	PX	iPPSZ		09	11					
	P30	eSSN		15	04					
	P6	iSSE		15	29					
	P	iSSSZ		21	22					
		eLZ		37						
	MW	iP'Z	02	54	41					
		ePPE		57	24					
	R	eP'Z		54	34					
		iPPNEZ		57	14					
		iPKSNEZ		58	13					
	SB	iP'NZ		54	43					
		ePPZ		57	02					
		iPKSEZ		58	18					
		iSSNE	03	14	37					
	LJ	iP'NEZ	02	54	46					
		ePPN		57	03					
		ePKSNE		58	28					
	T	eP'NEZ		54	36					
		ePPNEZ		56	55					
		iPKSZ		58	00					
		ePKSN		58	15					
		eSN?	03	06	55					
		iSKSPZ		07	28					
	H	eP'NE	02	54	38					
		ePPE		56	53					
		iPKSZ		58	04					
		eSE?	03	07	00					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 28	P	iPNEZ	05	00	16			d	deep?	
		eZ		02	14					
	MW	iPNEZ		00	17			d		
	R	iPNEZ		00	11			d		
		iZ			46					
	SB	iPZ			24					
	LJ	iPNEZ		00	07			d		
		iZ			44					
	T	iPNEZ			27			d		
		iZ			57					
		iZ		02	26					
	H	iPNEZ		00	21					
Dec 28	P	ePZ	17	54	05					
	MW	ePZ			04					
	T	ePZ		53	54					
Dec 28	P	iPZ	18	58	42					
	MW	iPZ			42					
	T	ePNEZ			57					
Dec 28	P	eZ	19	08	31				normal	
		iSZ		10	32					
	MW	ePZ		07	58					
		iZ		08	33					
		eSZ		10	28					
	R	ePZ		07	52					
		eZ		08	05					
		eSNEZ		10	15					
	T	eZ		08	45					
		eSNEZ		10	37					
	H	eZ		08	30					
		eSNE		10	27					
Dec 28	PX	eLN	19	11.3					normal	
Dec 28	P	iPZ	19	38	24				deep	
		iNEZ			26			d		
		iZ		40	14					
	MW	iPZ		38	25			c		
	R	iPNEZ			28					
	LJ	iPZ			35					
	T	ePZ			13					
		iPZ			15					
		eZ		40	00					
	H	ePNE		38	18					
Dec 28	P	iZ	22	18	18					
		iSZ		20	26					
	MW	ePZ		17	58					
		iZ		18	19					
		iSZ		20	21					
	R	ePZ		17	53					
		eZ		18	16					
		eSN		20	06					
	T	eZ		18	19					
		eSNEZ		20	30					
	H	eN		18	26					
		eSN		20	22					
Dec 28	MW	iPZ	23	19	07					
	T	ePZ			18					

Date	Station	Phase	G. C. T. h	m	s	T sec	A mm	c d	Focal depth	Remarks
Dec 29	P	eZ	03	59	21					
		eZ	04	02	29					
	MW	eZ	03	59	07					
		iZ	04	02	10					
		iZ			33					
	R	eZ	03	59	08					
	T	eZ			04					
		eZ	04	02	24					
Dec 29	P	eZ	23	55	47				normal	Heavy microseismic disturbance.
	PX	eZ		56	34					
		eZ	24	08.9						
		eLZ		29.9						
	R	eZ	23	56	45					
	T	eZ		55	50					
Dec 31	P	eZ	01	48	35					Possibly two shocks.
		iZ		52	19					
	MW	iZ		48	37					
		iZ		52	19					
	R	eZ		52	09					
	T	eZ		48	57					
		eZ		51	55					
		iZ		52	14					
Dec 31	P	eZ	05	12	30					
		eZ		13	13					
		iSNEZ		14	27					
	MW	eZ		12	00					
		iZ			33					
		iSZ		14	26					
	R	eZ		11	51					
		eSNEZ		14	10					
	T	eZ		12	29					
		eSNEZ		14	33					
	H	eN		14	25					
			Additional							
Dec 25	P	iPEZ	20	43	48			c		
	MW	iPZ			49					
	R	iPZ			50					

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