The International Seismological Summary.

1949 January, February, March.

INTERNATIONAL GEODETIC AND GEOPHYSICAL UNION.
ASSOCIATION OF SEISMOLOGY.
FORMERLY THE BULLETIN OF
THE BRITISH ASSOCIATION SEISMOLOGY COMMITTEE.

The Director of the I.S.S. wishes to express his thanks to U.N.E.S.C.O. and H.M. Treasury for financial support, which has covered the cost and preparation of this volume.

This number constitutes the beginning of the thirteenth volume of the International Seismological Summary in which travel times and Epicentral distances are calculated with reference to "Geocentric" latitudes of epicentres and observing stations. The travel-times used in making determinations are those contained in "Seismological Tables" by H. Jeffreys and K. E. Bullen, British Association for Advancement of Science—London, 1950, and residuals derived accordingly.

Distances are calculated from modified direction-cosines defined by :

$$A = \cos \phi' \cos \lambda$$
$$B = \cos \phi' \sin \lambda$$
$$C = \sin \phi'$$

λ being the east longitude from Greenwich and ϕ' the *geocentric* latitude whose relationship to the ordinary *geographic* latitude ϕ is :—

$$\tan \phi' = \cdot 99328 \tan \phi.$$

These formulae are used to determine direction-cosines of both epicentre and station, though the position is in every case referred to normal ϕ and λ.

The notation is that generally accepted. P and S stand for the times of onset of the direct longitudinal and transverse waves. Pg, Sg, P*, S* for short distances are used for times of these waves transmitted through the superficial "Granitic" and "Intermediate" layers respectively. Reflections of the direct waves at the earth's surface are denoted by PP, PS, PPP, SS . . . and at the outer surface of the central core by PcP, PcS . . .

The refracted longitudinal wave through the central core is known as K. Such waves as PKP, SKS, PKS, SKKS, are frequently recorded at great distances from the epicentre. All times are given as Greenwich Civil Time and are referred to the adopted T_0 as zero.

The arrangement of the " Summary " consists of :—

(1) Date and Time at Origin (T_0), calculated from the above-mentioned tables, together with the depth of focus where this is assumed not to be in the surface. The time calculated is that at which the P wave leaves the focus, not that when P arrives at the epicentre.

(2) Epicentre constants :—

$A=\cos\phi'\cos\lambda$ $\quad D=\sin\lambda$ $\quad G=\sin\phi'\cos\lambda$
$B=\cos\phi'\sin\lambda$ $\quad E=-\cos\lambda$ $\quad H=\sin\phi'\sin\lambda$
$C=\sin\phi'$ $\quad K=-\cos\phi'$

from which distances, Δ, and where necessary Azimuths, of stations with respect to the epicentre may be calculated by means of the formulae :—

$$\cos\Delta=aA+bB+cC$$
$$2-2\cos\Delta=(a-A)^2+(b-B)^2+(c-C)^2$$
$$\sin Az.=-(aD+bE)\operatorname{cosec}\Delta$$
$$\cos Az.=-(aG+bH+cK)\operatorname{cosec}\Delta$$

a, b, c being related to the observing station in the same way as A, B, C are to the epicentre.

δ is defined as the nearest integer to $10^5(A^2+B^2+C^2-1)$ and may be used to compare distances calculated by the first two formulae above, whose equivalence depends on the assumption

$$A^2+B^2+C^2=1$$

h is the height, in kilometres, of the epicentre above the sphere of equal volume concentric with the earth and is given by

$$h=-3\cdot549+10\cdot738\cos 2\phi$$

(3) The tabular matter consisting of the station names arranged in order of epicentral distances, followed by this distance and the Azimuth measured round the epicentre from North through East. Other columns give the P phase and its residual, or PKP, in which the residual is shown in brackets [ ]. The S phase or an associated phase follows with its residual. If SKS is entered here the residual is shown in [ ], and if SKKS in { }. Under " Supp " is placed the time of some other, preferably well recorded phase such as PS, SS, or, in the case of deep focus shocks, pP. The final column, L, records the onset, if known, of Rayleigh waves R, or of the horizontally polarised surface waves Q.

(4) Readings for which space is not available in the tabular part, added at the foot.

The letters E, N, Z after a phase indicate that the reading was taken on an instrument recording East-West, North-South, or Vertical component of motion, though some stations have instruments oriented to record North-East or North-West components. Reflections near

the epicentre take place, and in the case of deep focus earthquakes can be distinguished from the direct phases. These are distinguished as pP, sS, sP, pPP—the small p and s referring to the initial portion of the path towards the surface.

The letters a, k after a P or PKP phase stand for the terms " Anaseismic " and " Kataseismic," and indicate whether the first longitudinal motion was one away from the focus or towards it.

The epicentres for earthquakes with abnormal focal depth are calculated from travel times appropriate to them in the tables cited above. The depth to be assumed can be obtained from these tables when the observational data are plentiful, and the epicentre then determined in the usual way. When the data are scanty an indication of depth can be obtained from the evidence of the readings of certain individual stations.

The first quarter for 1949 contains 131 epicentres, 84 of which are repetitions from previous epicentre.

Cases of abnormal depth are noted below :—

			°	°	
Jan.	2d.	4h.	3·0N.	97·0E.	0·020
	2d.	8h.	21·6N.	143·4E.	0·020
	3d.	18h.	42·5N.	82·5E.	0·005
	9d.	10h.	23·3S.	66·4W.	0·030
	13d.	8h.	26·0S.	178·0E.	0·100
	13d.	9h.	Undetermined shock.		Suggested Deep.
	23d.	6h.	11·7S.	92·4E.	Suggested Deep.
	24d.	9h.	22·2S.	176·1W.	0·015
Feb.	2d.	17h.	52·8N.	173·2W.	0·030
	5d.	20h.	19·6N.	69·4W.	0·020
	6d.	9h.	18·5N.	146·0E.	0·020
	9d.	17h.	39·9S.	174·2E.	0·025
	13d.	18h.	32·8S.	178·1W.	Suggested Deep.
	13d.	20h.	20·8S.	69·0W.	0·010
	26d.	21h.	42·3N.	142·4E.	0·005
	28d.	4h.	Undetermined shock,		Suggested Deep,

Mar.	4d.	1h.	3·8S.	102·2E.	Suggested Deep.
	4d.	10h.	36·7N.	70·5E.	0·030
	7d.	14h.	Undetermined shock.		Suggested Deep.
	9d.	14h.	15·8S.	174·2W.	0·020
	11d.	19h.	36·7N.	70·5E.	0·030
	13d.	12h.	12·5S.	106·5E.	0·010
	13d.	18h.	21·0S.	67·5W.	0·005
	16d.	22h.	5·4S.	151·3E.	Suggested Deep.
	17d.	3h.	33·9N.	139·6E.	0·010
	17d.	21h.	5·4S.	151·3E.	Suggested Deep.
	18d.	3h.	42·4N.	147·0E.	0·025
	19d.	18h.	31·6N.	130·4E.	0·025

Thanks are also due to the Director of the Meteorological Office and the Superintendent of Kew Observatory for hospitality extended to the Staff and assistance with administration.

KEW OBSERVATORY,
Richmond,
SURREY.

November, 1956.

1949 JANUARY, FEBRUARY, MARCH.

Jan. 1d. 1h. 17m. 53s. Epicentre 36°·9N. 121°·7W. (as on 1948, June 20d.).

A = −·4213, B = −·6821, C = +·5978 ; δ = +12 ; h = −1 ;
D = −·851, E = +·525 ; G = −·314, H = −·509, K = −·802.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick		0·4	6	i 0 11	− 2	i 0 23	+ 2	i 0 17	S*	—
Santa Clara		0·5	336	e 0 13	− 1	i 0 20	− 3	—	—	—
Berkeley		1·1	335	i 0 21a	− 1	i 0 37	− 2	—	—	—
Fresno		1·5	96	e 0 27	− 1	i 0 47	− 2	i 0 30	P_g	—
Tinemaha		2·8	86	i 0 46	− 1	i 1 21	− 1	—	—	—
Santa Barbara		2·9	147	i 0 48	0	—	—	—	—	—
Reno	N.	3·0	29	i 0 53	+ 3	i 1 38	S_g	i 0 56	P*	—
Haiwee	E.	3·1	104	e 0 53	+ 2	i 1 34	+ 5	—	—	—
Mineral		3·4	1	0 56k	+ 1	i 1 40	+ 3	i 1 9	P_g	—
Shasta Dam		3·8	352	e 0 59	− 2	—	—	i 2 7	S_g	—
Pasadena		4·0	131	i 1 1	− 3	e 1 48	− 4	—	—	—
Boulder City		5·6	98	i 1 27	0	—	—	—	—	—
Pierce Ferry		6·2	94	e 1 35	0	—	—	—	—	—
Tucson		10·1	114	e 2 33	+ 5	e 4 21	− 4	e 4 2	?	e 5·1
Hungry Horse		12·7	24	i 3 10	+ 5	—	—	—	—	—

Additional readings :—
Mineral iZ = 0m.59s., iN = 1m.3s. and 1m.6s., iSN = 1m. 45s., iN = 1m. 55s.
Shasta Dam i = 2m.11s.

Jan. 1d. Readings also at 0h. (Boulder City, Pierce Ferry, Shasta Dam, near Andijan and Obi-garm), 1h. (Nanking and near Frunse), 2h. (Hungry Horse and near Shasta Dam), 3h. (Ksara, Klyuchi, Boulder City, Pierce Ferry, Hungry Horse, Shasta Dam, Tucson, Pasadena, Riverside, Palomar, and Tinemaha), 5h. (Pierce Ferry and near Shasta Dam), 7h. (near Shasta Dam (2)), 8h. (near Shasta Dam), 9h. (Boulder City, Pierce Ferry, Salt Lake City, Tucson, and Uccle), 10h. (Pierce Ferry and near Shasta Dam (2)), 11h. (near Shasta Dam (2)), 12h. (La Paz and near Shasta Dam (2)), 13h. (Pierce Ferry, Hungry Horse (2), and near Shasta Dam), 14h. (Pierce Ferry, Hungry Horse, Shasta Dam, near Messina, near Berkeley, Lick, Fresno, Mineral, Reno, and Santa Clara), 15h. (Boulder City (2) and Tucson), 16h. (Ashkabad), 17h. (Tucson), 18h. (Kew, Pierce Ferry, and near Shasta Dam), 19h. (Bombay, Hyderabad, Kodaikanal, Poona, Boulder City, Pierce Ferry, Tucson, Pasadena, and Palomar), 20h. (Salt Lake City), 23h. (Boulder City, Hungry Horse, Pierce Ferry, Tucson, La Paz, Bogota, and near Huancayo).

Jan. 2d. 4h. 44m. 18s. Epicentre 3°·0N. 97°·0E. Depth of focus 0·020.
(as on 1941, Nov. 14d.).

A = −·1217, B = +·9912, C = +·0520 ; δ = −1 ; h = +7 ;
D = +·993, E = +·122 ; G = −·006, H = +·052, K = −·999.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	Z.	13·4	134	i 3 4	− 1	i 5 29	− 1	—	—	—
Colombo	E.	17·5	283	3 42?	−13	7 42?	+39	—	—	10·7
Kodaikanal	E.	20·7	293	i 4 37	+ 8	i 8 14	+ 8	8 44	SS	10·1
Calcutta	E.	21·2	338	e 4 39	+ 5	e 8 25	+10	—	—	—
Hyderabad	N.	23·2	10	4 55	+ 2	8 54	+ 4	9 56	SS	—
Poona		27·4	305	e 5 41	+ 9	i 10 8	+ 9	11 16	SS	—
Bombay		28·4	305	4 49	−53	8 39	?	13 34	?	—
Murgab		41·0	332	7 28	− 1	13 49	+21	—	—	—
Obi-garm		43·4	329	i 7 46	− 2	i 14 15	+11	—	—	—
Andijan		43·7	332	7 50	− 1	i 14 25	+17	—	—	—
Stalinabad		43·8	328	i 7 49	− 2	i 14 19	+10	—	—	—
Frunse		44·4	337	e 7 58	+ 2	e 14 37	+19	—	—	—
Samarkand		45·5	327	e 8 5	0	i 14 46	+12	—	—	—
Tashkent		45·6	331	e 7 58?	− 8	i 14 48	+13	e 9 28	P_cP	—
Tchimkent		46·2	333	i 8 9	− 1	i 14 58	+14	—	—	—
Irkutsk		49·5	7	i 8 34	− 2	e 15 46	+16	e 10 26	PP	—
Grozny		60·5	320	9 59	+ 4	—	—	—	—	—
Leninakan		60·7	316	e 9 57	0	—	—	—	—	—
Sverdlovsk		61·0	339	9 57	− 2	i 18 18	+16	i 18 39	PS	—
Brisbane	Z.	61·8	124	i 9 50	−14	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Piatigorsk		62·6	319	e 10 2	− 7	—	—	—	—	—
Riverview	N.	62·7	131	—	—	i 18 18	− 6	—	—	e 28·9
Helwan		67·5	302	10 36	− 5	19 30	+ 8	11 0	pP	—
Theodosia		68·1	318	e 10 46	+ 2	19 52	+22	e 24 0	SS	—
Moscow		70·7	330	e 10 57	− 3	e 20 10	−10	—	—	—
Christchurch		81·7	135	—	—	37 42?	?	—	—	—
Stuttgart	z.	86·3	318	e 12 22	− 3	—	—	e 12 48	pP	—
Tamanrassett	z.	90·2	293	e 12 29	−14	—	—	i 12 53a	pP	—
Hungry Horse		122·1	24	i 18 31	[− 5]	—	—	e 20 9	PP	—
Shasta Dam		123·6	35	e 18 28	[−10]	—	—	e 20 17	PP	—
Lick	z.	126·2	38	i 18 46k	[+ 3]	—	—	i 18 51a	pPKP	—
Tinemaha	z.	128·4	37	e 18 46	[− 2]	e 22 4	PKS	—	—	—
Logan		128·7	27	e 18 38	[−10]	—	—	—	—	—
Pasadena	z.	130·4	39	i 18 49	[− 3]	—	—	e 21 4	PP	—
Boulder City		131·1	34	e 18 50	[− 3]	—	—	—	—	—
Pierce Ferry		131·5	33	e 18 50	[− 4]	—	—	e 21 13	PP	—
Palomar	z.	131·7	38	e 19 4	[+10]	—	—	e 21 30	PP	—
Tucson		136·1	35	e 18 55	[− 7]	—	—	e 21 45	PP	—
La Paz		160·2	226	i 19 44	[+ 4]	—	—	—	—	76·7

Additional readings :—
Batavia iSN =5m.26s.
Calcutta ePP?E =5m.38s., S_cSE =17m.56s.
Poona SSSEN =11m.37s.
Tashkent ePP =9m.54s., iPS =15m.9s., S_cS =17m.56s., eSS =18m.36s.
Irkutsk SS =19m.42s.
Helwan P_cPZ =10m.48s., PPZ =13m.16s., PPPZ =14m.56s.
Stuttgart eZ =15m.44s.
Tamanrasset iZ =12m.43s.k.
Shasta Dam i =20m.45s.
Pasadena eZ =22m.8s.
Tucson e =19m.16s.
Long waves were also recorded at Auckland, Wellington, Ksara, Kew, College, and Bozeman.

Jan. 2d. 8h. 49m. 38s. Epicentre 21°·6N. 143°·4E. Depth of focus 0·020.
A = −·7471, B = +·5548, C = +·3660 ; δ = −8 ; h = +4 ;
D = +·596, E = +·803 ; G = −·294, H = +·218, K = −·931.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	17·7	354	3 59	+ 1	7 9	+ 2	—	—	—
Vladivostok		23·5	339	i 4 57	+ 1	i 8 56	+ 1	i 9 35	sS	—
Irkutsk		42·9	326	i 7 44	0	i 13 54	− 2	8 8	pP	—
Batavia		45·3	237	i 8 6a	+ 3	i 14 30	− 1	—	—	—
Brisbane		49·7	169	i 8 38	+ 1	i 15 28	− 5	i 9 20	pP	i 20·6
Riverview		55·6	173	i 10 7a	pP	e 16 55	+ 2	i 10 30	pP	e 24·3
Almata		58·6	309	i 9 43	+ 1	i 17 31?	− 1	—	—	—
Frunse		60·3	308	e 9 55	+ 1	e 17 54	0	—	—	—
Murgab		61·1	303	10 0	+ 1	18 3	− 1	—	—	—
College		61·7	27	—	—	e 18 2	− 9	e 19 22	sS	e 30·3
Andijan		62·1	306	i 10 4	− 2	i 18 12	− 4	—	—	—
Tchimkent		64·0	308	i 10 15	− 4	i 18 33	− 7	—	—	—
Obi-garm		64·4	304	i 10 19	− 2	i 18 41	− 4	—	—	—
Tashkent		64·4	307	e 10 24	+ 3	i 18 43	− 2	i 19 36	sS	—
Poona	E.	64·9	282	i 10 24	0	i 18 48	− 3	10 45	pP	—
Stalinabad		65·1	304	i 10 25	− 1	i 18 52	− 2	19 46	sS	—
Auckland	N.	65·3	153	—	—	20 0	sS	—	—	—
Samarkand		66·3	305	e 10 34	+ 1	e 19 7	− 1	—	—	—
Sitka		67·4	36	—	—	e 19 17	− 4	—	—	e 27·5
Sverdlovak		68·3	325	10 46	0	i 19 27	− 5	i 20 21	sS	—
Wellington		69·0	156	—	—	19 34	− 6	—	—	28·7
Christchurch		70·1	158	11 42	pP	19 46	− 7	i 20 40	sS	29·7
Victoria		76·2	44	12 2	pP	i 20 57	− 5	—	—	—
Shasta Dam		79·3	51	i 11 48	− 1	e 21 27	− 8	i 12 35	pP	—
Mineral	z.	80·0	51	i 11 52a	− 1	—	—	i 12 44	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Berkeley	z.	80·3	54	i 11 54k	0	i 21 43	− 2	—		—	—
Grozny		80·8	313	11 59	+ 2	21 45	− 5	—		—	—
Moscow		80·9	327	11 54	− 4	i 21 44	− 7	—		—	—
Lick	z.	81·0	54	11 57a	− 1	—	—	i 12 2k	pP		—
Reno		81·6	52	i 12 1	0	—	—	—		—	—
Hungry Horse		82·1	41	i 12 3	− 1	e 21 56	− 7	—		—	—
Piatigorsk		82·4	315	12 5	0	22 4	− 2	—		—	—
Fresno		82·6	54	i 12 6	0	e 22 8	0	—		—	—
Erevan		82·8	311	e 12 8	+ 1	—	—	—		—	—
Leninakan		83·1	312	e 12 13?	+ 4	22 9?	− 4	—		—	—
Tinemaha		83·6	53	i 12 12	+ 1	—	—	—		—	—
Pasadena		84·8	56	i 12 17a	0	i 22 24	− 6	i 13 5	pP	e 34·4	
Palomar	z.	86·1	56	e 12 22	− 2	—	—	i 13 9	pP		—
Logan		86·3	47	i 12 22	− 3	i 22 46	+ 1	e 13 9	pP		—
Boulder City		86·6	53	e 12 25	− 1	e 22 39	[+ 5]	—		—	—
Pierce Ferry		87·1	53	i 12 28	− 1	i 22 52	0	e 22 38	SKS		—
Tucson		91·1	55	i 12 48	0	e 23 28	− 1	e 23 2	SKS		—
Ksara		91·8	307	i 12 51	0	—	—	i 16 34	PP		—
Helwan		97·0	306	13 13	− 2	e 23 31	[− 4]	e 24 26	S		—
Stuttgart	z.	98·9	332	e 17 25k	PP	—	—	—		—	—
St. Louis		101·8	40	—	—	i 24 1	[+ 2]	i 26 42	PS		—
Tamanrasset	z.	119·7	316	i 18 33k	[+ 2]	—	—	e 19 57	PP		—
Bogota		135·0	59	i 22 11	PKS	—	—	—		—	—
Huancayo		141·8	82	e 19 13	[0]	—	—	e 22 31	PP		—
La Paz		149·8	85	i 19 30	[+ 4]	i 29 37	SKKS	—		—	71·4

Additional readings :—
Vladivostok iPP =5m.35s.
Irkutsk pP =8m.0s., sS =14m.42s.?, SS =17m.16s.
Brisbane iZ =13m.31s., iE =16m.49s.
Riverview eSE =18m.12s., iE =18m.17s., eSSE =18m.55s.
College eSS =22m.22s.
Tashkent ePPP =12m.30s.
Poona sSE =19m.41s., iE =19m.53s.
Stalinabad iS_cS =19m.57s.
Sverdlovsk iSS =24m.2s., i =27m.24s.
Christchurch SSEN =24m.38s.
Mineral iZ =12m.7s.
Berkeley iN =21m.28s., iE =21m.40s., iZ =22m.26s., iN =23m.5s.
Reno eS =12m.54s.
Fresno eSE =22m.5s.
Pasadena iZ =13m.12s., eSEN =22m.20s., iEZ =23m.20s.
Logan eS =22m.26s.
Tucson e =14m.8s. and 15m.39s., esS =24m.9s., e =27m.32s.
Helwan eZ =17m.15s., eN =25m.0s.

Jan. 2d. 12h. 50m. 22s. Epicentre 24°·9N. 63°·5E. (as on 1948, Jan. 30d.).

$A = +\cdot4052$, $B = +\cdot8127$, $C = +\cdot4187$; $\delta = -2$; $h = +3$;
$D = +\cdot895$, $E = -\cdot446$; $G = +\cdot187$, $H = +\cdot375$, $K = -\cdot908$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Poona		11·5	121	i 2 42	− 6	5 3	+ 4	3 15	PPP		—
Ashkabad		13·7	343	3 20?	+ 2	—	—	—		—	—
Stalinabad		14·3	17	i 3 21	− 5	i 6 12	+ 6	i 6 26	SS		—
Obi-garm		14·7	19	i 3 25	− 6	—	—	—		—	—
Samarkand		15·0	10	i 3 34	− 1	—	—	—		—	—
Hyderabad		15·8	115	3 42	− 3	6 47	+ 5	7 21	SSS		—
Murgab		16·1	31	3 44	− 5	6 58	+ 9	—		—	—
Tashkent		17·1	15	e 3 56	− 6	e 7 13	+ 1	—		—	—
Andijan		17·4	23	i 4 3	− 3	—	—	—		—	—
Tchimkent		18·1	15	i 4 11	− 3	—	—	—		—	—
Baku		19·2	327	i 4 42	+14	—	—	—		—	—
Kodaikanal	E.	19·7	135	i 4 40	+ 6	i 8 23	+13	—		—	10·2
Frunse		20·1	24	i 4 36	− 2	—	—	—		—	—
Almata		21·4	27	i 4 49	− 2	—	—	—		—	—
Erevan		22·0	319	e 5 4	+ 6	—	—	—		—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Leninakan		22·8	319	e 5 16	+11	—	—	—	—	—
Calcutta	E.	22·9	90	i 5 2a	− 4	i 9 13	0	i 5 34	PP	—
Grozny		23·4	326	i 5 18	+ 7	9 40	+19	—	—	—
Colombo	E.	23·8	137	5 3	−12	—	—	—	—	14·7
Piatigorsk		25·3	324	e 5 34	+ 4	—	—	—	—	—
Ksara		25·6	297	i 5 39	+ 7	i 10 31	+32	—	—	—
Helwan		28·9	288	i 6 8a	+ 5	e 11 0	+ 7	7 0	PP	—
Yalta		30·8	317	—	—	e 11 40	+17	—	—	—
Sverdlovsk		32·0	357	i 6 31	+ 1	i 11 49	+ 7	i 13 54	SSS	—
Istanbul		32·8	308	e 6 43	+ 6	—	—	—	—	21·3
Moscow		36·2	336	i 7 6	0	e 13 0	+13	i 8 30	PP	—
Belgrade		40·0	311	e 7 41k	+ 3	e 13 35	− 9	—	—	e 30·4
Irkutsk		41·2	38	i 7 46	− 2	13 54?	− 8	9 22	PP	—
Ogyalla		42·3	315	e 9 20	PP	e 14 26	+ 7	—	—	—
Messina		42·5	301	e 8 4?	+ 5	—	—	—	—	—
Triest		44·8	311	8 18	+ 1	i 15 11	+16	—	—	—
Rome		45·2	306	8 22	+ 2	15 19	+18	18 43	SS	23·7
Tananarive		46·2	202	—	—	e 16 22	+67	—	—	e 24·6
Bologna	Z.	46·3	310	e 8 34a	+ 5	—	—	—	—	—
Collmberg		46·5	319	e 8 34	+ 3	—	—	e 10 12	PP	—
Salo	Z.	47·0	311	e 8 33a	− 2	—	—	—	—	—
Upsala		47·1	330	i 10 51a	PP	e 19 8	?	e 19 16	?	e 27·6
Stuttgart		48·4	315	e 8 46a	0	—	—	—	—	32·6
Zürich		48·6	313	e 8 48a	+ 1	—	—	e 9 37	PcP	—
Strasbourg		49·3	315	e 8 54	+ 1	—	—	e 9 46	PcP	e 25·1
Uccle	E.	51·7	317	—	—	e 16 38?	+ 6	—	—	e 34·6
Clermont-Ferrand		52·2	320	e 9 22	+ 7	—	—	e 10 19	PcP	—
Batavia		52·3	120	e 9 1	−14	i 17 50	+70	—	—	—
Tamanrasset	Z.	52·7	282	i 9 22a	+ 4	—	—	e 10 31	PcP	—
Paris		52·8	314	i 9 21	+ 2	—	—	i 10 44	PcP	e 38·6
Kew		54·7	317	e 4 38?	?	—	—	—	—	e 29·6
Vladivostok		58·0	54	—	—	i 17 52	− 5	—	—	—
Hungry Horse		106·3	358	e 18 4	[−24]	—	—	e 19 19	PP	—
Mineral	Z.	114·9	4	e 19 42	PP	—	—	—	—	—
Pierce Ferry		119·3	357	e 18 51	[0]	—	—	—	—	—
Christchurch		120·2	127	—	—	22 38?	PKS	—	—	—
Tucson		122·9	353	e 19 1	[+ 3]	—	—	e 20 31	PP	e 73·2
La Paz		134·2	270	i 19 25	[+ 5]	i 22 56	PKS	i 21 55	PP	70·3
Huancayo		139·1	280	e 37 13	?	e 40 52	SS	e 50 41	Q	e 70·2

Additional readings :—
Poona P_gEN =3m.43s., iSE =4m.38s., iSN =4m.41s., SEN =5m.35s.
Calcutta iSSE =10m.1s.
Helwan PPPZ =7m.15s., iN =11m.14s., 12m.0s., and 12m.44s.
Moscow eSS =15m.50s.
Tananarive e =19m.7s. and 19m.27s.
Collmberg eZ =8m.44s., eE =10m.29s.
Stuttgart eZ =8m.56s. and 9m.10s.
Clermont-Ferrand e =9m.51s.
Tamanrasset iZ =9m.56s.k, eZ =11m.50s.
Paris i =9m.31s.
Long waves were also recorded at Dehra Dun, Riverview, Auckland, Wellington, Ivigtut, De Bilt, Potsdam, and at other North American stations.

Jan. 2d. 18h. 1m. 44s. Epicentre 35°·5N. 27°·2E. (as on 1948, Oct. 19d.).
A = +·7258, B = +·3730, C = +·5781 ; δ = +11 ; λ = 0 ;
D = +·457, E = −·889 ; G = +·514, H = +·264, K = −·816.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul	5·8	14	e 1 57	P_g	3 6	S_g	—	—	—
Helwan	6·6	147	1 39	− 2	2 50	− 8	3 12	S*	—
Ksara	7·4	101	e 1 47	− 5	e 7 6	?	—	—	—
Sofia	7·8	339	e 2 0	+ 2	—	—	—	—	e 5·3
Bucharest	8·9	355	—	—	e 4 14	+19	e 4 33	S*	5·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Messina	N.	9·7	289	—	—	e 4 10	− 5	e 4 21	?	—
Zürich	Z.	18·3	317	e 4 23	+ 6	—	—	—	—	—
Stuttgart		18·7	322	e 4 25	+ 3	—	—	e 4 46	PPP	—
Collmberg	E.	19·1	331	e 4 25	− 2	—	—	—	—	—
Strasbourg		19·4	320	e 4 34	+ 4	—	—	e 4 40	PP	—
Clermont-Ferrand		20·9	307	e 4 43	− 3	—	—	e 5 11	PP	—
Paris		22·5	314	i 5 6	+ 4	—	—	e 5 22	PP	—
Tamanrasset	Z.	22·7	242	e 5 10	+ 6	—	—	i 5 46	PPP	—
Ottawa	Z.	73·6	315	e 11 37	0	—	—	—	—	—
Hungry Horse		89·6	335	i 13 0	− 1	—	—	i 13 6	P_cP	—

Additional readings :—
Helwan eZ = 2m.22s.
Bucharest eN = 4m.47s., eE = 5m.0s., iE = 5m.14s.
Stuttgart e = 4m.33s.
Tamanrasset iZ = 5m.17s. and 5m.23s.

Jan. 2d. 22h. Intensity 4·5 in Nevada. U.S.C.G.S. gives 38°·7N. 119°·0W. but data is inconsistent.

Reno iPNZ = 4m.20s.
Tinemaha iPEZ = 4m.25s., iSE = 6m.20s.
Fresno iPZ = 4m.31s., iPE = 4m.34s., iSEN = 5m.4s., iN = 5m.31s..
Lick iPEZ = 4m.41s.k, iNZ = 4m.46s.a, iN = 5m.16s. and 5m.19s.
Mineral iPZ = 4m.43s.k, iZ = 4m.48s.k, iE = 4m.51s., iN = 4m.54s., iEN = 5m.7s. and 5m.28s.
Berkeley iPZ = 4m.48s., iZ = 4m.51s. and 4m.57s., iE = 5m.17s.
Shasta Dam iP = 4m.52s., iS = 5m.1s., i = 5m.50s.
Branner iPZ = 4m.52s.k, eE = 4m.55s., iZ = 4m.58s., iN = 5m.31s., iSN = 5m.34s.
San Francisco iPEN = 4m.53s., iSEN = 5m.32s.
Boulder City eP = 5m.0s., i = 6m.4s.
Pierce Ferry eP = 5m.3s., i = 5m.19s.
Pasadena iPZ = 5m.18s.
Logan e = 5m.31s., 5m.49s., and 6m.12s., eS? = 6m.46s., eL = 6m.54s.
Santa Clara ePEN = 5m.39s., eSEN = 5m.45s.
Hungry Horse iP = 6m.28s., iL = 9m.29s.
Tucson e = 6m.50s., eS? = 7m.47s., eL = 8m.34s.

Jan. 2d. Readings also at 0h. (Stuttgart, Ksara, Boulder City, Hungry Horse, Logan, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Palomar, Tinemaha, Wellington, Christchurch, Auckland, and near Apia, more than one shock), 1h. (Almata, near Andijan, Murgab, Tashkent, Tchimkent, Stalinabad, and Samarkand), 2h. (Piatigorsk, near Leninakan, Erevan, and Grozny), 3h. (La Paz), 4h. (near Balboa Heights and Bogota), 5h. (Tucson), 6h. (near Andijan and Tchimkent), 8h. (near Hungry Horse), 14h. (Boulder City, Hungry Horse (2), Pierce Ferry (2), Shasta Dam (2), Ashkabad, and near Mizusawa), 15h. (near Leninakan, Erevan, Piatigorsk, and Grozny), 16h. (near Tucson), 17h. (La Paz), 21h. (Tacubaya), 22h. (Hungry Horse).

Jan. 3d. 13h. 43m. 36s. Epicentre 35°·0N. 116°·5W. (as on 1948, Dec. 18d.).

A = −·3663, B = −·7347, C = +·5710 ; $\delta = 0$; $h = 0$;
D = −·895, E = +·446 ; G = −·255, H = −·511, K = −·821.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside		1·2	216	i 0 26	+ 2	i 0 41	0	—	—	—
Pasadena		1·6	238	i 0 31	+ 1	i 0 51	0	—	—	—
Boulder City		1·7	54	i 0 30	− 1	—	—	—	—	—
Palomar		1·7	190	i 0 32	+ 1	—	—	—	—	—
Pierce Ferry		2·3	61	i 0 40	0	—	—	—	—	—
Tinemaha	Z.	2·5	326	i 0 43	0	—	—	—	—	—
Tucson		5·5	118	i 1 23	− 2	e 2 20	−10	i 1 44	P_g	i 2·9
Shasta Dam		7·3	322	e 2 22	P_g	i 3 46	S*	—	—	—
Logan		7·7	27	e 2 22	P*	—	—	—	—	e 3·5
Hungry Horse		13·5	7	i 4 26	+71	—	—	—	—	—

Tucson also gives i = 1m.37s., iS = 2m.24s., i = 2m.32s., and 2m.40s.

Jan. 3d. 18h. 11m. 22s. Epicentre 42°·5N. 82°·5E. Depth of Focus 0·005.
(as on 1947, Dec. 19d.).

A = +·0965, B = +·7332, C = +·6731 ; δ = −4 ; h = −3 ;
D = +·991, E = −·131 ; G = +·088, H = +·667, K = −·740.

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Almata		4·2	284	e 1 1	− 2	i 1 57	+ 5	—
Frunse		5·8	266	e 1 29	+ 4	i 2 41	+ 9	—
Murgab		7·7	241	1 58?	+ 6	2 16?	−63	—
Andijan		7·8	260	e 1 59	+ 6	e 3 26	+ 5	—
Tchimkent		9·6	275	i 2 18	0	—	—	—
Tashkent		9·9	265	e 2 24	+ 2	e 4 15	+ 3	—
Obi-garm		10·4	253	i 5 18?	?	—	—	—
Stalinabad		11·2	254	i 2 40	0	i 4 39	− 5	—
Samarkand		12·0	263	e 2 53	+ 3	—	—	—
Irkutsk		17·7	49	e 4 4	+ 1	e 7 15	− 1	—
Sverdlovsk		20·0	325	4 28	− 2	8 7	+ 1	—
Bombay	E.	24·9	202	—	—	e 10 11	+37	—
Poona	N.	25·0	200	—	—	i 10 10	+34	e 13·3
Hyderabad	N.	25·2	190	e 5 15	− 6	10 21	+42	14·9
Grozny		26·8	285	e 5 37	+ 1	—	—	—
Moscow		31·6	311	e 6 20	+ 1	—	—	—
Collmberg		46·6	307	e 8 23	0	—	—	—
Stuttgart	Z.	49·8	305	e 8 47	− 1	—	—	—
Tamanrasset	Z.	65·6	279	i 10 43k	+ 4	—	—	—
Hungry Horse		88·4	12	e 12 47	+ 1	—	—	—
Shasta Dam		94·2	20	i 13 13	0	—	—	—

Additional readings :—
Stuttgart eZ = 8m.51s.
Tamanrasset eZ = 10m.47s.
Long waves were also recorded at Ksara, Copenhagen, Upsala, De Bilt, and Kew.

Jan. 3d. Readings also at 0h. (Tacubaya), 4h. (Raciborzu), 6h. (Hungry Horse and Shasta Dam), 7h. (Tacubaya), 9h. (Calcutta, Murgab, and near Ashkabad), 10h. (near Basle), 13h. (near Copiapo and Santa Lucia), 17h. (near Mizusawa), 20h. (Tacubaya), 21h. (near Ashkabad), 22h. (Tacubaya and Hungry Horse), 23h. (La Paz and Tacubaya).

Jan. 4d. 2h. N. Pacific, off coast of China.

Zi-ka-wei ePN = 22m.0s., S = 23m.30s.
Nanking eP = 23m.42s., eS = 25m.29s.
Andijan eP = 29m.48s.
Tchimkent iP = 29m.53s.
Tashkent eP = 29m.53s., eS = 37m.8s.
Stalinabad eP = 29m.58s.
Ksara eP = 33m.1s., eS = 43m.30s.?
Helwan PZ = 33m.28s., eZ = 34m.36s., 35m.20s., and 37m.50s.
Victoria eZ = 33m.56s.
Calcutta eE = 34m.12s. and 40m.22s.
Shasta Dam eP = 34m.14s.
Hungry Horse iP = 34m.20s.
Pierce Ferry iP = 34m.48s.
Strasbourg e = 38m.54s.
Bombay eN = 40m.48s., eE = 47m.3s.
Poona eEN = 48m.5s.
Long waves were also recorded at other European stations.

Jan. 4d. 19h. 46m. 51s. Epicentre 34°·9N. 27°·0E. (as on 1948, Sept. 20d.).

A = +·7324, B = +·3732, C = +·5696; δ = +13; h = 0;
D = +·454, E = −·891; G = +·507, H = +·259, K = −·822.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		6·2	143	1 34	− 1	2 42	− 6	1 46	P*	—
Istanbul		6·3	14	2 27	+51	4 25	S_g	—	—	—
Ksara		7·4	96	e 2 8	P*	—	—	—	—	e 5·3
Triest		14·7	321	e 3 31	0	e 6 30	+14	—	—	—
Salo		16·5	315	3 49a	− 5	e 6 58	0	—	—	—
Chur		17·8	318	e 4 11	0	—	—	—	—	—
Zürich		18·6	318	i 4 20	− 1	e 8 3	+17	—	—	—
Stuttgart		19·1	323	e 4 27a	0	e 8 24	SS	e 4 58	PP	e 11·2
Basle		19·2	318	e 4 28a	0	—	—	—	—	—
Collmberg		19·3	332	e 4 32	+ 3	e 8 21	SS	—	—	—
Jena		19·5	330	e 4 34	+ 3	e 8 24	SS	—	—	—
Strasbourg		19·7	321	i 4 37	+ 3	—	—	e 4 53	PP	—
Tamanrasset	z.	22·3	243	e 4 53	− 8	—	—	—	—	—
Paris		22·8	315	e 5 5	0	—	—	—	—	—
Copenhagen		23·1	339	5 11	+ 3	—	—	—	—	—
Kew		25·7	318	e 4 9?	?	—	—	—	—	—
Weston		71·9	309	i 11 33	0	—	—	—	—	—
Ottawa	z.	73·9	314	e 11 39	0	—	—	—	—	—
College		80·5	358	i 12 18	+ 3	—	—	—	—	—
Hungry Horso		90·1	335	e 13 5	+ 2	—	—	—	—	—
Boulder City		101·0	328	i 13 59	+ 6	—	—	—	—	—

Additional readings :—
Helwan eZ = 1m.39s., S*Z = 3m.5s.
Stuttgart e = 5m.3s.
Jena eN = 5m.34s.
Paris i = 5m.22s.
Copenhagen i = 5m.19s.
Long waves were also recorded at Bologna and Rome.

Jan. 4d. Readings also at 1h. (near Granada), 3h. (Nanking and Hungry Horse), 7h. (Auckland, Christchurch, Wellington, Apia, Riverview, Pasadena, Palomar, Tinemaha, Tucson, Boulder City, Pierce Ferry, Reno, Shasta Dam, Lick, Hungry Horse, Victoria, and Stuttgart), 8h. (Victoria, Salo, near Triest (2), Zagreb, and near Bogota), 9h. (Stuttgart), 11h. (near Stalinabad), 13h. (La Paz), 14h. (Bucharest), 15h. (Tacubaya), 16h. (near Mizusawa), 17h. (Tacubaya), 19h. (near Messina), 20h. (Bucharest, Sofia, Ksara, and near Istanbul), 21h. (Bologna, near Rome, Boulder City, Pierce Ferry, Hungry Horse, near Shasta Dam, and near Murgab).

Jan. 5d. 9h. Loyalty Islands region.

Auckland PN = 0m.16s., SN = 3m.44s., SS?N = 4m.42s., LN = 5·2m.
Brisbane iPEZ = 0m.24s., iPPN = 0m.43s., iZ = 1m.4s., iSE = 3m.44s., eSN = 3m.47s., iLE = 5m.31s.
Apia eP = 0m.49s.
Riverview iPEZ = 1m.20s.k, iSE = 5m.16s., iP_cPN = 5m.27s., iZ = 5m.36s., eRZ = 6·6m.
Wellington P?Z = 1m.22s., e = 1m.34s., S = 5m.27s., L = 7·2m.
Kaitaia PNE = 1m.26s.
Christchurch PNZ = 1m.28s., S = 5m.38s., RNZ = 7m.50s.
Arapuni eE = 4m.0s.
Branner iPZ = 9m.9s.a, iZ = 9m.13s.
Berkeley iPZ = 9m.10s.
Pasadena iPZ = 9m.15s.
Fresno iPZ = 9m.16s.
Mineral ePZ = 9m.18s.
Palomar iPZ = 9m.19s.
Hungry Horse iP = 9m.22s.
Reno ePZ = 9m.23s.
Boulder City iP = 9m.31s.
Pierce Ferry iP = 9m.32s.
Tucson eP = 9m.38s., eS = 20m.3s., eL = 37m.7s.
La Paz ePKP? = 15m.10s.
Ottawa eZ = 15m.17s.
Stuttgart eZ = 16m.12s.
Ksara e = 24m.23s. and 27m.41s.

Jan. 5d. Readings also at 0h. (Copiapo, near Stalinabad, and near Tacubaya), 3h. (College, Hungry Horse, Shasta Dam (2), near Nanking, and Zi-ka-wei), 4h. (La Paz), 6h. (Hungry Horse, Pierce Ferry, and near Mizusawa), 12h. (near Mizusawa), 13h. (Paris), 17h. (Zürich and near Ottawa), 18h. (Tamanrasset, Rome, and near Messina), 19h. (near Messina), 21h. (Tashkent, Samarkand, Tchimkent, near Stalinabad, Obi-garm, Murgab, and Andijan), 22h. (Hungry Horse, Shasta Dam, Stalinabad, Tashkent, near Almata, Murgab, Frunse, and Andijan), 23h. (near Murgab and Andijan).

Jan. 6d. 11h. 42m. 15s. Epicentre 11°·0S. 79°·0W. (as on 1944, June 29d.).

Epicentre as given by U.S.C.G.S.

$A = +\cdot1873$, $B = -\cdot9638$, $C = -\cdot1896$; $\delta = -6$; $h = +6$;
$D = -\cdot982$, $E = -\cdot191$; $G = -\cdot036$, $H = +\cdot186$, $K = -\cdot982$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo	3·8	107	i 1 2	+ 1	i 1 32	−15	i 1 14	P_g	i 1·7
La Paz	11·9	119	e 3 38	+34	i 5 56	SSS	—	—	6·9
Bogota	16·3	18	i 3 50	− 2	i 6 36	−17	—	—	—
Tucson	52·7	326	e 9 18	0	—	—	—	—	—
Pierce Ferry	57·3	327	i 9 51	− 1	—	—	—	—	—
Hungry Horse	66·7	336	i 11 26	+31	—	—	—	—	—
College	91·1	337	e 13 7	− 1	—	—	—	—	—

Additional readings :—
Huancayo iS = 1m.23s.
Bogota iPP = 3m.57s., eP_cP = 9m.0s.

Jan. 6d. 19h. 29m. 8s. Epicentre 46°·1N., 14°·8E. (as on 1939, May 6d.).

Intensity VI at Váce (46° 07′N., 14° 50′E.); IV at Soléava, Dob, Blagovica, etc. Macroseismic radius 27·5km. Epicentre as adopted.

M. D. Uzelac.
Annuaire microséismique et macroséismique de l'Institut Séismologique de Beograd, 1949, Nouvelle Série No. 9, Belgrade, 1950, p. 51.

Intensity IV in Austria with macroseismic area 1600sq. km. Jahrbücher der Zentralanstalt für Meteorologie und Geodynamik, Jahrgang, 1950, Vienna, 1950, Nouvelle Série, Vol. 86, p. E1, with macroseismic chart.

$A = +\cdot6728$, $B = +\cdot1778$, $C = +\cdot7182$; $\delta = +8$; $h = -4$;
$D = +\cdot255$, $E = -\cdot967$; $G = +\cdot694$, $H = +\cdot183$, $K = -\cdot696$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zagreb	0·9	109	e 0 25	+ 5	e 0 37	+ 3	—	—	—
Bologna	2·9	237	—	—	e 1 30	S*	e 1 44	S_g	—
Salo	3·0	260	e 1 52	+62	2 30	+63	—	—	—
Zürich	4·5	289	e 1 4	− 7	e 2 13	+ 8	—	—	—
Stuttgart	4·6	308	e 1 10	− 2	e 2 29	S_g	e 1 26	P_g	—
Basle	5·1	289	e 1 45	P_g	e 2 45	S_g	—	—	—
Jena	5·2	338	e 2 4	?	e 2 14	− 8	e 2 44	S*	—
Collmberg	5·4	346	—	—	e 2 46	S*	2 55	S_g	—
Strasbourg	5·4	301	(e 1 24)	0	—	—	—	—	—

Additional readings and note :—
Zagreb iP_gE = 0m.27s., iS_gE = 0m.39s.
Stuttgart e = 2m.22s.
Strasbourg reading increased by 11 minutes.

Jan. 6d. Readings also at 0h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Pasadena, Palomar, and Santa Lucia), 2h. (Bombay, Helwan, Ksara, and near Santa Lucia), 3h. (Boulder City, Hungry Horse, Pierce Ferry, and Shasta Dam), 6h. (Almata and Batavia), 7h. (Hungry Horse), 8h. (near Erevan, Leninakan, and Grozny), 10h. (near Stalinabad, Samarkand, and Kulyab), 13h. (Mizusawa and Batavia), 14h. (Hungry Horse), 16h. (Hungry Horse and Pierce Ferry), 17h. (Hungry Horse), 18h. (near Tacubaya), 19h. (near Lick and Brunner), 20h. (Santa Lucia), 23h. (Hungry Horse).

A series of shocks accompanied the eruption of Mauna Loa (Hawaii), of which the principal one was at 5h.59m.

Jan. 7d. 17h. 20m. 40s. Epicentre 3°·2S., 148°·2E. (as on 1947, Dec. 25d.).

Approximate.

$A = -·8486$, $B = +·5262$, $C = -·0555$; $\delta = +9$; $h = +7$;
$D = +·527$, $E = +·850$; $G = +·047$, $H = -·029$, $K = -·998$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		24·6	169	i 5 13	−10	i 9 39	− 3	i 10 31	SS	i 13·9
Riverview		30·6	175	e 6 16	− 2	e 11 12	− 8	e 7 15	PP	e 15·8
Melbourne	E.	34·6	185	e 7 30	+37	i 12 25	+ 3	—	—	i 15·1
Batavia		41·3	265	i 9 26	PP	i 17 22	SS	—	—	—
Auckland	N.	41·5	147	9 55	PPP	e 16 55	SS	—	—	19·9
Wellington		44·8	151	10 15	PP	14 45	−10	17 20?	SS	22·3
Vladivostok		48·4	344	e 8 45	− 1	e 15 36	−10	e 10 35	PP	—
Irkutsk		66·5	333	—	—	e 19 44	0	—	—	—
Hyderabad	N.	71·7	289	e 12 51	?	20 54	+ 9	—	—	—
Poona		76·2	290	e 11 57	+ 5	e 21 44	+ 8	i 12 32	?	—
Bombay		77·2	290	e 12 6	+ 9	e 21 58	+11	e 12 28	?	37·6
Andijan		81·4	312	e 12 27	+ 7	—	—	—	—	—
Stalinabad		83·7	309	e 12 34	+ 2	—	—	—	—	—
Tchimkent		83·7	313	e 12 34	+ 2	—	—	—	—	—
Tashkent		83·8	312	e 12 35	+ 3	e 22 45	−10	—	—	—
Samarkand		85·3	310	e 12 40	0	—	—	—	—	—
Berkeley		91·6	53	—	—	e 30 22	SS	e 42 2	Q	e 44·2
Shasta Dam		91·9	50	i 13 1	−10	—	—	—	—	—
Mount Wilson	Z.	94·9	56	e 13 23	− 2	—	—	—	—	—
Boulder City		97·5	54	e 13 35	− 2	—	—	—	—	—
Hungry Horse		97·6	42	e 13 34	− 4	—	—	—	—	—
Ksara		110·3	305	e 19 22	PP	e 30 0	PPS	—	—	—
Kew		125·2	336	—	—	e 44 33	?	—	—	e 65·3
Huancayo		134·2	111	e 23 4	PKS	e 41 35	?	—	—	e 55·7
Bogota		137·8	86	e 14 31	?	—	—	e 16 21	?	—

Additional readings and note :—
Brisbane iSE = 9m.44s.
Riverview ePPZ = 7m.12s., iN = 11m.20s., eQE = 12m.50s.
Vladivostok iPS = 15m.55s.
Berkeley eN = 40m.26s.
Long were also recorded at Christchurch, Arapuni, Calcutta, Seven Falls, Philadelphia, Tucson, and at other European stations.

Jan. 7d. 17h. Pacific Ocean, possibly an after-shock of 17h.20m.

Brisbane iP?Z = 58m.41s., iSE = 63m.3s., iSSE = 63m.35s., iLE = 67m.49s.
Riverview iP?Z = 59m.44s., iS?N = 64m.45s., eQE = 66·3m.
Pasadena ePZ = 66m.21s.
Shasta Dam eP = 66m.27s.
Pierce Ferry eP = 67m.5s.
Hungry Horse eP = 67m.45s.
Arapuni S?E = 68m.18s., LE = 72·8m.
Strasbourg e = 83m.23s., 83m.57s., and 84m.13s., eL = 121m.
Long waves were also recorded at Tacubaya, Auckland, Wellington, Calcutta, Paris, Clermont-Ferrand, De Bilt, and Malaga.

Jan. 7d. Readings also at 1h. (La Paz), 2h. (near Malaga), 3h. (near Nanking), 6h. (La Paz), 7h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Lick, Branner, and Mineral), 8h. (La Paz (2), near Tchimkent, Frunse, Almata, Kulyab, Obi-garm, Stalinabad, Murgab, Andijan, Samarkand, and Tashkent), 9h. (La Paz, Apia, Huancayo, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Palomar, and Ksara), 10h. (Hungry Horse, Samarkand, Almata, near Andijan, Frunse, and Tchimkent), 13h. (near Mizusawa), 15h. (La Paz, Huancayo, Hungry Horse, Pierce Ferry, Pasadena, and Palomar), 16h. (near Ottawa), 17h. (La Paz, Berkeley, and near Tucson), 20h. (Boulder City, College, Hungry Horse, Pierce Ferry, Shasta Dam, Palomar, Paris, Stuttgart, and near Mizusawa).

Jan. 8d. Readings at 0h. (Strasbourg), 2h. (College, near Zürich, Basle, and Stuttgart), 3h. (Ksara, Santa Clara, Boulder City (2), Pierce Ferry (2), Tucson, near Shasta Dam (2), Lick (2), Berkeley (2), Fresno (2), San Francisco (2), Reno (2), near Andijan, Frunse, Tchimkent, Tashkent, Almata, and Samarkand), 4h. (Zürich and Strasbourg), 5h. (La Paz, near Murgab, and near Ashkabad), 6h. (Bogota), 8h. (Mizusawa (2), College, Boulder City, Pierce Ferry, Shasta Dam, and near Ashkabad), 9h. (College, Kulyab, and near Stalinabad), 10h. (near Mizusawa), 12h. (Apia), 16h. (near Alicante), 19h. (Mount Wilson and near Tinemaha), 20h. (near Tacubaya and near Sofia), 21h. (Strasbourg and Bucharest), 23h. (Mount Wilson, Palomar, and Ottawa).

Jan. 9d. 7h. 48m. 4s. Epicentre 5°·0N. 82°·5W. (as on 1948, Aug. 19d.).

A = +·1300, B = −·9877, C = +·0866; δ = −5; h = +7;
D = −·991, E = −·131; G = +·011, H = −·086, K = −·996.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Balboa Heights		4·9	35	i 1 18	+ 1	i 2 17	+ 2	— —	—
Bogota		8·4	92	i 2 10	+ 4	i 3 47	+ 4	i 4 53 S_g	—
Huancayo		18·7	157	e 4 21	− 1	e 8 11	PP	— —	e 9·2
Tacubaya		21·7	314	i 4 58 a	+ 3	e 9 17	SS	— —	e 11·3
La Paz		25·7	146	i 5 39	+ 6	i 10 23	+22	— —	13·9
St. Louis		34·2	350	i 6 47	− 2	e 12 14	− 2	— —	—
Tucson		37·9	319	e 7 19	− 1	—	—	e 8 44 PP	e 21·0
Weston		38·5	13	i 7 27	+ 1	e 13 26	+ 4	— —	—
Ottawa		40·7	7	e 7 41	− 3	—	—	i 7 44 P	16·9
Pierce Ferry		42·4	322	e 7 54	− 4	—	—	— —	—
Palomar	Z.	42·6	316	i 8 1	+ 2	—	—	— —	—
Boulder City		42·8	321	e 8 1	0	—	—	— —	—
Seven Falls	E.	43·2	13	e 8 4	0	—	—	— —	—
Pasadena	Z.	44·0	316	i 8 12	+ 1	—	—	— —	—
Logan		45·0	330	e 8 16	− 3	—	—	— —	—
Shasta Dam		50·4	322	i 6 49	?	—	—	— —	—
Hungry Horse		50·9	334	e 9 2	− 3	—	—	— —	—
Victoria		55·6	328	e 9 39	− 1	—	—	— —	—
College		75·2	336	i 11 45	− 1	—	—	— —	—
Stuttgart	Z.	87·4	42	e 12 53	+ 3	—	—	— —	—

Tucson also gives iP = 7m.23s.
Long waves were also recorded at Chicago and Philadelphia.

Jan. 9d. 10h. 34m. 46s. Epicentre 23°·3S. 66°·4W. Depth of focus 0·030.
(as on 1947, March 22d.).

Intensity III between 25° and 30°S. latitude. Depth 250km. Epicentre 23°·3S., 66°·8W. (Strasbourg).

F. Greve.
Boletín del año 1949, primer semestre, Instituto Sismológico, Santiago.

A = +·3681, B = −·8425, C = −·3933; δ = −1; h = +4;
D = −·916, E = −·400; G = −·157, H = +·360, K = −·919.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Copiapo	N.	5·4	220	i 1 26	+ 5	—	—	— —	i 2·4
La Paz		6·9	346	i 1 41 a	+ 1	i 2 52	− 6	— —	—
Santa Lucia		10·8	200	e 2 27	− 3	i 4 27	− 1	e 2 46 pP	—
La Plata		13·7	150	3 7	+ 1	5 32	− 2	— —	6·9
Huancayo		14·1	321	e 3 10	− 1	e 5 41	− 1	— —	i 6·2
Bogota		28·7	343	i 5 38	0	i 10 11	+ 1	i 5 46 pP	—
Fort de France		38·1	9	i 6 59	0	e 12 34	− 1	— —	—
San Juan		41·4	0	e 7 19	− 7	e 16 24	SS	i 16 33 ?	e 17·9
Tacubaya		53·2	320	i 8 59	+ 2	e 18 26	?	— —	—
Bermuda		55·4	2	—	—	e 17 44	+66	e 19 34 sS	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Philadelphia		63·5	353	—	—	e 18 20	− 2	e 19 22	sS	e 26·9
Fordham		64·2	355	i 10 11	− 2	i 18 28	− 3	i 11 0	pP	—
St. Louis		65·5	339	i 10 19	− 2	i 18 44	− 3	i 11 10	pP	—
Weston		65·5	357	i 10 20	− 1	—	—	i 11 14	pP	—
Harvard		65·6	357	i 10 20	− 2	—	—	i 11 13	pP	—
Cleveland		66·0	348	e 10 20	− 4	i 18 49	− 4	i 11 11	pP	—
Ottawa		68·9	353	e 10 40	− 2	e 19 28	+ 1	e 11 30	pP	—
Tucson		69·7	320	i 10 46	− 1	e 19 41	+ 5	e 11 18	P_cP	—
Seven Falls	E.	70·2	357	e 10 52	+ 2	—	—	—	—	—
Palomar		74·1	318	i 11 14	+ 1	—	—	—	—	—
Pierce Ferry		74·3	322	i 11 13	− 1	—	—	—	—	—
Riverside		74·8	318	i 11 18	+ 1	—	—	—	—	—
Pasadena		75·4	318	i 11 19	− 2	i 20 41	0	i 11 33	P_cP	—
Logan		77·2	327	e 11 22	− 9	e 21 1	+ 1	e 14 29	PP	—
Tinemaha		77·4	320	i 11 34	+ 2	—	—	—	—	—
Fresno		78·1	319	i 11 36	0	—	—	e 11 39	P	—
Lick	z.	79·6	318	i 11 44k	0	—	—	i 12 40a	pP	—
Reno		79·9	321	e 11 46	+ 1	—	—	i 12 7	?	—
Branner	z.	80·0	318	i 11 46a	0	—	—	—	—	—
Berkeley	z.	80·3	318	i 11 47k	0	—	—	—	—	—
Mineral	z.	81·5	321	i 11 54k	0	—	—	i 12 4a	pP	—
Shasta Dam		82·2	320	i 11 54	− 3	—	—	—	—	—
Hungry Horse		83·1	331	i 12 1	− 1	—	—	—	—	—
Tamanrasset	z.	83·6	61	i 12 8a	+ 4	—	—	e 13 1	pP	—
Victoria	z.	87·8	326	e 12 24	− 1	—	—	—	—	—
Rome		97·4	46	—	—	i 23 33	[+ 9]	—	—	—
Stuttgart	z.	98·3	41	e 13 15	+ 2	—	—	—	—	—
Triest		99·8	44	—	—	i 24 42	+12	i 26 20	PS	—
College		107·3	334	i 13 52	P	—	—	—	—	—
Ksara		112·4	61	—	—	i 28 20	PS	e 35 44	PSS	—
Sverdlovsk		129·3	34	18 44	[+ 2]	—	—	—	—	—
Tashkent		139·0	53	i 19 1	[+ 1]	i 22 17	PKS	—	—	—
Stalinabad		139·1	57	e 18 59	[− 1]	e 22 38	PKS	—	—	—

Additional readings :—
La Paz i = 2m.33s., iS_eE = 3m.28s., iE = 3m.53s., iN = 4m.14s., iE = 5m.6s.
Santa Lucia eN = 3m.28s., eE = 3m.45s., iN = 4m.35s., iE = 4m.45s. and 4m.57s., iN = 5m.1s. and 5m.43s.
La Plata N = 4m.50s., SEN = 5m.42s., N = 5m.59s., E = 6m.20s. and 6m.44s.
Bogota isSEN = 10m.27s., iSSEN = 11m.47s.
Philadelphia e = 20m.41s., eSS = 22m.18s.
St. Louis i = 10m.51s., e = 19m.49s.
Cleveland ipP?N = 10m.27s., iZ = 11m.16s., isS?E = 19m.55s.
Logan i = 11m.55s.
Lick iZ = 11m.48s.
Rome e = 26m.4s. and 29m.13s.

Jan. 9d. 16h. 35m. 18s. Epicentre 24°·8N., 124°·5E. (as given by Strasbourg).

A = −·5148, B = +·7490, C = +·4172 ; δ = +8 ; h = +3 ;
D = +·824, E = +·566 ; G = −·236, H = +·344, K = −·909.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei		6·9	338	e 2 2	P*	3 46	S_e	—	—	4·2
Vladivostok		19·3	16	e 4 27	− 2	i 8 14	+12	i 4 57	PPP	—
Irkutsk		31·4	336	e 6 18?	− 7	e 11 30	− 2	—	—	—
Calcutta	E.	33·1	274	—	—	e 13 40	SS	—	—	e 18·1
Andijan		46·0	303	e 8 29	+ 2	—	—	—	—	—
Poona	N.	47·3	273	i 12 8	?	—	—	—	—	—
Bombay	E.	48·1	274	e 8 51	+ 8	—	—	—	—	—
Tashkent		48·3	304	e 8 37	− 8	—	—	e 11 7	PPP	—
Stalinabad		48·7	301	e 8 50	+ 2	—	—	—	—	—
Samarkand		50·1	302	e 9 2	+ 3	—	—	—	—	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sverdlovsk	55·4	323	e 9 39	+ 1	17 16	− 6	e 17 28	PS	—
College	66·9	27	e 10 57	+ 1	—	—	i 11 37	P_cP	—
Leninakan	67·4	306	e 10 52	− 7	—	—	—	—	—
Yalta	73·3	311	—	—	e 20 59	− 5	—	—	—
Ksara	75·6	300	e 11 48	0	e 20 56	−33	—	—	—
Triest	85·9	319	—	—	e 23 15	− 1	e 22 51	SKS	—
Stuttgart	86·8	323	e 12 47?	0	—	—	—	—	e 45·7
Strasbourg	87·7	324	e 12 59	+ 7	e 28 42	SS	e 14 31	?	44·7
Kew	89·9	329	—	—	e 29 30	SS	e 46 42?	Q	e 48·7
Shasta Dam	90·0	44	e 12 49	−14	—	—	—	—	—
Hungry Horse	90·3	34	i 13 6	+ 2	—	—	e 17 42	?	—
Rathfarnham Castle	91·3	333	i 17 13	PP	—	—	e 22 17	?	—

Long waves were also recorded at Weston and at other European stations.

Jan. 9d. 17h. 55m. 13s. Epicentre 24°·8N. 124°·5E. (as at 16h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	N.	6·9	338	e 2 9	P*	i 3 59	S_g	—	—	—
Vladivostok		19·3	16	e 4 29	0	e 8 17?	+15	—	—	—
Irkutsk		31·4	336	e 6 21?	− 4	e 11 29	− 3	—	—	—
Stalinabad		48·7	301	e 8 46	− 2	—	—	—	—	—
Sverdlovsk		55·4	323	9 37	− 1	—	—	—	—	—
Stuttgart		86·8	323	e 12 47	0	—	—	—	—	e 48·8
Hungry Horse		90·3	34	i 13 10	+ 6	—	—	e 16 52	PP	—

Long waves were also recorded at Copengahen, Rome, Paris, and Clermont-Ferrand.

Jan. 9d. Readings also at 0h. (near Tacubaya (2)), 1h. (Santa Lucia), 2h. (La Paz), 3h. (Hungry Horse), 5h. (College, Pierce Ferry, Samarkand, Andijan, Tchimkent, near Obi-garm and Stalinabad), 7h. (Santa Lucia), 8h. (College and near Mizusawa), 9h. (Boulder City, Pierce Ferry, Shasta Dam, near Stalinabad, and near Ashkabad), 10h. (Hungry Horse, Irkutsk, Tchimkent), 11h. (Hungry Horse), 12h. (Boulder City, Pierce Ferry (3), Tucson, Hungry Horse, Logan, near Shasta Dam, Berkeley, Lick, Branner, San Francisco, Fresno, Mineral, and Reno), 13h. (Batavia), 16h. (Hungry Horse and Pierce Ferry), 17h. (Alicante, Almeria, Granada, and Malaga), 18h. (near Leninakan (2)), 21h. (Batavia), 22h. (Hungry Horse).

Jan. 10d. Readings at 2h. (La Paz), 3h. (near Leninakan), 4h. (Hungry Horse), 5h. (Victoria, Boulder City, Hungry Horse, Shasta Dam, Vladivostok, and near Mizusawa), 6h. (Hungry Horse, Wellington, Auckland, and near Almata), 8h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Helwan, Ksara, Stalinabad, Samarkand, Tchimkent, near Andijan and near Mizusawa), 9h. (Hungry Horse), 10h. (Boulder City), 12h. (near Obi-garm), 14h. (Pasadena, Stuttgart, and Collmberg), 16h. (Santa Lucia and near Stalinabad), 17h. (near Murgab), 18h. (Kew, Batavia, Ottawa, Hungry Horse, and La Paz), 20h. (Ottawa and Pierce Ferry), 22h. (Paris, Stuttgart, Collmberg, Boulder City, Pierce Ferry, and near Ashkabad).

Jan. 11d. Readings at 1h. (Boulder City, Pierce Ferry, and Shasta Dam), 8h. (Batavia), 9h. (near Stalinabad and Kulyab), 10h. (near La Paz), 11h. (Hungry Horse and Pierce Ferry), 12h. (Tacubaya, Pierce Ferry, near Stalinabad, Kulyab, near Stuttgart, Jena, and Collmberg), 13h. (Basle, Pierce Ferry, Hungry Horse, and Shasta Dam), 17h. (Hungry Horse, Stuttgart, near Rome, Prato, and Bologna), 18h. (Copiapo and near Tacubaya), 20h. (College, Hungry Horse, Stuttgart, Grozny, Stalinabad, Tchimkent, Tashkent, Obi-garm, Andijan, Frunse, and near Ashkabad), 23h. (Tucson).

Jan. 12d. Readings at 0h. (near College), 1h. (Bermuda, Hungry Horse, Victoria, near College, Ksara, Bucharest (2), Belgrade (2), Sofia (2), and near Istanbul (2)), 2h. (Pierce Ferry), 3h. (near Batavia), 4h. (Victoria), 7h. (near Rome), 8h. (Bologna), 10h. (Hungry Horse, Shasta Dam, and near Stalinabad), 11h. (Copiapo), 12h. (near Tacubaya), 13h. (near Ottawa), 15h. and 17h. (Hungry Horse), 18h. (Hungry Horse, Shasta Dam, near Tucson and near Ashkabad), 19h. (Hungry Horse and Santa Lucia), 20h. (Klyuchi and near Andijan), 21h. (Ottawa), 22h. (near Tacubaya), 23h. (near Zürich).

Jan. 13d. 8h. 47m. 35s. Epicentre 26°·0S. 178°·0E. Depth of focus 0·100.

Not intended as an approximate determination.

A = −·8994, B = +·0314, C = −·4360; δ = 0; λ = +3;
D = +·035, E = +·999; G = +·436, H = −·015, K = −·900.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	11·2	194	2 33	+ 2	4 35	+ 3	7 35	PcP	—
Arapuni	E.	12·2	189	—	—	5 13	+24	—	—	—
Tuai	N.	12·8	183	2 45	− 1	4 55	− 5	13 33	ScS	—
New Plymouth	E.	13·5	193	2 57	+ 4	5 20	+ 8	4 10	pP	—
Apia		15·5	40	e 3 4	− 8	e 5 41	− 4	e 13 46	ScS	—
Wellington		15·5	189	3 11	− 1	5 45	0	4 35	pP	—
Kaimata	NE.	17·4	197	3 28	− 1	6 19	+ 2	e 13 50	ScS	—
Christchurch		18·0	192	3 34	− 1	6 2	−25	—	—	—
Brisbane		22·3	261	i 4 16	+ 2	i 7 41	+ 5	e 7 4	sP	—
Riverview		24·5	245	i 4 36k	+ 3	i 8 16	+ 5	i 7 30	sP	—
Melbourne	E.	30·3	239	e 5 36	+14	i 9 55	+15	—	—	—
Batavia		70·4	273	e 10 11	0	e 18 37	+ 4	—	—	—
Vladivostok		80·8	328	i 11 8	0	i 20 23	0	i 13 19	pP	—
Branner		84·5	44	e 11 26	0	—	—	—	—	—
Berkeley		84·7	44	e 11 26k	− 1	i 21 6	+ 5	i 11 30	PcP	—
Lick		84·8	44	e 11 28	0	—	—	—	—	—
Pasadena		85·1	49	i 11 29	0	i 21 9	+ 5	i 13 46	pP	—
Arcata	Z.	85·5	41	e 11 31k	0	—	—	i 11 33	PcP	—
Riverside	Z.	85·5	49	i 11 30k	− 1	—	—	i 13 52	pP	—
Fresno		85·6	46	i 11 30	− 2	i 21 13	+ 4	—	—	—
Shasta Dam		86·4	42	i 11 33	− 2	i 24 22	sS	e 13 50	pP	—
Tinemaha		86·7	47	e 11 38	+ 1	i 21 27	+ 8	—	—	—
Reno		87·2	44	i 11 39k	0	i 21 31	+ 7	e 13 56	pP	—
Boulder City		88·4	49	e 11 44	− 1	—	—	i 13 54	pP	—
Pierce Ferry		89·0	49	e 11 43	− 4	—	—	i 11 46	P	—
Tucson		89·2	53	i 11 48	0	i 21 51	+ 9	i 14 5	pP	e 33·1
Victoria		90·8	35	e 11 54	− 2	e 22 3	+ 7	e 26 7	?	—
Tacubaya		92·2	70	e 12 9	+ 7	e 22 13	+ 5	e 25 47	sS	—
Logan		93·5	45	e 12 5	− 3	e 22 26	+ 7	e 14 25	pP	—
College		94·4	14	i 12 9	− 3	e 22 46	+20	i 14 22	pP	—
Butte	N.	95·3	41	—	—	i 22 41	+ 7	i 26 52	sS	—
Hungry Horse		95·7	38	i 12 16	− 2	—	—	i 14 38	pP	—
Bozeman		96·0	42	—	—	e 22 39	− 1	e 26 54	sS	e 34·8
Huancayo		99·3	109	e 14 55	pP	i 22 9	[0]	i 22 46	S	—
La Plata		99·6	137	—	—	e 22 9	[− 2]	22 48	S	—
Irkutsk		100·9	323	e 12 56	+15	i 22 19	[+ 2]	17 12	PP	—
Saskatoon		101·7	38	—	—	e 23 37	+10	e 21 55	SKS	37·4
La Paz		103·1	116	i 12 54	+ 3	i 22 28	[+ 1]	i 15 13	pP	—
St. Louis		107·0	55	e 17 38	PP	e 22 49	[+ 5]	e 27 15	sSKS	—
Bogota		108·1	94	e 17 51	PP	e 22 48	[− 1]	e 26 42	SP	—
Chicago		109·9	52	—	—	e 24 39	?	e 26 40	SP	—
Poona	E.	110·3	281	e 18 0	PP	i 22 59	[+ 1]	18 36	pPP	—
Bombay		111·3	281	e 18 10	PP	i 23 8	[+ 6]	—	—	—
Almata		115·1	308	—	—	i 23 20	[+ 4]	—	—	—
Frunse		116·7	307	17 34	[+ 4]	23 28	[+ 6]	—	—	—
Andijan		117·9	304	e 17 35	[+ 2]	i 23 32	[+ 6]	e 19 6	PP	—
Philadelphia		118·6	57	—	—	e 24 48	?	e 28 57	sS	—
Ottawa		119·2	51	i 17 35	[0]	e 26 1	sSKS	e 20 10	PP	37·4
Obi-garm		119·5	302	e 17 36	[0]	—	—	e 19 6?	PP	—
Stalinabad		120·2	302	i 17 39	[+ 2]	i 23 37	[+ 3]	e 20 2	pPKP	—
Tchimkent		120·2	306	e 17 39	[+ 2]	23 37	[+ 3]	—	—	—
Tashkent		120·3	305	i 17 39	[+ 1]	i 23 39	[+ 4]	21 25	pPP	—
San Juan		120·6	83	—	—	e 23 35	[− 1]	e 26 20	sSKS	e 38·0
Samarkand		121·8	302	e 19 15	PP	—	—	—	—	—
Weston		121·9	55	i 17 40	[− 1]	35 15	SS	30 37	PPPS	—
Bermuda		125·6	68	—	—	e 26 38	sSKS	e 37 15	SS	e 52·1
Sverdlovsk		126·3	323	i 17 50	[+ 1]	e 35 58	SS	e 19 31	PP	—
Grozny		137·7	307	e 18 2	[− 9]	—	—	20 51	PP	—
Moscow		138·7	327	e 18 15	[+ 2]	—	—	e 20 49	pPKP	—
Leninakan		139·4	303	e 17 58?	[−16]	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Theodosia		144·5	312	i 18 25	[+ 1]	—	—	21 3 pPKP	—
Ksara		146·4	292	e 18 28	[+ 2]	21 58	sPKP	i 20 56 pPKP	—
Copenhagen		148·5	345	e 18 31	[+ 2]	e 22 4	sPKP	21 1 pPKP	—
Istanbul		150·2	308	i 18 33	[+ 2]	24 33	[− 3]	— —	—
Helwan	z.	150·3	285	i 18 33k	[+ 1]	e 22 7	sPKP	21 5 pPKP	—
Potsdam	z.	151·5	342	i 18 35a	[+ 1]	i 22 24	sPKP	i 21 7 pPKP	—
Collmberg		152·3	340	i 18 44a	[+ 9]	—	—	e 21 9 pPKP	—
Jena		153·0	340	e 18 37	[+ 1]	—	—	e 21 15 pPKP	—
De Bilt		153·4	351	e 18 49	[+13]	e 42 25?	SS	e 21 19 pPKP	—
Kew	z.	154·5	357	i 18 36	[− 2]	—	—	i 19 5 PKP_2	—
Stuttgart		155·7	341	18 40	[+ 1]	e 36 25	PPS	e 20 51 pPKP	—
Strasbourg		156·2	343	e 18 41	[+ 1]	e 36 25	PPS	e 21 14 pPKP	—
Paris		156·9	353	e 18 43	[+ 2]	e 43 25?	SS	i 21 29 pPKP	—
Zürich		157·1	343	e 18 40	[− 1]	—	—	e 22 48 PP	—
Basle		157·2	344	e 19 18	PKP_2	—	—	— —	—
Salo		158·0	335	e 18 47	[+ 5]	—	—	19 21 PKP_2	—
Bologna	z.	158·6	333	e 19 17	PKP_2	—	—	— —	—
Clermont-Ferrand		159·9	350	e 18 46	[+ 1]	—	—	i 19 29 PKP_2	—
Almeria		169·2	2	18 53	[+ 1]	—	—	e 20 11 PKP_2	—
Tamanrasset	z.	172·4	247	i 18 57k	[+ 3]	—	—	e 22 47 $pPKP_2$	—

Additional readings :—
Auckland iN=4m.24s., S_cPN=9m.44s., P_cSN=10m.45s., S_cSN=13m.33s., sS_cSN=17m.35s.
Tuai iN =4m.51s., eN =9m.58s., sS_cS?N =13m.36s.
New Plymouth iE =5m.23s. and 6m.37s.
Apia e =3m.10s., eSN =5m.36s., eE =7m.0s.
Wellington i=3m.27s., iZ=3m.35s. and 5m.36s., i=5m.50s., S_cS=12m.40s., sS_cS?=18m.15s.
Kaimata eNE =4m.30s. and 10m.15s.
Brisbane iE =5m.17s., iEZ =8m.37s., iZ =10m.21s., iN =10m.46s. and 14m.7s.
Riverview iS_cSN =14m.16s.
Vladivostok eSKS =21m.13s., ePS =21m.49s., esS =24m.22s., iSSS =40m.13s.
Berkeley eZ =13m.49s., iSN =20m.51s., isSZ =21m.10s., iSKSZ =22m.5s., iSKSN = 22m.9s., iSKKSZ =23m.33s., iEN =25m.6s.
Pasadena iEN =25m.9s.
Shasta Dam i =13m.54s.
Reno iP_cPEN =11m.40s., eZ =21m.39s.
Tucson e =22m.10s., eSP =22m.39s., esS =25m.55s.
Tacubaya i =14m.34s., e =27m.30s.
Logan e =24m.42s.
College iSS =39m.20s.
Hungry Horse i =29m.4s., iS? =31m.45s., ePKKP =39m.23s.
Huancayo e =16m.48s. and 26m.43s., i =28m.8s., eSS =29m.57s.
Irkutsk SKKS =22m.57s., iS =23m.27s.?
La Paz iPPZ =17m.17s., iSKS =23m.18s., iE =25m.53s., iN =27m.0s., iSSN =31m.15s.
St. Louis eSKKS=23m.39s., iSN=24m.21s., eSP=26m.12s., isSN=28m.38s., e=30m.27s., 31m.39s., and 33m.25s., iSS =36m.24s., eSSS? =38m.18s., eSKP,PKP =40m.43s.
Bogota ePPSEN =27m.25s.
Chicago esS =28m.56s., eSS =32m.37s.
Poona sPE =18m.55s., P_cP?E =20m.27s., sSE =24m.3s., S_cS?E =27m.56s.
Philadelphia e =32m.55s. and 42m.15s.
Stalinabad iPP =19m.13s., S =26m.57s.
Tashkent SKSP =28m.10s., sSP =32m.13s.
San Juan eSP =28m.6s., e =30m.39s.
Bermuda e =33m.7s.
Moscow ePP =21m.9s.
Ksara PP =21m.35s.
Copenhagen i =18m.35s. and 18m.41s.
Helwan iZ =18m.40s. and 18m.52s., PPZ =22m.20s., iZ =22m.36s., SE =28m.13s., eZ =28m.40s. and 32m.33s.
Potsdam iZ =18m.42s. and 18m.53s.
Collmberg eZ =18m.57s. and 21m.18s., eEZ =31m.32s., eZ =31m.44s., eE =31m.48s.
Jena e =18m.46s., eZ =18m.57s., eE =19m.0s.
De Bilt eE =35m.25s.
Stuttgart ePKPZ =18m.52s., $ePKP_2Z$ =19m.11s.k, eZ =21m.27s., ePPZ =22m.48s., ePPPZ =25m.59s., eZ =27m.49s., e =28m.31s., eZ =31m.10s. and 31m.57s., ePSKS =33m.13s.
Strasbourg iPKP =18m.53s. and 19m.13s., $ePKP_2$ =19m.36s., $epPKP_2$? =21m.29s., $epPKP_2$ =21m.32s., ePP =22m.49s., esPP? =26m.9s., eSS =40m.57s.
Paris i =19m.1s., $iPKP_2$? =19m.16s., i =19m.55s., $ipPKP_2$ =21m.43s., ePP =22m.55s., e =29m.30s. and 37m.25s.
Clermont-Ferrand iPP =23m.11s.
Almeria PP =24m.57s.
Tamanrasset $ePKP_2Z$ =20m.28s., ePPZ =24m.26s., ePPP?Z =28m.16s., eZ =30m.15s., 30m.29s., and 34m.9s.
Long waves were also recorded at Seattle.

Jan. 13d. 9h. Perhaps a repetition of earthquake at 8h. Very deep focus.
Tuai PN =3m.10s., S?N =5m.25s., iN =5m.29s.
New Plymouth P?E =3m.25s.
Apia eP?Z =3m.30s., eS =5m.59s.
Wellington P =3m.38s., S =6m.16s.
Kaimata PNE =4m.0s.?, SNE =6m.43s.
Pasadena iPZ =11m.51s.
Riverside iPZ =11m.53s.
Tucson eP =12m.10s., e =12m.18s.

Jan. 13d. Readings also at 5h. (near Leninakan), 7h. (Tacubaya and near Bogota), 8h. (near Santa Lucia), 10h. (Ottawa, near Stalinabad, near Frunse, and Andijan), 17h. (Pierce Ferry and near Ottawa), 19h. (Hungry Horse), 21h. (Tucson, near Berkeley, Lick, Branner, and San Francisco), 22h. (Santa Lucia, Hungry Horse, Samarkand, Tchimkent, near Stalinabad, Kulyab, Obi-garm, Andijan, near Berkeley, Lick, Branner, and San Francisco), 23h. (near Leninakan).

Jan. 14d. 1h. Solomon Islands region.
Brisbane iPZ =8m.27s., iZ =9m.36s. and 10m.33s., iN =11m.55s., iE =12m.41s.
Vladivostok iP =12m.48s., iS =19m.48s.
College iP =15m.47s., i =16m.0s.
Andijan eP =16m.17s., eS =26m.29s.
Berkeley iPZ =16m.19s.a.
Shasta Dam iP =16m.19s.
Lick ePZ =16m.21s.
Victoria eZ =16m.21s.
Reno iPZ =16m.29s.k.
Pasadena iPZ =16m.32s.k, iP$_c$P?Z =16m.48s., epP?Z =18m.0s., iZ =18m.15s.
Riverside iPEZ =16m.35s.k, epP?Z =18m.5s., iZ =18m.12s.
Tinemaha ePEN =16m.35s.
Boulder City iP =16m.45s., i =20m.34s.
Pierce Ferry iP =16m.48s., i =18m.18s., e =20m.38s.
Hungry Horse iP =16m.50s.
Ottawa eZ =22m.16s.
Stuttgart eZ =22m.30s.k, 24m.13s., and 24m.40s.
Strasbourg ePKP =22m.31s.
Paris ePKP =22m.36s., iPP =24m.54s., i =25m.26s.
La Paz ePN =22m.40s.
Tamanrasset iPKPZ =23m.2s.k, iPKPZ =23m.5s.a, eZ =24m.33s.

Jan. 14d. 2h. 17m. 45s. Epicentre 33°·2N. 121°·0E. (as given by Strasbourg).
Felt at Nanking and in the lower valley of the Yangtse. Seismographic report of Shui-tsingtai seismic station, Nanking, Jan.-Dec., 1949, p.2.

A = −·4319, B = +·7187, C = +·5450; δ = +9; h = +1;
D = +·857, E = +·515; G = −·281, H = +·467, K = −·838.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei		2·0	170	0 43	+ 8	1 7	+ 5	—	—	—
Nanking		2·2	242	0 40	+ 2	1 10	+ 4	0 43	P*	—
Vladivostok		13·1	38	i 3 10	0	i 5 46	+ 8	—	—	—
Irkutsk		22·6	333	5 0	− 3	9 8	+ 1	—	—	—
Calcutta	E.	30·7	259	(e 7 4)	PP	(e 11 14)	− 7	—	—	—
Frunse		37·4	299	e 7 43	+27	—	—	—	—	—
Tashkent		41·4	298	e 7 47	− 3	—	—	—	—	—
Obi-garm		41·5	293	e 8 4?	+14	—	—	—	—	—
Stalinabad		42·2	293	e 8 4	+ 8	—	—	—	—	—
Bombay	E.	45·2	294	e 15 5	S	(e 15 5)	+ 4	—	—	—
Sverdlovsk		46·9	320	—	—	e 15 29	+ 4	—	—	—
College		61·0	29	i 10 13	− 5	—	—	—	—	—
Upsala	N.	68·1	328	—	—	e 20 23	PS	—	—	e 36·2
Stuttgart		78·3	322	e 12 2	− 1	—	—	—	—	e 42·2
Victoria		80·4	38	e 12 13	− 2	—	—	—	—	45·2
Paris		81·7	325	e 12 21	− 1	—	—	i 12 26	P$_c$P	e 45·2
Hungry Horse		85·1	33	i 12 38	− 1	—	—	—	—	—
Shasta Dam		86·1	43	e 12 10	−34	—	—	i 12 42	P	—
Boulder City		93·6	42	e 13 19	0	—	—	i 13 24	?	—
Shawinigan Falls	N.	99·6	8	—	—	e 35 48	SSS	—	—	—

Nanking gives also P$_g$ =0m.48s., S* =1m.13s., S$_g$ =1m.17s.
Calcutta readings reduced by 7 minutes.
Long waves were also recorded at Kew, Strasbourg, De Bilt, Potsdam, and Seven Falls,

Jan. 14d. 15h. 53m. 55s. Epicentre 38°·8N. 25°·3E.

$A = +·7064$, $B = +·3339$, $C = +·6240$; $\delta = -13$; $h = -1$;
$D = +·427$, $E = -·904$; $G = +·564$, $H = +·267$, $K = -·781$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		3·7	51	1 1	+ 1	2 4	S_g	—	—	—
Sofia		4·2	339	i 1 5	− 2	1 55	− 2	2 15	S_g	e 2·3
Bucharest		5·6	6	1 29	+ 2	i 2 34	+ 1	i 1 56	P_g	—
Taranto		6·4	288	1 36	− 2	2 43	−10	—	—	—
Campulung		6·5	358	e 1 47	+ 8	—	—	—	—	—
Belgrade		7·0	331	e 2 10a	P*	i 3 35	S*	i 2 27	P_g	—
Messina		7·7	268	e 1 54k	− 2	3 10	−15	i 3 38	S*	—
Kalossa	N.	9·0	331	—	—	e 3 21	−37	e 4 59	S_g	5·2
Budapest		9·8	334	e 3 2	+38	5 5	+48	e 3 56	?	5·5
Theodosia		9·8	47	e 2 41	+17	4 5	−12	—	—	—
Zagreb		9·8	318	i 2 24	0	e 4 46	SSS	i 2 31	PP	—
Ksara		9·9	117	—	—	e 4 15	− 5	i 5 48	?	—
Helwan		10·3	149	e 2 26	− 6	4 29	− 1	2 43	PPP	—
Rome		10·3	292	e 3 29	+57	i 4 52	+22	—	—	5·6
Ogyalla		10·5	332	e 2 56	PPP	e 5 29	+54	—	—	—
Skalnate Pleso		11·0	342	e 2 43	− 1	e 5 33	+46	—	—	e 6·3
Triest		11·0	312	e 2 46	+ 2	e 4 57	+10	i 3 48	P_gP_g	e 6·7
Padova		11·5	304	—	—	e 6 0	SSS	—	—	e 6·9
Florence	E.	11·7	300	e 3 13	PPP	—	—	—	—	e 7·1
Prato		11·8	300	e 2 58	+ 5	i 4 42	−24	—	—	—
Bologna		11·9	303	e 2 51	− 3	e 5 6	− 3	e 5 27	SS	—
Raciborzu		12·4	338	e 2 58	− 3	—	—	i 3 26?	PPP	e 6·8
Salo		12·9	307	e 2 59	− 8	e 5 54	SSS	e 5 4	?	—
Pavia	Z.	13·6	303	e 3 5?	−12	—	—	—	—	—
Piatigorsk		14·3	63	e 3 29	+ 3	—	—	—	—	—
Leninakan		14·4	76	e 3 38	+11	—	—	—	—	—
Ravensburg		14·5	313	e 3 25?	− 3	—	—	—	—	e 7·3
Erevan		14·9	79	e 3 46	+12	—	—	—	—	—
Zürich		14·9	301	e 3 32a	− 2	e 6 50	SSS	—	—	—
Stuttgart		15·3	316	e 3 33	− 6	e 6 40	+10	e 3 43	PP	e 7·9
Jena	N.	15·5	326	e 3 44	+ 2	—	—	—	—	e 8·3
Basle		15·6	310	e 3 41	− 2	e 7 3	SS	—	—	e 8·6
Neuchatel		15·7	307	e 3 42	− 2	e 8 56	P_cP	—	—	—
Potsdam		16·0	332	e 3 46	− 2	—	—	e 4 5?	PP	e 8·1
Strasbourg		16·0	314	e 3 49	+ 1	e 6 53	+ 7	e 3 57	PP	8·3
Algiers		17·7	270	e 2 39	?	—	—	—	—	—
Clermont-Ferrand		17·8	300	i 4 7	− 4	—	—	i 4 22	PP	9·1
Moscow		18·9	21	e 4 21	− 3	—	—	—	—	—
Uccle		19·0	316	e 4 24	− 2	e 7 59?	+ 4	4 29	P	e 9·7
Tortosa		19·1	284	—	—	9 31	L	—	—	(9·5)
Paris		19·2	309	i 4 24	− 4	e 7 49	−10	i 4 42	PP	e 10·1
De Bilt		19·3	321	i 4 31k	+ 2	e 8 7	+ 5	—	—	e 9·4
Alicante		20·2	279	4 49	+10	i 8 15	− 6	5 20	PPP	e 9·8
Upsala		21·6	349	—	—	e 8 59?	+10	—	—	e 11·1
Kew		21·9	315	i 4 56	− 1	i 8 57	+ 3	i 9 31	SS	e 11·1
Almeria		22·0	275	e 4 59	+ 1	i 9 3	+ 7	5 43	PPP	14·0
Jersey	E.	22·2	309	6 5	?	—	—	—	—	14·7
Toledo		22·7	282	i 5 3	− 1	9 8	− 1	i 5 34	PP	e 10·3
Granada		22·8	276	i 5 5k	0	i 9 35	+24	i 5 47	PPP	12·4
Tamanrasset	Z.	23·2	236	e 5 7	− 2	e 9 22	+ 4	e 5 39	PP	—
Rathfarnham Castle		26·0	315	i 5 14	−22	i 10 15	+ 9	i 7 17	?	—
Lisbon		26·8	282	5 43a	− 1	10 12	− 7	—	—	13·5
Bombay		45·5	102	—	—	e 15 11	+ 6	—	—	—
Poona		46·5	102	—	—	e 15 23	+ 4	—	—	—
Calcutta		55·6	87	—	—	e 17 53	+28	—	—	—
College		76·5	358	i 11 51	− 3	—	—	—	—	—
St. Louis		82·9	315	e 12 28	0	e 23 43	PS	e 26 54	?	—
Hungry Horse		86·0	334	i 12 40	− 3	—	—	—	—	—
Tucson		98·6	324	e 13 23	−19	—	—	—	—	e 54·4

For Notes see next page.

NOTES TO JANUARY 14d. 15h. 53m. 55s.

Additional readings :—
Sofia e =1m.31s.
Bucharest eP*N =1m.43s., iS*N =2m.54s., iS*E =2m.58s., iS$_e$EN =3m.18s.
Taranto e =2m.0s. and 3m.48s.
Belgrade i =3m.9s. and 4m.0s.
Messina i =4m.1s.
Kalossa eE =3m.41s. and 4m.50s.
Helwan iZ =5m.5s., eEN =5m.47s., eN =6m.11s. and 7m.37s.
Bologna e =4m.49s.
Raciborzu eN =6m.15s., iN =6m.26s.?
Stuttgart e =3m.40s. and eZ =4m.17s.
Strasbourg i =3m.55s., e =4m.23s., 4m.53s., 5m.15s., and 5m.37s., eSS =7m.10s.
Algiers e =3m.5s., 4m.30s., and 4m.36s.
Clermont-Ferrand i =4m.13s., 4m.29s., 4m.54s., and 5m.12s.
Paris iPPP =4m.57s.
Alicante PP =4m.13s., SS =8m.41s., SSS =8m.53s., P$_c$P =9m.1s., P$_c$S =12m.39s., S$_c$S = 16m.9s.
Kew iNZ =9m.1s., iEN =9m.9s.
Almeria P$_c$P =8m.46s., SSS =9m.55s., P$_c$S =12m.23s.
Toledo iSSSN =10m.5s.
Granada SS =11m.11s.
Tamanrasset ePPPZ =5m.51s.
Lisbon Z =7m.15s., 7m.20s., and 10m.43s.
Long waves were also recorded at Aberdeen, Barcelona, Bergen, and Collmberg.

Jan. 14d. Readings also at 0h. (Hungry Horse, near College and La Plata), 1h. (La Paz, and near Leninakan), 3h. (Cleveland, Weston, Ottawa, Hungry Horse, La Paz, Bogota, and near Nanking), 4h. (near Stalinabad), 5h. (near Leninakan), 6h. (College, Hungry Horse, and Pierce Ferry), 12h. (Berkeley, Boulder City, College, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Riverside, Ottawa, Victoria, Stuttgart, and Strasbourg), 17h. (near Alicante), 19h. (Hungry Horse (2), Tamanrasset, near Catania, and Messina), 20h. (Hungry Horse), 21h. (Victoria, Boulder City, College, Logan, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wilson, Riverside, Tinemaha, Lick, Reno, Paris, Strasbourg, and Stuttgart), 23h. (Tacubaya, Fort de France, Huancayo, San Juan, Boulder City, Hungry Horse, Pierce Ferry, Tucson, Pasadena, Riverside, Ottawa, Lick (2), and near Branner).

Jan. 15d. 1h. Undetermined shock.

Apia eP =54m.23s., eS =56m.12s.
Pasadena iPZ =63m.19s.
Riverside ePZ =63m.21s.
Shasta Dam iP =63m.24s.
Tinemaha ePE =63m.28s.
Boulder City iP =63m.36s.
Pierce Ferry iP =63m.39s., e =65m.37s.
Tucson iP =63m.40s., e =65m.40s.
Hungry Horse iP =64m.8s.
Stuttgart eZ =70m.52s., iZ =70m.59s., eZ =73m.8s.
Strasbourg e =71m.0s., ePKP$_2$ =71m.14s.
Tamanrasset ePKPZ =71m.14s., ePKP$_2$Z =72m.56s., ePPZ =76m.50s.

Jan. 15d. 7h. 20m. 26s. Epicentre 43°·7N. 16°·6E. (as given by Strasbourg).

$A = +\cdot6951$, $B = +\cdot2072$, $C = +\cdot6884$; $\delta = -1$; $h = -3$;
$D = +\cdot286$, $E = -\cdot958$; $G = +\cdot660$, $H = +\cdot197$, $K = -\cdot725$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zagreb	2·2	349	0 40?	+ 2	e 1 1	− 5	—	—	—
Triest	2·8	314	e 0 52	P*	i 1 26	+ 4	e 1 0	P$_g$	—
Belgrade	3·0	67	—	—	e 1 41	S$_g$	—	—	e 1·9
Padova	3·5	284	—	—	e 1 53	S$_g$	—	—	e 3·0
Rome	3·5	241	—	—	e 1 32	− 8	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bologna		3·9	283	—	—	e 2 24	S_g	—	—	e 2·8
Florence	E.	3·9	273	—	—	e 1 43	− 7	e 2 5	S*	—
Prato		4·0	274	—	—	e 1 52	0	i 2 18	S_g	—
Salo		4·7	295	e 1 13	− 1	e 2 26	S*	i 2 45	S_g	—
Zürich		6·7	306	e 1 46	+ 4	e 3 8	+ 8	e 3 33	S_g	—
Stuttgart		7·2	317	e 1 46	− 3	e 3 7	− 6	e 2 16	P_g	e 3·9
Basle		7·4	304	e 1 49	− 3	e 3 58	S_g	—	—	—
Strasbourg		7·8	312	e 2 28	P_g	e 3 38	+10	e 4 4	S*	—
Jena		8·0	336	e 2 59	P_g	e 3 36	+ 3	e 4 0	S*	e 4·2
Hungry Horse		78·6	329	12 4	− 1	—	—	—	—	—

Additional readings :—
Triest e = 1m.14s.
Stuttgart eZ = 1m.49s., e = 3m.20s., eS_g = 3m.50s.
Strasbourg e = 3m.0s., 3m.17s., and 3m.45s.
Jena eE = 3m.13s., eN = 3m.40s. and 4m.10s.
Long waves were also recorded at Collmberg.

Jan. 15d. Readings also at 0h. (near Stalinabad (2)), 1h. (La Paz and near Leninakan), 4h. (near Auckland, New Plymouth, Havelock North, Tuai, Wellington, Kaimata, and Christchurch), 9h. (Hungry Horse, Pierce Ferry, Shasta Dam, and Victoria), 10h. (Stuttgart, Basle, Tamanrasset, and near Algiers), 11h. (Stuttgart, Tamanrasset, and near Algiers), 12h. (Tacubaya, Boulder City, Hungry Horse, Pierce Ferry, and Shasta Dam), 13h. (Tamanrasset and near Algiers), 14h. (near Ashkabad), 16h. (Hungry Horse), 17h. (near Ashkabad and near Stalinabad), 18h. (Hungry Horse, Shasta Dam, and near Leninakan), 21h. (Berkeley, Pierce Ferry, Shasta Dam, and near Honolulu), 22h. (near Tucson), 23h. (College, near Ashkabad, and near Berkeley).

Jan. 16d. Readings at 0h. (College, Hungry Horse, Pierce Ferry, and Shasta Dam), 1h. (College), 3h. (near Logan), 5h. (Sofia and near Leninakan), 6h. (Hungry Horse), 12h. (College, Hungry Horse, and Pierce Ferry), 13h. (Alicante, Granada, Hungry Horse, near Grozny, Piatigorsk, Leninakan, and Erevan), 20h. (Strasbourg), 21h. (College), 22h. (near Leninakan), 23h. (Hungry Horse).

Jan. 17d. Readings at 2h. (La Paz), 4h. (Strasbourg, Stuttgart, Zürich, Sofia, Belgrade, and Trieste), 8h. (near Catania and Messina), 9h. (College, Hungry Horse, Pierce Ferry, and Shasta Dam), 14h. (near Ashkabad), 15h. (Sofia), 16h. (College, Tananarive, and near Klyuchi), 17h. (near Alicante), 21h. (near Florence).

Jan. 18d. 4h. South Pacific, near Chile.

Santa Lucia eN = 47m.46s. and 48m.24s.
La Paz iP = 50m.0s., PPZ = 51m.16s., iS = 55m.13s., iSSE = 57m.42s., L = 59·3m.
Huancayo eP = 50m.11s., e = 55m.35s., eL = 58m.9s.
Bogota iP = 55m.16s., iPP = 56m.26s.
Tucson iP = 55m.22s.
Boulder City eP = 55m.41s., i = 55m.46s.
Pasadena iPZ = 55m.42s.a
St. Louis eP = 55m.44s.
Pierce Ferry iP = 55m.51s.
Fresno iPZ = 55m.56s.
Tinemaha ePE = 55m.58s.
Berkeley iPZ = 56m.7s.k, iZ = 56m.15s. and 56m.20s.
Reno iPZ = 56m.12s.k, iZ = 56m.36s.a.
Shasta Dam iP = 56m.18s.
Ottawa eZ = 56m.21s.
Hungry Horse eP = 56m.42s.
Paris iPKP = 62m.25s.
Stuttgart ePKPZ = 62m.31s.

Jan. 18d. Readings also at 2h. (Riverview and Santa Lucia), 4h. (Helwan, Ksara, College, and near Mizusawa), 8h. (La Paz, Erevan, and near Leninakan), 10h. (La Paz), 12h. (Hyderabad, Granada, Boulder City, Pierce Ferry, Tucson, Pasadena, and Haiwee), 14h. (Pierce Ferry, near Berkeley, Branner, San Francisco, Fresno, Mineral, and Reno), 18h. (Copiapo, College, and Pierce Ferry), 19h. (Ksara, Hungry Horse, and Kew), 20h. (Boulder City, Pierce Ferry, near Tucson, near Berkeley, Lick, Branner, and San Francisco), 22h. (near Andijan), 23h. (Kew and near Tucson (2)).

Jan. 19d. 13h. 38m. 20s. Epicentre 23°·8N. 121°·8E.
(as on 1946, June 2d. and foreshock of 15h. 0m.).

A = −·4826, B = +·7784, C = +·4013; δ = −15; h = +4;
D = +·850, C = +·527; G = −·211, H = +·341, K = −·916.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Zi-ka-wei		7·6	357	e 2 0	+ 5	i 4 12	S_g	—
Nanking		8·7	343	e 2 8	− 2	e 3 47	− 3	—
Irkutsk		31·4	339	e 6 23	− 2	—	—	—
Frunse		43·2	308	e 8 18	+14	—	—	—
Andijan		44·5	305	e 8 21	+ 6	—	—	—
Poona	E.	44·9	273	e 8 14	− 4	—	—	—
Tchimkent		46·7	307	e 8 38	+ 6	e 15 28	+ 6	—
Tashkent		46·9	306	e 8 36	+ 2	e 15 30?	+ 5	—
Samarkand		48·5	303	e 8 55	+ 9	e 15 55	+ 7	—
Sverdlovsk		54·7	324	9 32	− 1	17 6	− 7	—
College		68·9	28	e 11 2	− 7	—	—	—
Upsala		76·5	330	—	—	e 23 10	PPS	e 38·7
Stuttgart	z.	86·1	323	e 12 43	− 1	—	—	—
Victoria	z.	87·5	38	e 12 48	− 3	—	—	—
Kew		89·5	328	—	—	e 29 40?	SS	e 44·7
Shasta Dam		92·4	44	e 13 11	− 3	—	—	—
Hungry Horse		92·5	34	i 13 12	− 2	—	—	—
Mineral	z.	93·1	43	e 13 14k	− 3	—	—	—
Tamanrasset	z.	102·7	303	18 21	PP	—	—	—

Long waves were also recorded at Calcutta and at other European stations.

Jan. 19d. 15h. 0m. 0s. Epicentre 23°·8N. 121°·8E. (as at 13h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei		7·6	357	e 1 56	+ 1	e 3 28	+ 5	i 4 7	S_g	—
Nanking		8·7	343	e 2 4	− 6	3 42	− 8	2 17	PP	4·0
Mizusawa		22·4	42	e 5 18	+16	e 8 58	− 6	—	—	—
Calcutta	E.	30·8	275	e 6 20	0	e 11 18	− 5	7 14	PP	—
Irkutsk		31·4	339	6 25	0	11 27	− 5	7 31	PP	—
Batavia	N.	33·2	208	e 6 43	+ 3	—	—	—	—	—
Hyderabad	N.	40·9	270	e 7 28	−18	13 21	−37	16 31	SS	19·4
Frunse		43·2	308	e 8 8	+ 4	—	—	—	—	—
Colombo	E.	43·6	255	i 8 40	+32	—	—	—	—	—
Andijan		44·5	305	e 8 17	+ 2	14 56	+ 5	—	—	—
Poona		44·9	273	e 8 22	+ 4	e 14 58	+ 2	10 10	PP	21·1
Bombay		45·7	274	e 8 27	+ 3	e 15 8	0	10 20	PP	—
Obi-garm		46·4	302	e 8 30?	0	—	—	—	—	—
Tchimkent		46·7	307	e 8 32	0	e 15 26	+ 4	—	—	—
Tashkent		46·9	306	e 8 32	− 2	e 15 28	+ 3	e 10 31	PP	—
Samarkand		48·5	303	e 8 51?	+ 5	e 15 53	+ 5	—	—	—
Sverdlovsk		54·7	324	i 9 34	+ 1	i 17 10	− 3	i 19 18	ScS	—
Riverview		63·8	154	—	—	e 19 42	+31	e 26 36	Q	e 30·6
Grozny		64·2	309	e 10 40	+ 1	19 22	+ 6	—	—	—
Piatigorsk		66·0	310	e 10 47	− 3	—	—	—	—	—
Moscow		67·4	323	10 59	0	19 52	− 3	—	—	—
College		68·9	28	e 12 4	+55	e 20 6	− 7	—	—	e 33·7
Yalta		72·1	312	11 26	− 2	20 50	0	—	—	—
Ksara		73·9	301	e 12 11	+32	e 20 34	−36	—	—	—
Upsala		76·5	330	—	—	e 21 35	− 4	e 26 0?	SS	e 34·0
Istanbul		76·7	309	e 11 54	− 1	—	—	—	—	—
Sitka		76·8	33	e 11 50	− 5	e 21 35	− 7	e 26 55	SS	e 33·3
Helwan		78·9	298	12 10	+ 3	22 12	+ 7	e 17 17	PPP	—
Skalnate Pleso		79·5	320	e 19 36	?	—	—	—	—	e 38·5
Copenhagen		80·9	328	e 12 18	+ 1	e 22 25	− 1	—	—	39·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bergen	N.	81·4	334	—	—	e 22 43	+12	—	—	e 34·0
Potsdam		82·1	325	i 12 25k	+ 1	—	—	—	—	e 42·5
Zagreb		83·6	318	e 12 34	+ 3	e 22 48	− 5	—	—	—
Jena	N.	83·7	323	e 12 33	+ 1	—	—	e 13 13	?	—
Triest		85·0	319	e 12 57	+19	e 23 23	+16	e 16 3	PP	e 41·0
Stuttgart		86·1	323	e 12 43	− 1	e 23 11	[+ 3]	e 16 6	PP	e 43·0
Salo		87·0	319	e 12 49	+ 1	e 23 40	+13	—	—	—
Strasbourg		87·0	323	e 12 50	+ 2	e 23 28	+ 1	e 23 16	SKS	41·0
Bologna		87·1	318	e 12 52	+ 3	e 23 32	+ 4	e 16 41	PP	—
Zürich		87·2	322	e 12 48	− 1	—	—	—	—	—
Florence		87·5	317	e 12 51	0	e 23 34	+ 3	—	—	—
Victoria		87·5	38	e 12 59k	+ 8	e 23 36	+ 5	—	—	42·0
Basle		87·7	322	e 12 51	− 1	—	—	—	—	e 56·0
Rome		87·7	316	e 12 53	+ 1	i 23 34	+ 1	e 23 14	SKS	—
Kew		89·5	328	—	—	e 25 45	PPS	e 40 0	Q	e 51·0
Paris		89·7	325	e 12 58	− 3	e 25 0?	PPS	e 13 3	PcP	e 47·0
Clermont-Ferrand		91·2	322	i 13 10	+ 2	—	—	i 16 49	PP	45·0
Shasta Dam		92·4	44	i 13 11	− 3	—	—	—	—	—
Hungry Horse		92·5	34	i 13 2	−12	—	—	—	—	—
Mineral	Z.	93·1	43	i 13 16k	− 1	—	—	—	—	—
Berkeley	N.	94·1	46	—	—	e 24 30	− 1	e 25 44	PS	e 45·0
Butte	N.	94·8	35	—	—	e 24 34	− 2	e 26 26	PPS	—
Bozeman		95·8	34	—	—	e 24 4	[− 1]	e 24 40	S	e 47·2
Tinemaha	E.	97·2	45	e 13 37	+ 1	—	—	—	—	—
Alicante		97·9	318	—	—	e 25 12	+ 9	e 38 40	Q	e 44·7
Logan		98·1	37	e 13 37	− 3	—	—	—	—	—
Pasadena		99·0	47	e 13 45	+ 1	—	—	—	—	e 40·7
Almeria		100·0	318	—	—	—	—	e 43 55	Q	51·3
Boulder City		100·0	43	e 13 48	0	—	—	—	—	—
Pierce Ferry		100·4	43	e 13 50	0	—	—	—	—	—
Tamanrasset	Z.	102·7	303	e 17 28	?	—	—	i 18 19a	PP	—
Tucson		104·9	44	e 14 10	0	—	—	e 18 23	PP	e 44·5
Weston		113·0	10	i 22 54	PKS	e 30 2	PPS	—	—	—
Bogota		147·8	30	i 19 45	[+ 1]	—	—	i 20 9	PKP_3	—
Huancayo		159·9	57	—	—	e 36 8	?	e 44 30	SS	e 77·2
La Paz		168·1	54	i 20 13	[+ 5]	i 27 16	[+ 6]	—	—	73·0

Additional readings :—
Calcutta iSSE =14m.16s.
Batavia ePE =6m.51s.
Hyderabad PPN =8m.49s.
Poona iE =8m.52s., P_cP?E =10m.32s., SSN =17m.46s., S_cS?E =18m.17s., QN = 18m.41s.
Tashkent eP_cP =10m.0s., ePPP =11m.1s.?, eSS =18m.55s.
College e =20m.43s. and 25m.28s.
Helwan iZ =12m.30s., eZ =13m.5s. and 14m.5s., S?N =22m.24s., eE =23m.11s., iZ = 23m.43s.
Stuttgart eZ =12m.57s., eSSS? =32m.0s., e =35m.6s.
Strasbourg e =13m.4s., 13m.22s., 13m.26s., 13m.47s., and 13m.50s., ePS =24m.44s.
Paris i =13m.6s.
Kew eEN =31m.
Berkeley eE =25m.18s., eN =39m.0s., eE =43m.36s., eZ =44m.0s.
Tucson e =17m.54s.
Long waves were also recorded at Wellington, Scoresby Sund, Bermuda, Philadelphia, Seven Falls, and at other European stations.

Jan. 19d. Readings also at 0h. (La Paz), 2h. (Wellington, Arapuni, near Andijan, Samarkand, Tashkent, Kulyab, and Stalinabad), 4h. (College, Tchimkent, Frunse, Almata, near Kulyab, Obi-garm, Stalinabad, Samarkand, Andijan, and Tashkent), 5h. (College), 7h. (near Ashkabad), 12h. (Batavia and Alicante), 13h. (Alicante, Pierce Ferry, Hungry Horse, and near Ashkabad), 14h. (Batavia), 15h. (Hungry Horse, Samarkand, Frunse, Tchimkent, near Andijan and near Ashkabad), 16h. (La Paz, Copiapo, and near Ashkabad), 19h. (near Stuttgart (2), Chur, Basle, and Zürich, intensity V at Locarno ; Samarkand, Stalinabad, Tashkent, Obi-garm, Tchimkent, Frunse, and near Ashkabad (3)), 20h. (near Ashkabad (2)), 21h. (Tacubaya, near Tucson and near Ashkabad (3)), 22h. (near Tucson and near Ashkabad (4)), 23h. (Ashkabad).

Jan. 20d. 6h. 48m. 55s. Epicentre 44°·8N. 14°·8E. (as on 1937, Jan. 29d.).

Intensity III in Dalmatia. Macroseismic area 5,500sq.km. in Austria.
Epicentre : 45°·0N. 15°·0E. (Rome).
44°45′N. 14°54′E. (Strasbourg and Triest).

Jahrbücher der Zentralanstalt für Meteorlogie und Geodynamik, Jahrgang 1949, Vienna, 1950, new series, vol. 86, p. E1, with macroseismic chart p. E2.

A second, much stronger, shock from this epicentre occurred at 6h. 50m. but does not seem to have been recorded. Intensity VII at Rab (44°46′N. 14°46′E.), Baska Otocac, VI at Senj, V at Tramonti di Sitto (Udine), IV-V at Triest, IV at Zagreb and Gorizia, III at Ljubljana, Klagengurth, Vienna, and Innsbruck. Macroseismic area 58,000 sq.km.

M. D. Uzelac.
Annuaire microséismique et macroséismique de l'Institut Séismologique de Beograd, 1949, Nouvelle Série No. 9, Belgrade, 1950, pp. 51-52.

$A = +\cdot6883$, $B = +\cdot1819$, $C = +\cdot7023$; $\delta = +7$; $h = -3$;
$D = +\cdot255$, $E = -\cdot967$; $G = +\cdot679$, $H = +\cdot179$, $K = -\cdot712$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest		1·1	319	e 0 23	+ 1	i 0 39	0	—	—	—
Zagreb		1·3	39	i 0 16k	− 9	i 0 44	0	i 0 26	P_g	—
Padova		2·1	279	0 38	+ 1	1 13	S_g	—	—	1·7
Bologna		2·5	273	i 0 45a	+ 2	e 1 13	− 1	i 0 55	P_g	—
Florence		2·7	248	e 0 47	+ 2	i 1 21	+ 2	e 0 57	P_g	—
Prato		2·8	293	i 0 47	0	i 1 23	+ 1	—	—	—
Salo		3·1	286	e 0 52a	+ 1	i 1 30	+ 1	i 1 5	P_g	—
Kalossa		3·4	58	e 1 9	P_g	1 48	S*	—	—	2·1
Rome		3·4	210	i 0 58	+ 3	i 1 38	+ 1	i 1 11	P_g	—
Ogyalla		3·9	36	e 0 54?	− 8	e 1 43?	− 7	—	—	—
Belgrade		4·0	87	e 1 13k	P*	i 2 3	S*	i 1 21	P_g	—
Budapest		4·0	46	1 13	P*	1 54	+ 2	1 59	S*	2·1
Pavia		4·0	277	i 1 5a	+ 1	e 1 55	+ 3	e 1 8	P*	—
Chur		4·2	301	e 1 4	− 3	e 1 55	− 2	—	—	—
Ravensburg		4·7	312	e 1 15	+ 1	e 2 24	S*	e 1 31	P_g	i 2·7
Taranto		4·7	156	1 13	− 1	2 31	S_g	1 21	P*	—
Zürich		5·1	303	e 1 18	− 2	e 2 19	− 1	e 1 41	P_g	—
Ebingen		5·3	312	e 1 45	P_g	e 2 52	S_g	—	—	—
Stuttgart		5·5	318	e 1 25	0	i 2 29	− 1	i 1 50	P_g	—
Basle		5·7	302	e 1 29	+ 1	e 2 33	− 2	e 1 43	P*	—
Raciborzu		5·8	22	e 1 23?	− 6	e 3 3	S*	e 1 42	P*	e 3·3
Skalnate Pleso		5·8	38	e 1 24	− 5	e 2 26	−12	—	—	—
Neuchatel		5·9	295	e 1 31	0	e 3 16	S_g	—	—	—
Strasbourg		6·1	311	e 1 35	+ 1	i 2 37	− 8	i 2 1	P_g	—
Jena	E.	6·5	342	e 1 38	− 1	e 2 49	− 6	e 3 28	S_g	—
Sofia		6·5	106	e 1 19	−20	i 3 19	S*	—	—	—
Collmberg		6·6	350	i 1 38	− 3	i 2 53	− 5	e 3 33	S_g	—
Messina		6·6	175	e 2 30?	+49	e 3 50?	+52	—	—	—
Potsdam		7·7	352	—	—	e 3 20	− 5	i 4 14	S_g	i 4·6
Clermont-Ferrand		8·3	281	i 2 2	− 2	i 3 34	− 6	i 2 25	P*	—
Uccle	Z.	9·2	314	(e 2 10)	− 6	(e 4 2)	− 1	—	—	(e 4·2)
Paris		9·3	300	e 2 21	+ 4	e 4 16	+11	i 2 33	PP	e 5·7
Alicante		13·1	246	3 14	+ 4	5 37	− 1	3 29	PPP	6·5
Almeria		15·3	245	3 40	+ 1	6 38	+ 8	4 2	PPP	9·1
Tamanrasset	Z.	23·2	202	e 5 9	0	—	—	e 5 40	PP	—
College		69·8	353	e 16 43	?	—	—	—	—	—
Hungry Horse		77·0	328	i 11 54	− 2	—	—	—	—	—
Shasta Dam		86·6	329	i 12 39	− 7	—	—	—	—	—

Additional readings :—
Triest iPsP = 28s.
Zagreb i = 30s., iP_gS_g = 41s., iP_gS_gZ = 47s.
Bologna iS = 1m.19s., iS_g = 1m.33s.
Florence iE = 1m.9s.
Salo iE = 1m.10s., iN = 1m.18s., iE = 1m.27s., iS_g? = 1m.38s.
Belgrade e = 1m.38s., iP_gS = 2m.13s.
Ravensburg e = 2m.35s., iS_gZ = 2m.38s.

Continued on next page.

Stuttgart i = 1m.29s.$_s$, eP* = 1m.38s., eP$_g$ = 1m.46s., i = 1m.57s., e = 2m.5s. and 2m.11s., eS* = 2m.20s., i = 2m.44s., iS = 2m.56s., i = 3m.3s., iS$_g$ = 3m.7s.
Strasbourg eP = 1m.48s., e = 2m.5s., iS = 3m.5s., i = 3m.15s. and 3m.20s., iS$_g$ = 3m.26s.
Collmberg iZ = 1m.43s., eE = 1m.46s., iSEN = 2m.50s., eS$_g$E = 3m.28s.
Potsdam eN = 3m.27s., eZ = 3m.31s., eE = 3m.40s., iN = 4m.1s., iE = 4m.8s., iN = 4m.17s. and 4m.26s.
Clermont-Ferrand i = 2m.15s., 2m.32s., 3m.18s., 3m.53s., and 4m.22s.
Uccle readings reduced by 1 minute.
Paris i = 2m.42s. and 4m.31s., e = 5m.9s.
Alicante P$_c$P = 8m.31s.
Almeria SSS = 7m.12s., P$_c$P = 8m.46s.
Tamanrasset ePPPZ = 5m.51s.
College i = 16m.56s. and 18m.23s.
Long waves were also recorded at Istanbul.

Jan. 20d. 7h. 59m. 26s. Epicentre 39°·6N. 120°·1W. (as on 1948, Dec. 29d.).

Epicentre given by U.S.C.G.S.

A = −·3882, B = −·6680, C = +·6349; δ = +2; h = −2;
D = −·865, E = +·503; G = −·319, H = −·549, K = −·773.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Reno		0·2	106	i 0 0	−10	—	—	—	—	—
Mineral		1·4	327	i 0 27	0	i 0 48	+ 2	—	—	—
Shasta Dam		2·1	328	i 0 38	+ 1	i 1 8	+ 4	—	—	—
Ukiah		2·5	259	—	—	e 1 33	S$_g$	—	—	2·2
Lick	Z.	2·6	241	i 0 49	P*	—	—	—	—	—
San Francisco		2·6	225	i 0 44	0	i 1 17	0	—	—	—
Santa Clara	N.	2·7	231	e 0 57	P$_g$	e 1 23	S*	—	—	i 1·6
Fresno		2·9	175	e 0 48	0	i 1 26	+ 2	i 0 51	P*	—
Tinemaha		3·0	148	i 0 55	P*	i 1 35	S*	—	—	—
Arcata		3·3	296	e 1 2	P*	i 1 35	0	i 1 49	S$_g$	i 1·9
Haiwee		3·9	152	i 1 11	P*	i 2 3	S*	—	—	—
Pasadena		5·7	162	e 1 28	0	i 2 47	S*	—	—	—
Pierce Ferry		6·0	123	i 1 30	− 2	—	—	—	—	i 3·1
Hungry Horse		9·8	25	i 2 26	+ 2	—	—	—	—	i 5·2
Tucson		10·5	131	e 2 47	PP	—	—	e 3 37	?	e 5·0

Additional readings :—
Fresno iN = 1m.35s.
Arcata iN = 1m.30s.
Long waves were also recorded at Bozeman, Butte, and Victoria.

Jan. 20d. 11h. 41m. 53s. Epicentre 34°·8N. 137°·0E. (as on 1948, March 9d.).

Intensity V at Irako; IV at Nagoya, Tu, Kameyama, and Iida; II-III at Gihu, Hikone, Shizuoka, Omaesaki, Tsuruga, Osaka, Hukui, Kohu, and Kyoto. Macroseismic radius 200-300km. Epicentre 34°·7N., 137°·2E.

The Seismological Bulletin of the Cent. Met. Obs., Japan, for the year 1949. Tokyo, 1950, p. 5, with macroseismic chart.

A = −·6019, B = +·5612, C = +·5681; δ = −3; h = 0;
D = +·682, E = +·731; G = −·415, H = +·387, K = −·823.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Kameyama	0·4	277	0 11k	− 2	0 19	− 2
Nagoya	0·4	356	0 9	− 4	—	—
Gihu	0·6	342	0 16	+ 1	0 26	0
Hikone	0·8	307	0 10k	− 8	0 22	− 9
Omaesaki	1·0	101	0 19k	− 2	0 33	− 3
Owase	1·0	222	0 21	0	0 34	− 2
Kyoto	1·1	282	0 20	− 2	0 38	− 1
Osaka	1·2	263	0 25	+ 1	0 43	+ 2
Shizuoka	1·2	82	0 21k	− 3	0 36	− 5
Kobe	1·5	266	0 29	+ 1	0 53	+ 4

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Hunatu	1·6	64	0 28	− 2	0 49	− 2
Misima	1·6	79	0 28	− 2	0 47	− 4
Siomisaki	1·7	217	0 33	+ 2	0 56	+ 2
Sumoto	1·8	256	0 34	+ 2	0 58	+ 2
Osima	1·9	91	0 32	− 2	0 54	− 5
Toyama	1·9	5	0 36	+ 2	1 3	+ 4
Toyooka	2·0	298	0 37	+ 2	1 2	0
Nagano	2·1	28	1 37	+60	—	—
Kumagaya	2·3	55	1 42	+62	2 16	+67
Maebasi	2·3	46	0 46	P_g	1 14	+ 5
Mera	2·3	87	0 41	+ 1	—	—
Yokohama	2·3	74	0 42	+ 2	1 11	+ 2
Tokyo	2·4	66	0 44	+ 3	1 17	+ 5
Wazima	2·6	358	0 51	P_g	1 25	S_g
Kakioka	3·0	61	0 53	+ 3	—	—
Koti	3·1	246	1 3	P_g	1 31	+ 2
Mito	3·2	61	1 1	P_g	1 37	S*
Aikawa	3·4	17	0 55	0	1 42	+ 5
Hirosima	3·8	265	1 30	+29	2 17	+30
Hamada	4·1	273	1 32	+27	—	—
Hukusima	4·1	43	1 17	P*	2 5	S*
Sendai	4·7	41	1 23	P*	2 31	S_g
Hukuoka	5·6	260	2 36	S	(2 36)	+ 3
Kagosima	6·3	241	1 30	− 6	—	—
Hungry Horse	75·8	41	i 11 48	− 2	—	—

Hukuoka also gives S = 3m.11s.

Jan. 20d. 13h. 24m. 56s. Epicentre 35°·6N. 134°·2E. (as on 1943, Oct. 18d.).

Intensity VII-VIII at Nisitani (Hyogo Pref.); VI at Toyooka and Hukui; V at Kobe, Hikone, Tsuruga, Sumoto, Osaka, Kasiwara, Tu, Matsue, and Kyoto; IV at Yonago, Takamatsu, Tohusima, Saigo, Wakayama, Koti, and Hirosima; II-III at Kohu, Irako, Hamada, Iida, Wazima, and Nagoya. Macroseismic radius >300km. Slight damage to walls and houses in the epicentral region. No loss of human life. Epicentre 35°·6N. 134°·6E.

The Seismological Bulletin of the Cent. Met. Obs., Japan, for the year 1949. Tokyo, 1950, p. 6, with macroseismic chart.

A = −·5682, B = +·5843, C = +·5795; δ = +8; h = 0;
D = +·717, E = +·697; G = −·404, H = +·415, K = −·815.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Toyooka	0·5	98	0 7k	P_g	0 10	S_g	—	—	—
Kobe	1·2	139	0 19k	− 5	0 34	− 7	—	—	—
Osaka	1·4	131	0 25k	− 2	0 42	− 4	—	—	—
Sumoto	1·4	156	0 25k	− 2	0 42	− 4	—	—	—
Hikone	1·7	101	0 20k	−11	0 33	−21	—	—	—
Hamada	1·9	248	0 37a	+ 3	1 5	+ 6	—	—	—
Hirosima	1·9	230	0 37	+ 3	1 2	+ 3	—	—	—
Kameyama	2·0	112	0 32	− 3	0 59	− 3	—	—	—
Gihu	2·1	95	0 34k	− 3	—	—	—	—	—
Koti	2·1	195	0 37	0	1 4	0	—	—	—
Nagoya	2·3	101	0 36k	− 4	1 10	+ 1	—	—	—
Owase	2·3	133	0 39	− 1	1 5	− 4	—	—	—
Siomisaki	2·5	149	0 40k	− 3	1 11	− 3	—	—	—
Toyama	2·7	66	0 42a	− 3	1 44	+25	—	—	—
Wazima	2·8	51	0 43a	− 4	1 24	+ 2	—	—	—
Nagano	3·4	71	0 35	−20	—	—	—	—	—
Omaesaki	3·4	107	0 54k	− 1	1 45	S*	—	—	—
Izuka	3·5	238	1 4	P*	1 55	S_g	—	—	—
Shizuoka	3·5	101	0 53	− 4	1 43	+ 3	—	—	—
Hukuoka	3·7	238	1 5	+ 5	1 54	S*	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hunatu		3·7	90	0 45k	−15	1 42	− 3	—	—	—
Kumamoto		4·0	227	1 8k	+ 4	2 11	S_g	—	—	—
Maebasi		4·0	77	1 11	P*	2 5	S*	—	—	—
Aikawa		4·1	52	1 2a	− 3	1 58	+ 3	—	—	—
Kumagaya		4·2	81	1 8	+ 1	2 11	S*	—	—	—
Miyazaki		4·3	213	1 13	+ 5	2 11	S*	—	—	—
Osima		4·3	100	1 6	− 2	2 12	S*	—	—	—
Yokohama		4·4	91	1 19	P*	2 11	S*	—	—	—
Tokyo		4·5	87	1 14	+ 3	2 15	S*	—	—	—
Mera		4·7	97	1 27	P*	2 20	S*	—	—	—
Utunomiya		4·7	77	1 16	+ 2	2 25	S*	—	—	—
Tukubasan		4·8	81	1 13	− 2	—	—	—	—	—
Kakioka		4·9	81	1 9	− 8	2 28	S*	—	—	—
Kagosima		5·0	218	1 24a	P*	2 44	S_g	—	—	—
Mito		5·1	79	1 23	+ 3	2 31	S*	—	—	—
Hukusima		5·5	65	1 24	− 1	2 27	− 3	—	—	—
Sendai		6·0	62	1 34	+ 2	2 46	+ 3	—	—	—
Akita		6·2	47	1 39	+ 4	—	—	—	—	—
Mizusawa	N.	6·5	55	1 40	+ 1	3 2	+ 7	—	—	—
Morioka		6·9	51	1 42a	− 3	3 10	+ 5	—	—	—
Aomori		7·3	43	1 52	+ 2	3 23	+ 8	—	—	—
Miyako		7·4	55	1 50	− 2	3 15	− 3	—	—	—
Vladivostok		7·7	348	i 1 59	+ 3	i 3 39	+14	—	—	—
Irkutsk		27·0	318	5 46	+ 1	10 27	+ 5	—	—	—
Calcutta	E.	41·8	268	—	—	e 17 11	SS	—	—	—
Frunse		45·9	298	e 8 31	+ 5	—	—	—	—	—
Andijan		48·0	296	e 8 43	0	—	—	—	—	—
Tchimkent		49·6	299	e 8 54	− 1	—	—	—	—	—
Tashkent		50·1	297	i 9 1	+ 2	e 16 24	PPS	e 10 54	PP	—
Stalinabad		51·3	294	e 9 10	+ 2	e 16 30	+ 4	—	—	—
Samarkand		52·3	296	e 9 19	+ 4	—	—	—	—	—
Sverdlovsk		52·4	319	9 46?	+30	—	—	—	—	—
College		53·4	32	i 9 20	− 4	—	—	—	—	—
Bombay		56·2	270	e 14 4?	?	e 17 40	+ 7	—	—	—
Moscow		64·9	322	e 10 43	0	—	—	—	—	—
Theodosia		71·3	313	11 24	+ 1	—	—	—	—	—
Shasta Dam		76·5	50	i 11 51	− 3	—	—	—	—	—
Hungry Horse		76·7	40	i 12 53	+58	—	—	—	—	—
Ksara		77·1	302	—	—	e 20 10	−96	e 29 14	SSS	—
Mineral	z.	77·2	50	i 11 56k	− 1	—	—	i 12 2k	P_cP	—
Reno	z.	78·8	50	i 12 6	0	—	—	—	—	—
Jena		80·2	327	e 12 16	+ 2	—	—	—	—	—
Helwan	z.	82·6	301	e 12 27	+ 1	—	—	—	—	—
Stuttgart	z.	82·8	327	e 12 26	− 1	—	—	—	—	—
Pasadena	z.	83·2	52	i 12 27	− 2	—	—	—	—	—
Strasbourg		83·6	328	i 12 32	+ 1	—	—	—	—	e 45·1
Boulder City		84·1	50	e 12 31	− 3	—	—	—	—	—
Zürich		84·1	327	e 12 33	− 1	—	—	e 13 18	?	—
Basle		84·4	327	e 12 35	− 1	—	—	—	—	—
Pierce Ferry		84·5	49	i 12 35	− 1	—	—	—	—	—
Salo		84·5	324	e 12 32	− 4	—	—	e 12 41	P_cP	—
Paris		85·6	330	i 12 41	0	—	—	e 12 45	P_cP	—
Tucson		89·1	50	e 12 58	0	—	—	—	—	—
Alicante		95·3	326	e 17 4	PP	—	—	—	—	—
Almeria		97·4	326	e 17 17	PP	—	—	—	—	52·1
Granada		97·7	327	e 16 32	?	—	—	—	—	52·7
Tamanrasset	z.	104·3	312	e 17 29	?	—	—	e 18 4	PP	—
La Paz	N.	152·5	51	20 4	[+13]	—	—	—	—	—

Additional readings :—
Jena eE =12m.39s.
Strasbourg e =12m.53s., 13m.5s., and 14m.8s.
Basle e =13m.18s.
Salo eZ =12m.49s., e =13m.12s.
Long waves were also recorded at Zi-ka-wei.

Jan. 20d. Readings also at 0h. (Poona, near Wellington, Auckland, Tuai, New Plymouth, Kaimata and Havelock North), 2h. (Mineral, Boulder City, College, Hungry Horse, Pierce Ferry, and Shasta Dam), 3h. (Poona, Pierce Ferry, and Tucson), 4h. (Boulder City, Pierce Ferry, Tchimkent, Frunse, Almata, near Kulyab, Obi-garm, Stalinabad, Andijan, Samarkand, and Tashkent), 5h. (Wellington and near Apia), 6h. (near Obi-garm, Kulyab, Stalinabad, Andijan, Samarkand, and Tashkent), 7h. (Frunse, near Obi-garm, Kulyab, Stalinabad, Andijan, Tashkent, Samarkand, and Tchimkent (2)), 8h. (Strasbourg), 9h. (College, Hungry Horse, and Pierce Ferry), 12h. (near Ashkabad and near Andijan), 13h. (near Granada), 14h. (Ashkabad), 15h. (Sofia, La Paz, Tamanrasset, and Ashkabad (2)), 16h. (Ksara, Stuttgart, La Paz, Tamanrasset, and Tananarive), 17h. (Ashkabad), 18h. (Boulder City and near Tucson), 20h. (Ashkabad), 21h. (near Tucson and near Ashkabad), 22h. (Helwan), 23h. (Hungry Horse (2) and Pierce Ferry).

Jan. 21d. 15h. 21m. 2s. Epicentre 10°·5S. 163°·0E. (as on 1937, Jan. 25d.).
A = −·9405, B = +·2875, C = −·1811; $\delta = -1$; $h = +6$;
D = +·292, E = +·956; G = +·173, H = −·053, K = −·984.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		19·3	208	i 4 28	− 1	i 8 9	+ 7	i 8 39	SS	i 9·9
Riverview		25·6	203	e 5 36	+ 4	10 22	+23	e 6 11	PP	e 12·9
Arapuni	E.	29·7	159	e 5 4	−66	—	—	—	—	—
Wellington		32·4	164	(7 32)	PP	(11 37)	−11	13 58	SSS	16·8
Vladivostok		60·5	334	e 10 14	0	e 18 31	+ 2	e 13 56	PPP	—
College		83·6	19	e 12 28	− 3	—	—	—	—	—
Pasadena	Z.	86·7	55	e 12 49	+ 2	—	—	—	—	—
Boulder City		89·8	53	e 13 2	0	—	—	—	—	—
Pierce Ferry		90·5	53	e 13 1	− 4	—	—	—	—	—
Hungry Horse		93·1	42	i 13 19	+ 2	—	—	—	—	—
Ksara		126·5	303	e 21 4	PP	—	—	—	—	—
Helwan	Z.	131·1	300	e 21 43	PP	—	—	e 22 33	PKS	—

Additional readings and note :—
Riverview eE = 10m.39s. and 11m.8s.
Wellington PP and S are recorded as S and SS, also S_cS? = 8m.43s.
College i = 12m.34s.
Long waves were also recorded at Auckland and Perth.

Jan. 21d. Readings also at 0h. (Ashkabad), 1h. (Brisbane), 3h. (Copiapo), 5h. (Copiapo and La Paz), 7h. (3) and 8h. (near Ashkabad), 10h. (Ashkabad and Strasbourg), 11h. (Ashkabad), 12h. (Hungry Horse, near Boulder City, and Pierce Ferry), 15h. (Ashkabad), 16h. (College), 17h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, College, Kodaikanal, and near Apia), 18h. (Pierce Ferry, Shasta Dam, Hungry Horse, College, Stuttgart, near Ashkabad (2), and near Apia (2)), 19h. (near Apia), 20h. (near Ashkabad and near Alicante), 21h. (near Ashkabad).

Jan. 22d. 5h. South West Pacific.

Auckland PN = 38m.10s., PPN? = 38m.24s., SN? = 41m.6s., LN = 42m.0s.
Brisbane iPZ = 38m.35s., iE = 39m.14s., iSN = 41m.58s., iLN = 43m.45s.
Wellington P = 39m.0s., PP = 39m.39s., i = 41m.20s., S = 42m.46s., SS = 43m.20s., L = 44m.10s.
Apia eP = 39m.16s.
Riverview iP = 39m.24s.s, ePPEN = 39m.49s., iSE = 43m.20s., iP_cPN = 43m.24s., isSE = 43m.37s.
Arapuni eE = 43m.
Pasadena ePZ = 46m.20s., eZ = 47m.34s., eLEZ = 66m.23s.
Vladivostok eP = 46m.20s., eS = 56m.3s.
Pierce Ferry eP = 46m.37s., i = 46m.43s.
Hungry Horse eP = 46m.49s.
Shasta Dam eP = 47m.1s., i = 47m.31s. and 47m.55s.
Tucson e = 47m.54s.
Tamanrasset ePKP?Z = 54m.12s., $ePKP_3$?Z = 55m.19s., ePPZ = 59m.19s.
Stuttgart ePKPZ = 54m.32s., eZ = 54m.49s.
Strasbourg ePKP = 54m.42s.
Long waves were recorded at Berkeley.

Jan. 22d. Readings also at 0h. (Boulder City), 1h. (Haiwee, Pasadena, Shasta Dam, College, and near Apia (2)), 2h. (Tucson, Boulder City, Pierce Ferry, Hungry Horse, and near Apia), 3h. (Bombay, Calcutta, Hyderabad, Kodaikanal, Poona, Frunse, Sverdlovsk, Tashkent, Helwan, Ksara, Stuttgart, Tamanrasset, Tchimkent (2), Samarkand (2), Kulyab, near Andijan, and Stalinabad (2)), 4h. (College), 5h, Shawinigan Falls and near College), 6h. (near Ashkabad), 7h. (Ksara), 8h. (Andijan, near Kulyab, Samarkand, and Stalinabad), 9h. (Hungry Horse, Pierce Ferry, Tucson, and near Balboa Heights), 10h. (Ashkabad), 11h. (Brisbane, Riverview, and near Stalinabad), 12h. (Auckland, Wellington, Pasadena, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, College, Santa Lucia, near Ashkabad, near Stuttgart, and Triest), 14h. (Hungry Horse), 15h. (Ashkabad), 17h. (Alicante), 19h. (Kulyab and near Stalinabad), 20h. (near Ashkabad), 21h. (near Alicante), 22h. (Hungry Horse and near Ashkabad (2)), 23h. (Copiapo, Santa Lucia, College, and Ashkabad).

Jan. 23d. 1h. 8m. 30s. I } Epicentre 71°·0N. 18°·0W.
1h. 13m. 50s. II } (as on 1940, June 2d.).

A = +·3115, B = −·1012, C = +·9448 ; δ = −·8 ; h = −12 ;
D = −·309, E = −·951 ; G = +·899, H = −·292, K = −·328.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Scoresby Sund	1·4	248	i 0 44	S	(0 44)	− 2	i 0 49	S_g	—
II		1·4	248	i 0 57	S_g	—	—	—	—	—
I	Aberdeen E.	15·4	146	2 56	−44	—	—	—	—	7·8
I	Upsala	18·2	111	e 2 9	?	—	—	—	—	e 4·5
I	Rathfarnham C.	18·5	159	i 5 29	+70	i 6 40	−64	—	—	11·0
II		18·5	159	i 4 24	+ 5	—	—	—	—	—
I	Copenhagen	20·2	125	i 4 37	− 2	—	—	—	—	11·5
II		20·2	125	i 4 37	− 2	—	—	—	—	10·2
I	De Bilt	21·7	140	e 4 52	− 3	e 9 0	+ 9	—	—	e 10·5
I	Potsdam z.	23·3	128	i 5 9k	− 1	e 10 30	+70	—	—	e 12·5
I	Collmberg	24·3	130	e 5 5	−15	—	—	e 5 22	P	e 13·5
II		24·3	130	e 5 19	− 1	—	—	—	—	—
I	Paris	24·3	147	i 5 21?	+ 1	—	—	—	—	e 11·8
II		24·3	147	i 5 18	− 2	—	—	—	—	e 13·2
I	Strasbourg	25·5	138	e 5 34	+ 2	e 9 52	− 5	e 6 14	PP	e 12·5
II		25·5	138	e 5 31	− 1	—	—	—	—	e 11·7
I	Stuttgart	25·7	137	e 5 33	0	e 10 10	+ 9	—	—	e 13·5
II		25·7	137	e 5 32	− 1	—	—	—	—	—
I	Basle	26·5	140	e 5 41	0	—	—	—	—	—
II		26·5	140	e 5 34	− 7	—	—	—	—	—
I	Clermont-Ferrand	27·3	148	e 5 49	+ 1	—	—	—	—	—
II		27·3	148	e 5 50	+ 2	—	—	—	—	—
I	Triest	29·7	132	e 5 30	−40	—	—	—	—	—
I	Istanbul	38·1	117	e 7 18	− 4	—	—	—	—	—
II		38·1	117	e 7 20	− 2	—	—	—	—	—
I	College	40·1	331	e 7 45	+ 6	—	—	—	—	—
I	Ksara	46·8	114	8 30?	− 3	e 15 34	+10	—	—	—
I	Hungry Horse	47·1	297	e 8 36	+ 1	—	—	—	—	—
II		47·1	297	e 8 52	+17	—	—	—	—	—
I	Helwan	49·2	120	10 42	PP	i 16 3	+ 5	—	—	—
II		49·2	120	—	—	e 15 58	0	—	—	—
I	Tamanrasset z.	50·1	152	9 0	+ 1	—	—	—	—	—

Additional readings :—
Collmberg II eE = 5m.23s.
Strasbourg I eP = 5m.37s., e = 5m.56s., 6m.38s., and 7m.42s., eSS = 10m.53s., II e = 5m.55s. and 6m.18s.
Stuttgart I eP = 5m.36s.k, e = 5m.48s.
Hungry Horse I i = 8m.43s. and 8m.52s.
Long waves were also recorded at Almeria, Bergen, Kew, and other American Stations.

Jan. 23d. 6h. 31m. 3s. Epicentre 11°·7S. 92°·4E.

B.C.I.S. and U.S.C.G.S. suggest depth 100km.

$A = -\cdot0410$, $B = +\cdot9786$, $C = -\cdot2015$; $\delta = -6$; $h = +6$;
$D = -\cdot999$, $E = +\cdot042$; $G = +\cdot008$, $H = -\cdot201$, $K = -\cdot979$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		15·3	70	3 16	−23	i 5 41	−49	—	—	8·4
Colombo	E.	22·3	324	5 57?	+56	9 57?	+55	—	—	—
Kodaikanal	E.	26·3	325	i 5 34	− 5	i 10 10	− 1	11 12	SS	14·1
Perth		29·5	137	6 7	− 1	11 0	− 2	12 17	SS	—
Hyderabad	N.	32·1	334	6 13	0	11 49	+ 6	7 33	PP	15·7
Calcutta	E.	34·3	353	e 6 58	+ 8	i 12 37	+20	i 14 23	SS	15·7
Poona		35·2	329	i 6 56	− 2	i 12 35	+ 4	8 16	PP	17·2
Bombay		36·0	327	i 7 6	+ 1	i 12 50	+ 6	8 24	PP	17·3
Dehra Dun	N.	44·0	342	—	—	e 13 42	−61	—	—	e 21·2
Stalinabad		54·7	338	e 9 30	− 3	i 17 12	− 1	—	—	—
Andijan		55·4	341	e 9 38	0	17 29	+ 7	—	—	—
Samarkand		56·3	336	e 9 47	+ 2	e 17 37	+ 3	—	—	—
Almata		56·5	347	e 9 46	0	i 17 39	+ 2	—	—	—
Frunse		56·7	344	e 9 49	+ 1	i 17 48	+ 8	—	—	—
Tashkent		56·9	339	i 9 48	− 1	i 17 43	+ 1	e 13 17	PPP	—
Miyazaki		57·2	40	e 9 48	− 3	—	—	—	—	—
Riverview		57·7	123	i 9 55k	0	i 17 53	0	i 12 4	PP	27·3
Ashkabad		58·3	329	10 5	+ 6	18 13?	+12	—	—	—
Brisbane		58·7	115	i 9 56	− 6	i 18 8	+ 2	i 12 12	PP	i 28·3
Hamada		59·7	38	9 45	−24	18 16	− 3	—	—	29·3
Osaka		61·6	40	e 10 25	+ 3	18 51	+ 8	—	—	—
Nagoya		62·9	41	10 24	− 6	e 19 5	+ 5	—	—	44·1
Irkutsk		64·5	8	10 44	+ 3	19 24	+ 5	26 9	SSS	—
Tokyo		64·9	42	e 10 38	− 5	19 23	− 1	—	—	29·0
Maebasi		64·9	41	e 10 51	+ 8	29 37	L	—	—	(29·6)
Baku		65·1	325	10 49	+ 4	—	—	—	—	—
Vladivostok		65·4	32	i 10 50	+ 3	i 19 36	+ 6	i 14 53	PPP	—
Sendai		67·3	40	10 59	C	20 44	+50	—	—	37·3
Erevan		68·1	323	11 7	+ 3	e 20 8	+ 5	—	—	—
Leninakan		68·8	323	11 3	− 5	e 20 7	− 4	—	—	—
Grozny		69·3	326	e 11 9	− 2	—	—	—	—	—
Ksara		70·2	312	i 11 17k	0	i 20 37	+ 9	—	—	—
Helwan		71·8	307	11 23	− 3	20 45	− 1	14 3	PP	—
Sverdlovsk		73·2	343	e 11 32	− 3	i 21 4	+ 2	i 14 22	PP	—
Kaimata	NE.	74·1	131	11 42	+ 2	—	—	—	—	—
Theodosia		76·3	322	e 11 49	− 3	i 21 35	− 2	—	—	—
Wellington		76·7	130	11 57	+ 2	21 28	−13	22 21	PS	35·0
Yalta		76·8	321	11 59	+ 4	—	—	—	—	—
Auckland	N.	77·0	125	10 47?	−69	20 27	−78	25 4	SS	33·5
Arapuni	E.	77·6	127	—	—	22 3	+12	26 45	SS	36·0
Istanbul		78·4	316	e 11 57	− 7	22 0	0	—	—	—
Tuai	N.	78·7	128	—	—	21 57	− 6	—	—	—
Moscow		81·2	332	e 12 19	0	e 22 28	− 1	15 30	PP	—
Bucharest		81·9	318	e 12 26	+ 3	i 22 41	+ 5	e 15 42	PP	40·0
Sofia		83·0	316	e 12 32	+ 4	e 22 48	+ 1	—	—	—
Belgrade		85·7	317	e 12 45a	+ 3	i 23 18	+ 4	e 16 14	PP	e 47·8
Kalossa		87·3	319	e 13 6	+16	—	—	e 13 11	?	—
Skalnate Pleso		87·4	322	e 13 33	+43	e 22 21	−69	—	—	—
Budapest	E.	87·6	319	12 56	+ 5	23 22	−10	—	—	e 44·5
	N.	87·6	319	e 13 14	+23	23 38	+ 6	—	—	e 51·0
Ogyalla		88·2	319	e 13 18	+24	e 23 44	+ 6	—	—	—
Zagreb		89·0	317	e 12 58	0	—	—	e 16 29	PP	—
Helsinki		89·3	332	e 13 3	+ 4	e 23 47	− 1	e 13 37	pP	e 42·0
Rome		90·3	313	e 13 2	− 2	e 23 32	[− 3]	i 16 36	PP	—
Triest		90·5	316	e 13 6	+ 1	i 23 39	[+ 3]	e 16 42	PP	e 43·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tamanrasset	Z.	91·6	293	e 13 8	− 2	—	—	i 13 33	pP	—
Florence		91·7	314	e 13 25	+15	e 24 13	+ 3	e 23 39	SKS	—
Prato		91·8	313	e 13 21	+10	i 24 25	+14	—	—	—
Bologna		91·8	315	e 13 13	+ 2	e 23 50	[+ 7]	e 16 59	PP	—
Potsdam		92·4	323	i 13 19a	+ 5	e 23 48	[+ 1]	i 19 9	PPP	e 43·7
Collmberg		92·5	321	e 13 11	− 3	e 23 49	[+ 2]	e 25 30	PS	e 38·0
Upsala		92·5	330	i 14 47	?	24 17	0	e 23 49	SKS	e 42·0
Salo		92·7	315	e 13 13	− 2	e 24 19	+ 1	e 23 46	SKS	—
Apia		92·8	105	e 13 14	− 2	—	—	e 17 13	PP	e 37·0
Jena		93·2	321	e 13 17	0	e 24 21	− 2	—	—	—
Chur		93·6	317	e 13 50	+31	e 23 59	[+ 6]	—	—	—
Copenhagen		94·0	326	17 12	PP	24 2	[+ 6]	—	—	—
Stuttgart		94·2	318	e 13 21	− 1	e 24 0	[+ 3]	e 13 36	pP	45·0
Zürich		94·4	317	e 13 23	0	e 24 36	+ 3	e 17 4	PP	—
Basle		95·1	317	e 13 51	+25	e 25 37	+58	e 19 9	PPP	—
Strasbourg		95·2	318	e 13 29	+ 2	e 24 44	+ 4	e 17 17	PP	e 46·2
Algiers		96·4	306	e 13 9	−23	e 24 57	+ 7	—	—	—
De Bilt		97·4	322	e 23 21	?	i 24 21	[+ 7]	e 26 29	PS	e 41·0
Uccle		97·7	321	—	—	e 27 57?	PPS	—	—	e 53·9
Clermont-Ferrand		97·8	315	e 13 43	+ 5	i 24 25	[+ 9]	i 17 42	PP	46·0
Paris		98·6	318	e 14 5	+23	e 24 23	[+ 3]	i 17 44	PP	e 47·0
Bergen		98·7	330	—	—	e 25 17	+ 7	e 26 42	PS	49·0
Tortosa		99·0	310	18 13	PP	i 31 58	SSP	—	—	e 50·0
Alicante		99·4	307	14 19	+33	24 51	−24	15 0	pP	e 42·7
Kew		100·7	321	i 18 2	PP	e 24 24	[− 6]	e 27 8	PS	e 41·0
Almeria		100·8	305	13 23	−29	24 47	[+16]	17 19	PP	49·3
Jersey	E.	101·7	318	—	—	e 27 59	PPS	e 32 39	SS	e 55·0
Granada		101·7	306	13 35a	−21	24 41	[+ 6]	i 18 4	PP	i 52·6
Aberdeen		102·1	326	i 18 9	PP	i 24 42	[+ 5]	i 27 20	PS	50·3
Toledo	E.	102·3	308	e 18 9	PP	24 43	[+ 5]	i 32 55	SS	49·6
Lisbon		106·2	307	i 18 42k	PP	27 59	PS	33 34	SS	50·9
Honolulu		112·4	71	—	—	e 30 22	PPS	e 34 15	SS	e 48·0
College		113·0	23	e 14 33	P	e 29 11	PS	e 35 25	SSP	e 54·3
Sitka		121·9	28	e 20 37	PP	e 30 35	PS	e 37 19	SS	e 51·5
La Plata	E.	125·8	210	—	—	37 4	SS	41 57	SSS	57·7
Santa Lucia	E.	132·3	199	—	—	e 22 48	PKS	—	—	e 62·8
Victoria		133·4	32	e 21 46	PP	e 33 51	PPS	e 40 1	SSP	66·0
Saskatoon		136·8	17	22 19	PP	40 19	SS	45 24	SSS	60·0
Hungry Horse		137·3	25	e 19 10	[−15]	—	—	—	—	—
Shasta Dam		137·9	40	i 19 8	[−19]	—	—	—	—	—
Mineral	Z.	138·4	40	i 19 13a	[−14]	—	—	e 22 30	PP	—
Berkeley		139·5	44	i 19 27a	[− 2]	i 26 29	[− 9]	i 22 22	PP	e 64·6
Butte	N.	139·8	44	e 23 9	PP	e 34 23	PS	e 45 38	SSS	e 59·1
Santa Clara	Z.	140·0	44	e 21 46	?	—	—	—	—	e 68·2
Reno		140·2	40	e 19 26	[− 5]	—	—	e 22 28	PP	—
Lick	Z.	140·2	44	i 19 35	[+ 4]	—	—	e 22 25	PP	—
Bozeman		140·7	26	e 22 34	PP	e 26 36	[− 4]	e 33 42	PS	e 59·2
Halifax		141·3	332	—	—	e 41 31	SSP	—	—	72·0
Fresno		141·8	43	e 19 33	[− 1]	—	—	e 22 32	PP	—
Seven Falls	E.	142·0	341	e 19 42	[+ 8]	e 41 15	SS	—	—	58·0
Shawinigan Falls	N.	143·1	342	e 19 52	[+16]	—	—	—	—	—
Logan		143·3	30	e 19 28	[− 8]	e 41 23	SS	e 22 31	P	e 64·3
Haiwee	Z.	143·4	42	i 19 32a	[− 4]	—	—	—	—	—
Salt Lake City		144·0	31	e 19 29	[− 8]	e 41 38	SS	e 22 47	PP	e 61·4
Pasadena		144·2	45	i 19 34a	[− 4]	e 41 45	SS	i 22 53	PP	59·8
Ottawa		144·9	345	e 20 35k	[+56]	e 42 17	SSP	—	—	73·0
Riverside		144·9	45	e 19 37	[− 2]	—	—	—	—	—
Rapid City	E.	145·0	19	e 20 40	[+61]	—	—	e 23 16	PP	e 61·7
Boulder City		145·5	40	i 19 39	[− 1]	—	—	—	—	—
Pierce Ferry		145·9	39	i 19 39	[− 2]	—	—	—	—	—
La Paz		146·0	215	i 19 42a	[+ 1]	i 29 57	{+ 1}	i 20 47	pPKP	69·0
Weston		146·2	337	i 19 40	[− 1]	41 58	SS	—	—	—
Harvard		146·3	337	e 19 38	[− 3]	—	—	e 20 10	pPKP	e 77·0
Fordham		148·6	339	i 19 47	[+ 2]	e 42 55	SS	—	—	74·0
Cleveland		149·8	351	e 19 54	[+ 7]	i 42 50	SS	e 23 28	SKP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Philadelphia		149·8	340	e 20 54	[+67]	e 31 24	?	—	—	e 64·3
Lincoln	E.	149·9	14	e 20 4	[+17]	e 42 35	SS	e 24 12	PP	e 62·2
Chicago		150·1	0	e 20 12	[+25]	e 43 32	SSP	—	—	e 60·5
Tucson		150·4	42	e 19 49	[+ 1]	e 48 10	SSS	i 20 30	pPKP	e 61·6
Bermuda		150·5	317	e 20 32	pPKP	e 43 25	SSP	—	—	e 63·3
St. Louis		153·1	4	e 19 52	[0]	e 30 52	{+17}	i 20 31	pPKP	—
Huancayo		153·4	207	e 19 56	[+ 4]	e 43 45	SS	e 49 1	SSS	e 62·9
Fort de France		154·1	279	e 19 41	[−12]	—	—	—	—	—
Columbia		157·0	346	e 24 11	PP	e 43 56	SS	e 36 47	PS	e 60·0
San Juan		158·2	290	e 21 12	?	e 44 25	SS	e 24 20	PP	e 79·4
Bogota		164·9	243	e 20 7	[+ 1]	e 31 52	{+14}	—	—	—
Tacubaya		166·4	55	i 20 53	pPKP	i 27 8	[− 1]	—	—	—

Additional readings :—
Perth PP =6m.49s.
Hyderabad SSN =13m.9s.
Poona iPPE =8m.20s., P_cPE =9m.17s., P_cPN =9m.49s., SSE =15m.10s.
Bombay PPN =8m.17s., iN =8m.41s., iSSEN =15m.39s.
Tashkent ePS =18m.5s., eSS =21m.21s.
Riverview iPPZ =12m.7s., iPPPE =13m.20s., iZ =17m.59s., iPSE =18m.11s., iN = 18m.44s., iSSE =21m.48s., iSSSE =24m.7s.
Brisbane iE =13m.51s., iSZ =18m.11s., iSKSE =19m.42s., iN =24m.30s.
Irkutsk S_cS =20m.40s.
Vladivostok P_cP =11m.24s., iSS =23m.51s.
Helwan i =11m.30s., P_cPZ =11m.42s., eZ =12m.20s. and 13m.18s., PPPZ =15m.49s., eZ =17m.3s., PSEN =21m.20s., PPSE =21m.36s., SSN =25m.20s.
Sverdlovsk PPP =16m.7s., iPS =21m.48s., iSS =25m.26s.?, iSSS =29m.15s.
Wellington PPZ =14m.37s., PPPZ =16m.58s., iZ =21m.59s., SSZ =27m.10s., SSS = 30m.57s., Q =31m.44s.
Auckland SSSN =28m.57s.
Arapuni eE =22m.57s.
Moscow SS =27m.58s.
Bucharest eN =15m.16s., ePPPN =17m.32s., ePPPE =17m.36s., ePSN =23m.22s., ePSE =23m.25s.
Belgrade e =13m.25s.
Zagreb e =13m.1s., and 14m.54s.
Helsinki ePP =16m.35s., eSKS =23m.31s., ePS =24m.50s., eSS =29m.44s., eSSS = 33m.6s., e =35m.57s.
Rome iPZ =13m.8s., ePS =24m.42s., eSSE =29m.39s.
Triest epP? =14m.13s., ipPP? =17m.22s., ePPP =18m.46s., iS =24m.5s., iPS =24m.52s., eSS =29m.58s.
Tamanrasset iPZ =13m.12s. and 13m.16s., iZ =13m.37s., isP?Z =13m.42s., iPPZ = 16m.54s., ipPP?Z =17m.11s.
Florence ePSN =25m.13s.
Bologna ePPP?E =19m.6s.
Potsdam eE =14m.57s.?, iZ =15m.8s.k, ePPN =16m.39s., iSKKSZ =24m.32s., eE = 25m.33s., iZ =26m.1s., 26m.10s., and 28m.35s.
Upsala eE =20m.57s.?, and 24m.43s., eSSE =30m.25s., eSSN =30m.35s., eE =36m.25s., eS_cS,S_cS?N =36m.57s.?
Salo e =25m.32s., ePS =25m.50s.
Copenhagen 24m.35s., PS =25m.47s., SS =31m.9s., SSS =35m.15s.
Stuttgart eP =13m.26s.a, e =14m.44s., eZ =15m.13s., ePPP =19m.18s., eSKKS = 24m.37s., e =25m.39s. and 28m.39s., eQ =42·9m.
Zürich eSKS =23m.52s.
Basle e =16m.28s.
Strasbourg e =13m.41s., 14m.5s., 14m.25s., 14m.41s., 15m.17s., and 16m.40s., ePPP = 19m.23s., and 19m.28s., e =20m.25s., 21m.18s., and 21m.44s., eSKS =23m.59s., ePS =26m.4s., e =29m.13s. and 30m.46s., eSS =31m.18s., eSSS =35m.15s. and 35m.48s., e =39m.17s.
Collmberg eE =15m.17s. and 23m.51s., eSSE =30m.29s.
Clermont-Ferraud iPS =26m.36s., iPPS =27m.18s., iSS =31m.56s.
Paris e =16m.23s. and 16m.56s., i =17m.4s. and 17m.16s., ePPP =20m.19s., e =26m.17s., ePS =26m.37s., ePPS =27m.43s., eSS =31m.45s., eSSS =36m.29s., e =38m.15s.
Bergen eE =31m.55s.?
Alicante PP =17m.56s., PPP =19m.33s., PS =26m.15s., PPS =26m.49s., SS =30m.31s.
Kew eZ =18m.11s., iS?E =24m.35s., eSSN =32m.24s., eSSSN =36m.28s.
Almeria PPP =19m.31s., SKS =23m.55s., PS =26m.19s., PPS =27m.7s., SS =31m.47s., SSS =35m.31s.
Granada PS =27m.14s., PPS =28m.6s., iSS =32m.38s., SSS =35m.2s., Q =50m.27s.
Aberdeen iE =21m.45s., iSSE =32m.34s.
Toledo i =27m.15s.
Lisbon Z =20m.47s.
Sitka eS? =28m.17s., e =30m.39s. and 32m.9s.
La Plata PPSE =38m.17s., Q?E =54·5m.

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Victoria e =22m.50s., 31m.54s., 44m.51s., and 53m.57s.?
Saskatoon e =23m.54s.?, e =41m.13s.?
Mineral iZ =19m.23s.a
Berkeley iZ =22m.19s., 26m.59s., 29m.37s., and 31m.37s., iE =32m.41s., iZ = 36m.4s., eE =40m.33s., iN =46m.51s.
Butte eSSN =39m.58s.
Reno eE =19m.38s., eN =19m.55s., eE =20m.50s., iE =22m.21s. and 22m.52s.
Lick eZ =24m.59s.
Bozeman e =24m.38s., eSKKS =28m.11s., e =32m.20s., eSS =39m.55s.
Fresno eE =19m.45s., eN =24m.18s., eE =24m.40s.
Seven Falls eE =21m.2s.
Logan i =19m.34s., ePPP =26m.1s., eSSS =46m.50s.
Salt Lake City ePPP =26m.7s., ePS =33m.7s.
Pasadena iZ =20m.14s. and 21m.43s.
Ottawa e =21m.37s.
Rapid City iE =21m.0s., eE =38m.54s.
La Paz isPKPZ =21m.25s., PP? =23m.17s., iSSZ =42m.27s., SSS =47m.13s.
Harvard i =19m.42s. and 19m.51s., e =20m.57s.?
Fordham i =19m.51s. and 21m.45s.
Cleveland iN =19m.57s., eN =20m.12s., iN =20m.25s., eE =23m.25s., eN =23m.51s., eSN =42m.23s.
Lincoln eSKSPE =33m.25s.
Chicago e =23m.8s. and 31m.10s.
Tucson ePP =23m.25s., ipPP =24m.12s., e =28m.57s., 32m.51s., and 40m.5s.
Bermuda e =25m.50s., ePS =34m.54s., e =43m.57s.
St. Louis e =19m.55s., i =20m.0s., 20m.14s., and 20m.39s., e =31m.22s., eS? =31m.54s., eSS? =36m.41s., e =39m.18s., i =42m.59s., e =45m.54s.
Huancayo e =21m.25s., 22m.41s., 31m.34s., and 33m.57s.
Columbia eSKKS =29m.10s.
San Juan e =28m.42s., 35m.25s., 58m.32s., and 66m.27s.
Tacubaya i =21m.16s., esPP =25m.1s., e =25m.58s. and 32m.45s.
Long waves were also recorded at New Plymouth, Ivigtut, Rathfarnham Castle, Pavia, and Barcelona.

Jan. 23d. Readings also at 0h. and 1h. (2) (near Ashkabad), 2h. (Alicante, Granada, Andijan, Samarkand, near Kulyab, Stalinabad, and near Ashkabad), 3h. (Rome), 4h. (Arapuni, Auckland, Wellington, Riverview, Huancayo, La Paz, Tucson, Helwan, Ksara, and Stuttgart), 5h. (Berkeley and near Ashkabad (2)), 6h. (Ashkabad and Santa Lucia), 7h. (Boulder City, Hungry Horse, College, and Granada), 8h. (Malaga), 10h. (Helwan, College, Andijan, Tchimkent, near Kulyab, Samarkand, Stalinabad, near Alicante (3) and near La Paz), 14h. (Ksara, Jena, near Collmberg, Grozny, Leninakan, Tacubaya, and near La Paz), 15h. (College, Hungry Horse, Pierce Ferry, near Irkutsk, and near Malaga), 16h. (Pasadena, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 19h. (near Andijan and Murgab), 20h. (near Ashkabad), 21h. (College), 22h. (near Ashkabad and near (Alicante).

Jan. 24d. 9h. 15m. 51s. Epicentre 22°·2S., 176°·1W. Depth of focus 0·015.

Intensity IV-V in the Kermadec Islands, and at Nukualofa (Apia).
Epicentres : 21°S. 176°W. (Wellington).
22°S. 176°W. (Strasbourg and Pasadena).
Depth of focus 100km.

The Seismological Report for January-March, 1949, Seismological Observatory, Wellington, New Zealand, p. 3.

$A = -·9246$, $B = -·0630$, $C = -·3756$; $\delta = -7$; $h = +4$;
$D = -·068$, $E = +·998$; $G = +·375$, $H = +·026$, $K = -·927$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		9·3	27	e 2 2	−10	3 33	−22	—	—	—
Auckland	N.	16·6	206	3 44	− 2	6 46	0	4 9	sP	—
Arapuni	E.	17·4	203	—	—	7 9	+ 6	—	—	8·0
Tuai	N.	17·5	198	3 56	− 1	6 55	−11	e 15 38	S_eS	—
New Plymouth	E.	18·8	204	4 15	+ 3	7 33	0	—	—	—
Wellington	Z.	20·5	201	4 29	− 1	8 4	− 3	5 20	PPP	—
Kaimata	NE.	22·8	204	4 54	+ 2	8 52	+ 4	—	—	—
Brisbane		28·5	253	i 5 44	− 1	i 10 24	+ 2	i 6 29	PP	i 12·9
Riverview		31·0	241	i 6 9a	+ 1	i 11 6	+ 4	i 6 30	pP	e 13·1
Melbourne	E.	36·8	236	e 7 1	+ 4	i 12 25	− 6	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Subic Bay		72·4	295	e 13 39	PP	(e 20 41)	+15	—	—	e 20·7
Batavia		75·7	270	i 11 31	− 2	i 21 6	+ 4	—	—	—
Branner	Z.	78·0	41	i 11 46k	0	—	—	—	—	—
San Francisco	E.	78·1	41	e 11 48	+ 2	—	—	—	—	—
Santa Clara		78·1	41	i 11 47	+ 1	e 21 37	+ 9	—	—	—
Berkeley		78·2	41	i 11 47k	0	i 22 38	+69	i 12 8a	pP	e 34·3
Lick		78·3	41	i 11 47	0	e 21 41	+11	—	—	—
Ukiah		78·5	40	e 12 54	+66	e 22 29	+56	—	—	e 32·7
Pasadena		78·6	46	i 11 48k	− 1	i 21 39	+ 5	e 12 13	pP	e 32·3
Riverside		79·0	46	e 11 51	0	—	—	—	—	—
Fresno		79·1	43	i 11 51	− 1	e 21 48	+ 9	e 38 46	P′P′	—
Haiwee		79·9	44	i 11 56	0	—	—	i 38 53	P′P′	—
Shasta Dam		80·0	39	i 12 11	PcP	—	—	—	—	—
Mineral	Z.	80·3	40	i 11 58k	0	—	—	i 12 13a	PcP	—
Vladivostok		80·7	324	i 12 1	+ 1	e 22 3	+ 7	i 12 25	pP	—
Reno		80·8	41	i 12 1k	0	i 22 6	+ 9	i 12 35	pP	—
Boulder City		81·8	46	i 12 6	0	—	—	—	—	—
Pierce Ferry		82·5	46	i 12 10	0	—	—	—	—	—
Tucson		82·6	51	i 12 11	+ 1	e 22 17	+ 2	i 12 30	pP	e 34·5
Victoria		84·7	33	12 23	+ 2	22 41	+ 5	23 26	PS	—
Tacubaya		85·8	68	e 12 26	0	i 22 55	+ 9	i 12 32	PcP	—
Salt Lake City		86·5	43	e 12 19	−11	i 22 51	− 2	e 12 49	pP	e 37·4
Sitka		86·5	21	i 12 28	− 2	i 22 49	− 4	i 23 44	PS	e 35·2
Logan		87·0	42	i 12 29	− 3	e 22 57	− 1	i 15 47	PP	e 36·2
Butte	N.	88·9	39	e 12 39	− 2	e 23 23	+ 7	e 13 16	pP	e 36·8
Hungry Horse		89·4	37	i 12 42	− 1	—	—	—	—	—
College		89·5	12	i 12 42	− 2	e 23 1	[+ 1]	i 24 11	sS	e 36·3
Bozeman		89·7	40	e 12 49	+ 4	i 23 28	+ 5	e 15 57	PP	e 37·1
Rapid City	E.	93·7	44	i 13 7	+ 4	e 23 29	[+ 5]	e 24 7	S	e 44·5
Huancayo		95·2	106	e 13 10	0	e 23 42	[+10]	e 13 43	pP	e 37·9
Saskatoon		95·5	35	17 3	PP	24 30	+17	25 14	sS	37·2
Lincoln	E.	96·7	49	—	—	e 23 34	[− 6]	—	—	—
La Paz		99·7	113	i 13 31k	+ 1	i 24 48	− 1	i 14 1	pP	49·7
St. Louis		100·4	53	i 13 31	− 3	e 24 3	[+ 4]	i 17 37	PP	—
Irkutsk		102·1	322	17 51	PP	i 24 9	[+ 2]	e 18 15	pPP	—
Bogota		102·9	91	e 18 33	PP	e 24 10	[− 1]	e 25 1	SKKS	63·1
Calcutta	E.	103·1	290	e 17 29	PP	i 24 17	[+ 5]	—	—	—
Chicago		103·4	50	—	—	e 24 14	[+ 1]	i 25 13	S	e 52·3
Columbia		106·1	59	—	—	e 25 54	+12	—	—	e 43·9
Cleveland		107·7	52	e 18 32	PP	e 26 5	S	i 18 55	pPP	—
Kodaikanal	E.	108·9	274	e 18 30	PP	—	—	—	—	—
Hyderabad	N.	110·3	282	—	—	24 44	[+ 1]	—	—	—
Philadelphia		112·0	55	e 27 18	?	e 28 27	PS	e 34 48	SS	e 46·4
Ottawa		112·6	49	e 18 21	[0]	e 29 57	PPS	(34 45)	SS	34·8
City College N.Y.		113·1	54	—	—	e 26 59	S	(e 34 43)	SS	e 34·7
Fordham		113·2	54	—	—	i 26 56	S	e 28 57	PS	—
San Juan		114·7	80	—	—	e 27 14	S	—	—	—
Poona	E.	114·9	281	e 22 9	PPP	i 25 2	[+ 1]	i 25 55	SKKS	—
Weston		115·3	52	i 19 25	PP	27 9	?	i 27 59	SP	—
Bombay		115·9	281	e 19 30	PP	i 25 12	[+ 7]	e 29 22	PS	—
Seven Falls	E.	116·2	47	—	—	e 29 27	PS	(39 9?)	SSS	39·2
Almata		117·0	309	—	—	e 25 17	[+ 8]	—	—	—
Frunse		118·7	308	e 18 40	[+ 7]	e 25 24	[+ 9]	—	—	—
Bermuda		119·1	65	e 20 59	PP	e 26 19	[+63]	e 30 47	PS	e 49·4
Andijan		120·2	305	e 18 39	[+ 4]	i 25 29	[+ 9]	e 20 5	PP	—
Tananarive		120·9	230	e 20 38	PP	29 51	PS	36 23	SS	—
Halifax		121·1	50	—	—	e 27 51	?	(37 9?)	PSS	37·2
Tchimkent		122·3	307	e 18 45	[+ 5]	e 25 55	[+28]	—	—	—
Tashkent		122·5	306	e 20 17	PP	i 25 37	[+ 9]	29 32?	SP	—
Samarkand		124·2	304	e 19 5	[+22]	—	—	—	—	—
Sverdlovsk		126·4	325	i 18 50	[+ 2]	25 48?	[+ 8]	e 20 43	PP	—
Ivigtut		127·2	29	—	—	28 27	?	37 27	SS	—
Baku		137·2	306	22 40	PKS	—	—	—	—	—
Moscow		138·2	332	e 19 12	[+ 2]	—	—	i 22 39	sPP	—
Grozny		139·5	311	e 19 18	[+ 6]	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Leninakan		141·6	309	19 16	[0]	—	—	— —	—
Theodosia		145·6	319	19 27	[+ 4]	—	—	— —	—
Copenhagen		146·0	352	i 19 26	[+ 2]	—	—	i 19 52 pPKP	—
Yalta		146·6	319	19 32	[+ 7]	—	—	— —	—
Potsdam		149·0	350	i 19 32a	[+ 3]	—	—	e 20 7? pPKP	—
Ksara		149·6	299	i 19 32	[+ 2]	—	—	23 10 PP	—
Raciborzu	N.	150·0	342	e 19 41	[+11]	—	—	— —	—
Collmberg		150·1	350	e 19 37	[+ 7]	—	—	e 19 40 PKP	—
De Bilt		150·1	358	i 19 33	[+ 3]	—	—	— —	e 70·2
Kew		150·6	6	—	—	e 33 9? SP		e 42 25 SS	e 72·2
Jena	Z.	150·7	349	e 19 32	[+ 1]	—	—	e 23 15 PP	—
Istanbul		151·6	318	e 19 11	[−22]	—	—	19 41 pPKP	—
Ogyalla		151·9	339	e 20 36	[+63]	—	—	e 21 48 ?	—
Budapest	N.	152·0	338	19 43	[+10]	—	—	i 21 0 ?	—
Kalossa		152·8	338	e 19 43	[+ 9]	—	—	e 19 58 PKP_2	—
Stuttgart		153·1	352	e 19 36k	[+ 1]	e 43 4 SS		e 20 16 pPKP	—
Paris		153·4	3	i 19 38	[+ 3]	e 36 27 PPS		i 19 59 PKP_2	e 90·2
Strasbourg		153·5	354	i 19 38	[+ 3]	e 36 19 PPS		i 19 59 PKP_2	72·6
Helwan	Z.	154·2	293	e 19 39	[+ 3]	— —		21 7 pPKP	—
Basle		154·5	354	e 19 39	[+ 3]	— —		e 20 4 pPKP	—
Zagreb		154·5	340	e 19 40	[+ 4]	— —		e 19 55 PKP_2	—
Zürich		154·6	353	e 19 39	[+ 2]	— —		e 20 5 pPKP	—
Triest		155·2	344	i 19 50	[+13]	i 30 23 SKKS		i 20 5 PKP_2	—
Salo		156·0	349	e 19 38	[− 1]	— —		e 20 44 $pPKP_2$	—
Clermont-Ferrand		156·5	2	i 19 44	[+ 5]	— —		i 20 13 PKP_2	77·2
Pavia		156·7	351	e 20 9?	PKP_2	— —		— —	—
Bologna		156·9	346	e 19 43a	[+ 3]	e 29 56 SKKS		e 20 15 PKP_2	—
Florence		157·6	346	i 20 17a	PKP_2	e 29 45 SKKS		e 43 7 SS	—
Prato		157·6	347	e 19 39	[− 2]	e 29 19 ?		— —	—
Rome		159·1	342	i 19 40a	[− 2]	e 30 20 SKKS		20 22 pPKP	e 76·2
Toledo		161·1	20	i 19 46	[+ 1]	26 36 [+ 1]		i 20 30 PKP_2	—
Alicante		163·5	12	19 52	[+ 5]	26 52 [+15]		20 36 PKP_2	e 71·2
Granada		163·7	22	i 19 45k	[− 3]	30 59 SKKS		20 36 PKP_2	82·2
Malaga	Z.	163·8	25	i 19 49a	[+ 1]	— —		i 20 30 PKP_2	79·5
Almeria		164·4	19	i 19 58	[+10]	26 58 [+21]		20 44 PKP_2	71·6
Algiers		165·4	3	19 39	[−10]	e 35 9 ?		e 20 50 pPKP	—
Tamanrasset	Z.	178·4	—	e 19 58k	[+ 3]	e 21 34 sPKP		e 20 20 pPKP	—

Additional readings :—
Auckland P_cPN =8m.48s., P_cSN =11m.25s., S_cSN =15m.35s., sS_cSN =16m.9s., S_cSS_cSN =25m.19s.
Tuia eN =6m.51s.
Wellington iZ =7m.7s., P_cP =8m.53s., S_cS =15m.48s., sS_cS =16m.37s.
Kaimata iNE =6m.54s.
Brisbane iE =6m.51s., iN =6m.56s., iSE =10m.28s., iSSN =11m.4s., iZ =12m.29s.
Riverview iPPEZ =7m.17s., iZ =7m.29s. and 7m.49s., iEN =8m.40s., iE =11m.10s., iS_cPZ =12m.58s., iS_cSEN =16m.37s.
Berkeley ipPZ =11m.50s., iZ =22m.23s., iE =23m.24s.
Pasadena i =12m.20s., iEN =22m.11s., eSSEN =26m.38s., iPKP,PKP,Z =38m.54s.
Vladivostok i =22m.11s.
Reno iE =12m.53s.
Tucson iPP =15m.19s., esS =23m.5s., e =27m.23s.
Victoria PP =12m.59s.
Salt Lake City ePP =15m.51s., eS =22m.42s., i =23m.35s., eSS =28m.29s.
Sitka eSS =28m.41s., e =29m.32s.
Logan i =12m.49s., e =15m.52s., ePPP =17m.52s., isS =23m.46s., e =28m.46s.
Butte esSN =24m.14s., eSSN =29m.14s.
College iS =23m.5s., eSS =29m.15s.
Bozeman eSKS =23m.12s., e =25m.29s.
Rapid City ePP?E =16m.9s., ePPPE =17m.46s.
Huancayo ePP =16m.59s., e =28m.34s. and 30m.56s.
La Paz iPPZ =17m.35s., ipPPZ =18m.9s., PPPN =19m.57s., iSKSE =24m.1s., iEN =25m.9s., iPSN =26m.19s., iE =29m.17s., QNZ =46m.9s.
St. Louis iSE =25m.3s., iE =25m.48s., iPS?N =25m.52s., iSSN =31m.58s., eN =32m.35s.
Irkutsk S =24m.55s., PS =26m.49s.
Bogota eEN =33m.12s.
Chicago iSKS =24m.24s., eSS =33m.5s.

Continued on next page.

Cleveland iPKP = 18m.45s., eSKKSE = 25m.26s., esSKKSE = 26m.9s., esSN = 26m.49s., eN = 26m.58s., eE = 27m.53s., eSSN = 33m.38s., esSSN = 34m.21s., eN = 37m.8s., eSSS?N = 37m.41s., eN = 38m.7s.
Ottawa e = 26m.54s. and 27m.37s.
Fordham i = 27m.32s., eSS? = 34m.56s.
San Juan i = 27m.56s., e = 32m.57s.
Bermuda e = 27m.23s. and 34m.9s., eSS = 36m.59s.
Andijan ePPP = 22m.41s.?.
Tananarive SSS? = 39m.44s.
Tashkent sPP = 20m.51s., iSKKS = 26m.23s., pPS = 30m.23s.
Sverdlovsk ipPP = 21m.9s., iPKS = 22m.34s., SKKS = 27m.31s.
Potsdam iZ = 19m.36s. and 19m.42s., eEN = 19m.45s., iZ = 20m.0s. and 20m.4s., ipPKPE = 20m.13s., ipPKPZ = 20m.17s., iZ = 21m.28s., iPPZ = 23m.21s.
Jena ePKP?N = 19m.36s., iZ = 19m.39s., eZ = 20m.9s.
Stuttgart ePKPZ = 19m.43s., epPKP?Z = 19m.57s., eZ = 21m.19s., ePPZ = 23m.26s., eSS = 43m.42s.
Paris i = 19m.46s., 20m.27s., and 20m.41s., iPP = 23m.36s., e = 33m.27s.
Strasbourg i = 19m.46s., e = 19m.51s., epPKP? = 20m.27s., ePP = 23m.36s., epPP? = 23m.57s. and 24m.1s., e = 24m.53s., ePP_2 = 27m.43s., eSKKS? = 30m.17s., $eSKKS_2$ = 34m.17s., e = 37m.15s., eSS = 42m.54s., e = 43m.42s., 44m.51s., and 44m.57s., eSSS = 48m.55s., e = 52m.55s., 56m.22s., 60m.33s., 60m.43s., and 65m.9s.
Helwan eZ = 19m.47s., 20m.4s., 20m.39s., and 22m.5s., PPZ = 23m.36s., SN = 30m.18s., eZ = 32m.7s., sSZ = 32m.57s., eZ = 33m.49s., SSN = 34m.27s.
Zürich e = 19m.47s.
Salo $iPKP_2$ = 20m.9s., e = 20m.31s.
Clermant-Ferrand iPP = 23m.57s.
Bologna e = 27m.48s.
Florence $ePKP_2$?N = 20m.40s.
Rome $iPKP_2$ = 20m.16s., i = 20m.47s. and 24m.28s., eN = 31m.30s., e = 32m.18s., PSKS = 34m.9s., SS = 43m.49s.
Toledo i = 20m.57s., iPP = 24m.12s.
Alicante PKS = 23m.12s., PP = 24m.30s., PPS = 37m.2s., SS = 43m.44s., SSP = 44m.54s.
Granada iPP = 24m.27s., SKSP = 34m.23s., SS = 45m.35s.,
Malaga iPPZ = 24m.29s.
Almeria PP = 24m.30s., PPP = 28m.18s., SKKS = 31m.16s., PPS = 37m.58s., SS = 44m.50s., SSS = 51m.2s.
Algiers e = 20m.9s., 26m.17s., and 31m.9s.
Tamanrasset $ePKP_2Z$ = 21m.49s., iPPZ = 25m.42s., iZ = 28m.49s., and 30m.19s., eZ = 32m.23s., 33m.8s., and 36m.8s.
Long waves were also recorded at Honolulu and Upsala.

Jan. 24d. Readings also at 0h. (Ashkabad, near Santa Clara, Berkeley, Lick, Brønner, Fresno, San Francisco, Mineral, and Reno), 1h. (Bombay, Pierce Ferry, Tucson, Pasadena, and Haiwee), 2h. (College and Hungry Horse), 3h. (College and Ashkabad), 4h. (near Berkeley, Lick, Branner, and San Francisco), 5h. (Tamanrasset, Ottawa, Boulder City, Huancayo, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, La Paz, and near Fort de France), 6h. (Bogota and Tananarive), 7h. (Tucson and near Granada), 8h. (College, Hungry Horse, and Ashkabad), 9h. (Tucson, Ottawa, and near Florence), 10h. (Alicante), 11h. (Alicante and near Ashkabad), 13h. (College), 14h. (Santa Lucia), 19h. (Frunse, near Andijan, and Tchimkent), 20h. (Ashkabad, Andijan, near Kulyab, and Stalinabad), 21h. (Auckland, Boulder City, near Branner, Lick, near Balboa Heights, and near Ashkabad (2)), 22h. (Hungry Horse, Ashkabad, Stuttgart, Wellington, and Arapuni), 23h. (College, Hungry Horse, Logan, Pierce Ferry, Shasta Dam, and near Apia).

Jan. 25d. 7h. 53m. 6s. Epicentre 11°·5N. 86°·3W. (as on 1948, March 23d.).

A = +·0633, B = −·9782, C = +·1981 ; δ = +13 ; h = +6 ;
D = −·998, E = −·065 ; G = +·013, H = −·198, K = −·980.

	Δ	Az.	P.	O−C.	S.	O−C.		Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Balboa Heights	7·0	109	e 1 38	− 8	—	—	—	—	—
Bogota	13·9	119	e 3 12	− 9	e 5 48	− 9	e 11 46	ScP	6·5
Tacubaya	14·7	304	i 3 40	+ 9	—	—	e 3 51	PP	—
San Juan	20·6	68	—	—	e 8 46	+17	—	—	e 13·4
Huancayo	25·8	155	e 5 23	−11	(e 9 51)	−11	—	—	e 9·8
St. Louis	27·2	354	i 5 49	+ 2	—	—	e 11 37	SS	—
Tucson	30·6	317	i 6 20	+ 2	—	—	—	—	—
La Paz	33·1	147	e 6 38	− 2	i 13 42	SS	7 50	PP	16·8
Ottawa	35·0	13	e 6 57	+ 1	—		—	—	18·9
Pierce Ferry	35·0	319	i 6 58	+ 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		35·5	319	e 6 58	− 2	—	—	—	—	—
La Jolla	z.	35·5	313	i 7 4	+ 4	—	—	—	—	—
Pasadena		36·8	315	i 7 15k	+ 4	—	—	—	—	—
Logan		37·5	329	e 7 17	0	—	—	—	—	—
Tinemaha	z.	38·4	318	i 7 29k	+ 4	—	—	—	—	—
Fresno	z.	39·2	316	e 7 24	− 7	—	—	—	—	—
Berkeley		41·5	316	i 7 54k	+ 4	—	—	—	—	e 20·9
Hungry Horse		43·4	333	i 8 7	+ 1	—	—	—	—	—

Additional readings :—
Bogota eS_cSEN =15m.40s.
San Juan e =8m.50s.
La Paz iN =15m.18s.
Boulder City iP =7m.2s.
Logan e =7m.37s.
Fresno eP_cN =7m.27s.
Long waves were also recorded at Bermuda, Philadelphia, Weston and Seven Falls.

Jan 25d. Readings also at 0h. (Stuttgart, near Tananarive, and near Almata), 2h. (near Ashkabad (2)), 3h. (Pierce Ferry, Shasta Dam, Hungry Horse, College, and Ashkabad), 4h. (Apia, Auckland, Wellington, Boulder City, Pierce Ferry, Shasta Dam, Berkeley, Reno, Fresno, Hungry Horse (2), Logan, College (2), Clermont-Ferrand, Collmberg, Strasbourg, and Stuttgart), 5h. (Ashkabad and near Mizusawa), 6h. (Pierce Ferry and Shasta Dam,) 8h. (near Ashkabad (2)), 9h. (College (2), Hungry Horse, Almata, Samarkand, near Andijan, Frunse, Kulyab, Murgab, Stalinabad, Tashkent, Tchimkent, and near Klyuchi), 11h. (near Murgab), 13h. (Bogota and Strasbourg), 16h. (Ashkabad), 17h. (Jena and near Collmberg), 18h. (Wellington, College, Hungry Horse, La Paz, near Huancayo, near Ottawa, near Tacubaya (2), and near Ashkabad), 21h. (Hungry Horse), 23h. (Boulder City, Pierce Ferry, and near Ashkabad.)

Jan. 26d. 23h. Undetermined shock. Peru.

La Paz iPZ =40m.20s.k, iP_g =40m.44s., iS =41m.20s., iS_g =41m.50s.
Huancayo eP =40m.37s., iS =41m.40s., iL =41m.55s.
Bogota eP =44m.9s., eS =47m.59s., eP_cP =48m.33s.
Pierce Ferry iP =49m.52s.
Boulder City eP =50m.11s.
Hungry Horse iP =50m.46s.
Shasta Dam iP =50m.46s.
Tamanrasset iPZ =51m.48s.k.

Jan. 26d. Readings at 0h. (College, Hungry Horse, Poona, Almata, Stalinabad, near Andijan, Frunse, Kulyab, Murgab, Samarkand, Tashkent, and Tchimkent), 1h. (College), 3h. (Kaimata, New Plymouth, near Tuai, and Wellington), 5h. (Ashkabad), 6h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and near Santa Lucia), 7h. (Ashkabad), 8h. (near Alicante), 9h. (2) and 11h, (2) (near Ashkabad), 12h. (Batavia), 13h. and 14h. (Santa Lucia), 16h. (near Ashkabad), 18h. (Ashkabad (2) and Hungry Horse (3)), 19h. (Ashkabad), 20h. (near Tucson), 23h. (Pierce Ferry, Hungry Horse, and Ashkabad).

Jan. 27d. 7h. 18m. 7s. Epicentre 3°·5S. 152°·5E. (as on 1948, Jan. 12d.).

Approximate.

$A = -·8854$, $B = +·4609$, $C = -·0606$; $\delta = +3$; $h = +7$;
$D = +·462$, $E = +·887$; $G = +·054$, $H = -·028$, $K = -·998$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		23·9	178	i 5 14	− 2	i 9 34	+ 4	i 5 38	PP	i 12·3
Riverview		30·2	182	e 6 11	− 3	e 11 8	− 5	i 7 6	PP	e 13·0
Melbourne	E.	34·8	191	e 7 26	+32	e 12 24	− 1	—	—	i 14·8
Auckland	N.	39·0	151	9 55	P$_c$P	13 50	+21	—	—	18·4
Arapuni	E.	40·4	152	—	—	14 5	+15	—	—	19·9
Wellington		42·6	155	9 42	PP	14 26	+ 3	17 38	SS	20·9
Perth		44·6	226	14 33	S	(14 33)	−19	—	—	i 21·3
Batavia		45·6	264	i 7 32	−52	i 13 28	?	—	—	—
Vladivostok		50·0	340	e 8 49	− 9	e 15 52	−17	i 10 46	PP	—
Honolulu		54·5	60	—	—	e 17 36	+26	—	—	e 25·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	67·7	296	—	—	e 19 35	−23	—	—	—
Irkutsk		69·3	331	e 11 10	− 1	20 4	−13	24 37	SS	—
Hyderabad	N.	75·9	289	e 12 16	+26	21 14	−18	—	—	31·6
Poona	E.	80·4	289	e 11 53	−22	—	—	—	—	—
College		80·8	22	e 12 17	0	e 22 32	+ 7	—	—	e 33·8
Bombay		81·4	290	e 12 17	− 3	e 22 16	−15	e 12 34	P_cP	39·2
Murgab		83·2	309	12 23	− 6	—	—	—	—	—
Frunse		83·5	314	e 12 38	+ 7	—	—	—	—	—
Sitka		83·5	32	—	—	e 23 3	+11	—	—	e 35·2
Andijan		84·8	311	e 12 36	− 1	—	—	—	—	—
Tchimkent		87·1	312	e 12 43?	− 6	e 23 24	− 4	—	—	—
Tashkent		87·2	311	e 12 42	− 7	e 29 29?	SS	e 24 20	PS	—
Stalinabad		87·3	309	e 12 45	− 5	i 23 20	[+ 4]	—	—	—
Berkeley		88·4	53	i 13 9a	+14	e 23 37	− 3	i 29 43	SS	e 41·0
Shasta Dam		88·5	49	i 13 2	+ 6	—	—	—	—	—
Santa Clara		88·6	53	e 13 15	+19	e 23 28	[+ 4]	—	—	e 41·4
Victoria		88·7	42	13 19	+22	23 43	0	25 7	PPS	37·3
Lick	Z.	88·8	53	e 13 5	+ 8	—	—	i 16 37	PP	—
Samarkand		88·8	310	e 12 59	+ 2	—	—	—	—	—
Mineral	Z.	89·1	50	e 13 5	+ 7	e 28 52	SS	e 16 39	PP	e 49·5
Seattle		89·3	43	—	—	e 22 23	?	—	—	e 41·6
Fresno	Z.	90·2	53	e 13 12	+ 8	—	—	—	—	—
Reno		90·4	51	e 13 11	+ 7	e 24 9	+11	—	—	—
Pasadena		91·4	56	e 13 14	+ 5	e 30 11	SS	i 16 55	PP	38·0
Tinemaha	Z.	91·5	53	e 13 28	+18	—	—	—	—	—
Boulder City		94·2	54	i 13 33	+11	—	—	—	—	—
Hungry Horse		94·9	42	i 13 30	+ 5	—	—	—	—	—
Pierce Ferry		94·9	54	e 13 28	+ 3	—	—	e 13 31	PcP	—
Logan		96·6	48	e 13 49	+16	e 25 23	+31	e 17 39	PP	e 45·9
Bozeman		97·0	44	—	—	e 24 22	[+10]	e 26 33	PS	e 44·7
Tucson		97·5	58	e 13 39	+ 2	e 27 29	PPS	e 17 46	PP	e 41·0
Tananarive		103·0	250	—	—	—	—	e 40 5	Q	e 50·3
St. Louis		113·3	49	e 19 40	PP	e 29 19	PS	e 39 5	SSS	—
Ksara		113·9	306	e 19 45	PP	—	—	—	—	57·9
Cleveland	N.	118·7	43	—	—	e 27 46	?	—	—	50·5
Ottawa		120·8	37	e 18 57	[+ 3]	e 37 3	SS	e 28 35	?	51·3
Fordham		124·2	40	—	—	e 38 3	SSP	—	—	54·4
De Bilt		124·5	336	—	—	e 39 53?	?	—	—	e 56·9
Weston		125·0	38	—	—	38 9	SSP	—	—	—
Stuttgart		125·1	331	e 19 1	[− 2]	e 37 53	SS	e 19 5	PKP	63·9
Strasbourg		125·9	332	—	—	e 38 26	SSP	e 42 33	SSS	e 59·9
Basle		126·8	330	e 19 26	[+20]	—	—	—	—	e 75·9
Kew		127·1	338	—	—	e 34 53?	?	e 53 53?	Q	e 66·9
Huancayo		130·0	108	e 19 26	[+14]	e 39 25	SSP	—	—	e 54·4
Bogota		133·5	86	e 19 37	[+19]	e 23 13	SKP	e 25 5	PPP	66·9
Bermuda		134·9	45	e 23 15	SKP	e 27 1	[+30]	e 34 10	PPS	e 57·2
La Paz		135·2	117	i 19 29	[+ 7]	26 29	[− 2]	40 7	SS	66·3
San Juan		139·4	64	e 26 7	PPP	e 35 22	PPS	—	—	e 67·6
Almeria		139·6	328	e 19 27	[− 3]	—	—	e 63 57	Q	e 72·9
Malaga	Z.	140·7	330	e 19 32	[0]	—	—	—	—	73·8
Lisbon		141·2	336	22 35a	PP	—	—	—	—	72·9
Tamanrasset	Z.	142·7	305	e 19 7	[−28]	—	—	e 22 29	PP	—
Fort de France		145·0	69	e 19 54	[+15]	—	—	—	—	—

Additional readings :—
Brisbane iNZ = 6m.8s., iE = 6m.11s. and 11m.3s.
Riverview iPcPZ = 9m.5s., iScS?E = 16m.22s.
Wellington PcP = 10m.9s., Q = 20m.3s.
Vladivostok iPPP = 11m.54s., iPS = 16m.4s., iSS = 19m.29s.
Tashkent eSSS = 32m.29s.
Berkeley iZ = 13m.17s., eN = 23m.53s., eZ = 23m.57s., ePSN = 25m.41s., iN = 30m.1s., eN = 38m.23s.
Victoria e = 23m.58s.
Reno eZ = 13m.21s., eEN = 13m.25s., eZ = 13m.51s., eN = 17m.39s., eE = 24m.13s. and 24m.37s.
Pasadena iZ = 13m.23s., eE = 23m.51s.

Continued on next page.

Bozeman eS =25m.28s.
Tucson eSS =32m.25s.
St. Louis e =25m.55s., eS =27m.29s., e =28m.24s.
Cleveland eN =28m.58s., eE =31m.35s., eEN =36m.44s.
Strasbourg e =47m.18s. and 51m.30s., eL =54m.3s.
Huancayo e =22m.37s. and 29m.8s.
Bermuda eSS =40m.1s.
La Paz iE =23m.17s., Q =58m.17s.
Long waves were also recorded at Tacubaya and other European and North American stations.

Jan. 27d. 10h. 59m. 59s. Epicentre 54°·6N. 163°·5E.

A = −·5579, B = +·1653, C = +·8133 ; δ = +3 ; h = −7 ;
D = +·284, E = +·959 ; G = −·780, H = +·231, K = −·582.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Klyuchi		2·3	318	(0 47?)	P_g	(i 1 17?)	S_g	— —	—
Vladivostok		23·5	253	e 5 8	− 4	i 9 46	SS	— —	— (i 12·0)
College		25·9	47	i 5 34	− 1	e 10 3	− 1	e 6 27 PP	e 12·3
Sitka		33·3	60	—	—	i 12 9	+ 7	— —	e 17·5
Irkutsk		34·4	291	e 8 7	PP	e 12 43	+24	— —	—
Hungry Horse		49·0	61	i 8 50	0	—	—	— —	—
Shasta Dam		49·5	74	e 8 52	− 2	—	—	— —	—
Mineral	z.	50·2	74	i 9 0	0	—	—	— —	—
Berkeley		51·5	77	i 9 11a	+ 2	e 16 35	+ 6	— —	e 25·3
Reno		51·7	74	e 9 13k	+ 2	e 16 38	+ 6	i 11 3 PP	—
Lick	z.	52·2	77	i 9 15	0	—	—	— —	—
Fresno	z.	53·7	76	i 9 27	+ 1	—	—	— —	—
Tinemaha	z.	54·4	75	i 9 33	+ 2	—	—	— —	—
Logan		54·6	66	e 9 32	0	—	—	— —	—
Pasadena		56·5	77	i 9 46k	0	e 17 40	+ 3	— —	—
Boulder City		57·0	73	i 9 50	0	—	—	— —	—
Pierce Ferry		57·4	72	e 9 53	0	—	—	— —	—
Tchimkent		58·9	300	e 10 9	+ 6	—	—	— —	—
Murgab		59·6	294	10 18	+10	—	—	— —	—
Tashkent		59·8	300	e 10 14	+ 5	—	—	— —	—
Tucson		62·0	73	i 10 25	+ 1	—	—	e 12 38 PP	e 37·0
Stalinabad		62·1	298	e 10 19	− 6	—	—	— —	—
Calcutta	E.	63·4	272	—	—	e 19 22	+16	— —	—
St. Louis		67·8	55	e 11 2	0	i 20 1	+ 1	i 11 29 pP	—
Ottawa		68·5	41	e 11 4	− 2	—	—	e 13 39 PP	36·0
Grozny		69·0	316	e 11 8	− 1	—	—	— —	—
Leninakan		71·9	316	e 11 38	+11	—	—	— —	—
Hyderabad	N.	73·1	277	—	—	e 20 55	− 6	— —	—
Philadelphia		73·3	44	e 13 26	?	—	—	— —	e 38·3
Stuttgart	z.	74·8	343	e 11 41	− 3	—	—	e 11 51 P_cP	—
Poona	E.	74·9	281	e 11 36	− 8	e 21 15	− 7	— —	—
Bombay	E.	75·2	282	e 19 32	?	e 21 13	−12	— —	—
Strasbourg		75·2	344	i 11 44	− 2	—	—	e 11 54 P_cP	e 36·4
Paris		75·7	348	i 11 47	− 2	e 22 20	PPS	i 11 56 P_cP	e 46·0
Basle		76·2	344	e 11 41	−11	—	—	— —	—
Zürich		76·2	343	e 11 49	− 3	—	—	— —	—
Clermont-Ferrand		78·6	346	e 12 4	− 1	—	—	— —	48·0
Ksara		81·1	318	12 1?	−17	—	—	— —	—
Helwan		86·3	319	e 12 41	− 4	e 23 9	[0]	e 12 53 P_cP	—
Riverview	E.	88·7	189	—	—	e 23 43	0	e 33 13 SSS	e 44·8
Tamanrasset	z.	100·6	340	e 17 49	PP	—	—	— —	—

Additional readings and note :—
Klyuchi readings have been reduced by 1 minute.
Vladivostok iPP =8m.23s., L given as SSS at 12m.1s.
Berkeley iZ =9m.21s., eN =16m.31s.
Reno eZ =9m.33s., ePPE =11m.41s.
St. Louis esS =20m.48s.
Strasbourg e =31m.8s.
Helwan eZ =13m.3s.
Long waves were also recorded at Bermuda and at other North American and European stations.

Jan. 27d. 14h. 58m. 32s. Epicentre 3°·5S. 152°·5E. (as at 7h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		23·9	178	i 5 12	− 4	i 9 36	+ 6	i 5 43	PP	i 12·0
Riverview		30·2	182	e 6 14	0	e 11 9	− 4	i 7 18	PP	e 13·0
Melbourne	E.	34·8	191	e 7 31	+37	e 12 28	+ 3	—	—	i 14·7
Auckland	N.	39·0	151	—	—	e 13 46	+17	—	—	17·5
Arapuni	E.	40·4	152	—	—	e 14 28?	+38	—	—	—
Wellington		42·6	155	10 10	PPP	13 15	−68	10 36	?	19·5
Batavia		45·6	264	i 8 27	+ 3	e 15 9	+ 3	—	—	—
Vladivostok		50·0	340	e 8 55	− 3	i 16 10	+ 1	i 11 0	PP	—
Calcutta	E.	67·7	296	e 12 35	?	e 19 48	−10	—	—	—
Irkutsk		69·3	331	e 11 15	+ 4	e 27 28?	SSS	e 13 53	PP	—
Poona	E.	80·4	289	e 12 9	− 6	—	—	—	—	—
College		80·8	22	i 12 15	− 2	e 22 26	+ 1	e 27 21	SS	e 37·7
Bombay		81·4	290	e 12 22	+ 2	e 22 22	− 9	—	—	—
Murgab		83·2	309	12 26	− 3	—	—	—	—	—
Frunse		83·5	314	e 12 53?	+22	—	—	—	—	—
Sitka		83·5	32	e 12 48	+17	i 23 2	+10	e 28 34	SS	e 34·5
Andijan		84·8	311	e 12 35	− 2	—	—	—	—	—
Tchimkent		87·1	312	e 12 44	− 5	—	—	—	—	—
Tashkent		87·2	311	e 12 40	− 9	e 23 22?	{+ 1}	e 29 37?	SS	—
Stalinabad		87·3	309	e 12 45	− 5	e 23 20	− 9	—	—	—
Berkeley		88·4	53	e 13 4	+ 9	e 23 51	+11	—	—	e 40·9
Shasta Dam		88·5	49	i 13 0	+ 4	—	—	—	—	—
Victoria		88·7	42	—	—	e 23 52	+ 9	—	—	35·5
Lick	z.	88·8	53	e 13 9	+12	—	—	e 16 41	PP	—
Samarkand		88·8	310	e 12 56	− 1	—	—	—	—	—
Mineral	z.	89·1	50	e 13 2	+ 4	—	—	e 16 38	PP	—
Reno		90·4	51	e 13 10	+ 6	e 25 10	PS	—	—	—
Pasadena		91·4	56	e 13 14	+ 5	e 25 24	PS	e 16 48	PP	e 38·3
Tinemaha	z.	91·5	53	e 13 16	+ 6	—	—	—	—	—
Boulder City		94·2	54	i 13 31	+ 9	—	—	—	—	—
Hungry Horse		94·9	42	i 13 28	+ 3	—	—	—	—	—
Pierce Ferry		94·9	54	i 13 34	+ 9	—	—	—	—	—
Tucson		97·5	58	e 13 47	+10	—	—	e 17 8	PP	e 45·5
Stuttgart	z.	125·1	331	e 19 2	[− 1]	—	—	—	—	—
Kew		127·1	338	—	—	e 43 23	SSS	—	—	e 65·5
Rome		127·7	322	e 18 6	[−62]	—	—	—	—	—
Huancayo		130·0	108	e 22 46	SKP	—	—	—	—	e 54·3
La Paz		135·2	117	i 22 4	PP	i 22 39	SKP	—	—	65·5
Tamanrasset	z.	142·7	305	e 19 40	[+ 5]	—	—	e 22 23	PP	—

Additional readings :—
Brisbane iZ =6m.21s. and 7m.18s., iSE =9m39s., iSSN =10m.22s.
Vladivostok iP_cP =10m.22s., iS =16m.4s., eSS =19m.28s.
College eSSS =32m.1s.
Sitka e =23m.16s.
Berkeley eN =25m.44s. and 38m.46s.
Reno eEN =13m.14s., eN =13m.29s., eE =13m.40s., eN =17m.40s.
Long waves were also recorded at Honolulu, Bermuda, Seven Falls, Chicago, and at other European stations.

Jan. 27d. Readings also at 0h. (Shasta Dam, near Bogota, and near Ashkabad (2)), 1h. (near Zürich and near La Paz), 2h. (Brisbane, Riverview, College, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Mount Wilson, and Tinemaha), 3h. (Brisbane, Riverview, Wellington (2), College, Hungry Horse (2), Pierce Ferry, Shasta Dam (2), Mount Wilson, and Tinemaha), 4h. (near Zürich and near Ashkabad), 5h. (Ashkabad and Bombay), 6h. (Hungry Horse, Shasta Dam, and near Klyuchi), 8h. (Hungry Horse), 9h. (Andijan, near Kulyab, and Stalinabad), 10h. (Hungry Horse, Pierce Ferry, and near Andijan), 11h. (Hungry Horse and Ashkabad), 13h. (Hungry Horse), 14h. (near Ashkabad), 16h. (Calcutta), 17h. (Helwan, Ksara, and Ashkabad), 19h. (Pierce Ferry), 20h, (Santa Lucia and near La Paz), 21h. (near Tucson), 22h. (Boulder City, College, Pierce Ferry, and Pasadena), 23h. (Ksara and near Ashkabad).

Jan. 28d. 8h. 18m. 4s. Epicentre 28°·7N. 43°·6W. (as on 1947, June 20d.).

$A = +\cdot6362$, $B = -\cdot6058$, $C = +\cdot4777$; $\delta = -6$; $h = +2$;
$D = -\cdot690$, $E = -\cdot724$; $G = +\cdot346$, $H = -\cdot329$, $K = -\cdot879$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		18·5	287	i 4 16	− 3	e 7 44	0	—	—	e 8·9
Fort de France		21·4	231	e 4 47	− 4	i 8 51	+ 6	—	—	—
Halifax		22·5	321	5 6	+ 4	9 6	+ 1	5 27	PP	11·9
San Juan		23·0	248	e 5 6	− 1	e 9 16	+ 2	e 5 20	PP	e 9·7
Weston		26·2	309	i 5 41	+ 3	e 10 16	+ 7	—	—	—
Harvard		26·4	309	e 5 43	+ 3	—	—	—	—	e 11·9
Fordham		27·5	305	e 5 59	+ 9	i 10 39	+ 9	—	—	13·2
Seven Falls	E.	28·1	319	e 5 56	+ 1	—	—	(7 56?)	PPP	7·9
Philadelphia		28·3	302	e 7 0	PP	e 11 40	SS	—	—	e 13·9
Ottawa		30·3	313	e 6 12	− 3	e 11 26	+11	—	—	14·9
Columbia		32·3	290	e 6 28	− 5	e 11 51	+ 5	—	—	e 15·0
Cleveland		33·3	303	i 4 22	?	i 12 28	+26	—	—	—
Malaga	Z.	33·8	65	i 6 42k	− 4	i 12 12	+ 2	i 8 8	PP	16·8
Toledo	Z.	34·3	60	e 6 49	− 1	e 12 35	+18	—	—	—
Granada		34·4	64	i 6 55k	+ 4	13 28	+69	7 7	pP	—
Almeria		35·3	65	i 7 3	+ 4	i 12 43	+10	8 25	PP	18·0
Alicante		36·9	63	7 17	+ 5	13 9	+11	8 45	PP	19·1
Bogota		37·5	236	e 7 29	+12	e 12 58	− 9	e 8 41	PP	15·9
Tortosa	E.	37·8	59	7 25	+ 5	13 28	+17	—	—	—
St. Louis		39·7	298	i 7 36	0	e 13 47	+ 7	i 9 6	PP	—
Clermont-Ferrand		40·3	52	i 7 44	+ 4	i 14 1	+12	i 9 24	PP	19·9
Paris		40·4	46	i 7 43	+ 2	—	—	e 9 25	PP	e 17·9
De Bilt		42·9	42	—	—	e 13 38	−49	—	—	e 15·9
Basle		43·6	50	e 8 9	+ 1	e 14 18	−20	e 10 0	PP	—
Strasbourg		43·8	48	i 8 13	+ 4	—	—	e 9 56	P_cP	e 21·9
Zürich		44·2	50	e 8 13a	+ 1	—	—	—	—	—
Tamanrasset	Z.	44·4	85	e 8 16	+ 2	e 15 6	+17	—	—	—
Pavia		44·5	53	e 8 16?	+ 1	—	—	—	—	—
Stuttgart		44·8	48	e 8 18	+ 1	e 15 8	+13	e 10 11	PP	e 21·9
Salo	Z.	45·4	53	e 8 23	+ 1	—	—	—	—	—
Prato		45·8	56	e 8 32	+ 7	14 8	S_cP	—	—	—
Florence	Z.	45·9	55	e 8 36	+10	—	—	—	—	—
Bologna		46·0	55	e 8 30	+ 3	—	—	—	—	—
Jena		46·6	46	e 8 31	− 1	—	—	—	—	—
Rome		46·9	57	i 8 32	− 2	i 13 33	?	i 10 22	PP	e 22·6
Collmberg		47·5	45	e 8 40	+ 2	—	—	—	—	—
Triest		47·7	52	i 8 43	+ 3	i 15 47	+11	i 10 33	PP	—
Zagreb		49·3	53	e 8 59	+ 6	—	—	—	—	—
Rapid City	E.	49·3	305	e 8 53	0	e 15 56	− 3	e 10 59	PP	e 24·9
Lubbock		49·5	291	i 8 58	+ 4	—	—	—	—	—
Huancayo		50·8	222	e 9 1	− 3	—	—	—	—	—
La Paz		50·8	211	i 9 1a	− 3	i 16 39	+19	i 11 13	PP	24·5
Tacubaya		51·2	272	e 9 44	+37	—	—	—	—	—
Bozeman		54·8	308	e 9 42	+ 8	e 17 22	+ 8	e 11 3	PP	e 20·3
Butte	N.	55·8	309	e 10 11	+30	—	—	—	—	e 28·1
Logan		55·9	303	e 9 39	− 3	e 17 32	+ 3	e 11 42	PP	e 29·0
Hungry Horse		56·5	311	i 9 45	− 1	—	—	—	—	—
Tucson		57·2	292	e 9 49	− 2	e 17 42	− 4	e 12 9	PP	e 37·9
Pierce Ferry		58·7	297	i 10 0	− 2	—	—	—	—	—
Boulder City		59·4	297	i 10 7	+ 1	—	—	—	—	—
Tinemaha	Z.	61·8	299	i 10 23a	0	—	—	—	—	—
Riverside	E.	62·0	296	e 10 24	0	—	—	—	—	—
Reno	Z.	62·3	302	e 10 26k	0	—	—	—	—	—
Pasadena	Z.	62·6	296	i 10 28a	0	—	—	i 39 40	P′P′	—
Victoria		62·6	313	10 41	+13	19 5	+ 9	—	—	32·9

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno	z.	63·1	300	i 10 30	− 2	—	—	—	—	—
Mineral	z.	63·4	303	i 10 33	− 1	—	—	—	—	—
Shasta Dam		63·9	304	i 10 34	− 3	—	—	—	—	—
Helwan	z.	64·2	68	e 10 39	0	—	—	e 14 51	PPP	—
Lick	z.	64·3	301	i 10 40	+ 1	—	—	—	—	—
Berkeley		64·6	301	e 10 51	+10	i 19 32	+11	—	—	e 32·7
Branner	z.	64·7	301	i 10 43k	+ 1	—	—	—	—	—
Ksara		66·5	63	e 10 55	+ 1	e 21 1	S_cS	—	—	—

Additional readings :—
San Juan e =6m.8s.
Philadelphia i =7m.45s.
Malaga S_cPZ =12m.46s.
Toledo eZ =11m.22s.
Granada iPP =8m.25s., SS =14m.44s., S_cS =16m.46s.
Almeria PPP =8m.48s., P_cP =9m.19s., P_cS =13m.5s., SS =15m.15s., S_cS =17m.10s.
Alicante P_cP =9m.8s., P_cS =12m.57s., SS =16m.9s.
Bogota ePPPEN =8m.59s., eP_cPEN =9m.36s., eEN =12m.35s.
St. Louis iZ =7m.42s. and 7m.56s., eS?E =13m.27s.
Clermont-Ferrand iPPP =9m.53s.
Paris i =7m.50s.
Strasbourg i =8m.20s. and 8m.36s., e =8m.40s. and 9m.4s., ePP =10m.11s., ePPP = 10m.54s., e =11m.27s., e? =13m.51s. and 15m.52s.
Tamanrasset iZ =8m.23s.
Stuttgart e =8m.26s.
Salo eZ =8m.48s.
Jena eP?E =8m.35s., eN =9m.25s.
Rome i =16m.43s.
Collmberg eE =8m.46s.
La Paz iE =22m.32s.
Tucson e =14m.19s., 22m.34s., and 28m.27s.
Reno eN =10m.29s., eZ =10m.34s., iN =10m.43s., iE =10m.46s., iN =11m.6s.
Pasadena iZ =10m.34s.
Fresno ePN =10m.35s., ePE =10m.38s.
Mineral ePN =10m.36s., ePE =10m.39s.
Shasta Dam i =10m.40s.
Berkeley ePE =11m.1s., iPZ =11m.42s., ipPZ =11m.48s.
Branner iZ =10m.50s.
Long waves were also recorded at Ivigtut and Lincoln.

Jan. 28d. Readings also at 2h. (near Klyuchi), 3h. (College and near Klyuchi), 4h. (Tananarive), 5h. (Kulyab, Murgab, Samarkand, Tchimkent, near Andijan, and Stalinabad), 7h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Logan, Cleveland, College, Stuttgart, Irkutsk, Leninakan, near Ashkabad, and near Klyuchi), 8h. (Kew), 9h. (Pierce Ferry), 13h. (Hungry Horse, Andijan, Tchimkent, near Kulyab, and Stalinabad), 14h., 17h., 19h. (2), and 20h. (3) (near Ashkabad), 21h. (Santa Lucia, Toledo, near Alicante, Almeria, and Malaga), 22h. (College), 23h. (College, Logan, Shasta Dam, Hungry Horse, Pasadena, Tinemaha, Ashkabad, Tamanrasset, Copenhagen, Collmberg, Jena, Strasbourg, Stuttgart (2), near Basle, and Zürich).

Jan. 29d. Readings at 2h. (La Paz and near Murgab), 4h. (Stuttgart and near Ashkabad), 5h. (Ksara, Tamanrasset, Huancayo, La Paz, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 6h. (Seven Falls and Paris), 7h. (College), 9h. (Ottawa, Lick, near Berkeley, Branner, and San Francisco), 10h. (near Tananarive), 12h. (Andijan, Samarkand, near Kulyab, Stalinabad, La Paz (2), and Hungry Horse), 13h. (College), 14h. (Auckland, Kaimata, New Plymouth, near Tuai, and Wellington), 16h. (near Istanbul), 17h. (College, Hungry Horse, and Tamanrasset), 18h. (College and near Ashkabad (2)), 20h. (Wellington), 22h. (Ottawa, Paris (2), and Ashkabad), 23h. (Ivigtut and near Ashkabad).

Jan. 30d. Readings at 0h. (Hungry Horse), 1h. (Ashkabad, College, Strasbourg, Clermont-Ferrand, Paris, Almeria, Toledo, Stuttgart, Alicante, Tamanrasset, and near Collmberg), 2h. (Boulder City, Pierce Ferry, Bermuda, Scoresby Sund, Hungry Horse, College, near Ashkabad (2), near Andijan, Kulyab, Murgab, Samarkand, Stalinabad, Tashkent, and Tchimkent), 3h. (Ashkabad and Stuttgart), 4h. (Hungry Horse), 5h. (Tacubaya), 6h. (Tamanarive and near Stalinabad), 7h. (Boulder City, Hungry Horse, and Scoresby Sund (2)), 8h. (Alicante and Scoresby Sund), 9h. (Ashkabad), 10h. (Ashkabad, Merida, Oaxaca, and Tacubaya), 11h. (Ashkabad), 12h. (Ashkabad, Tucson, and Santa Lucia), 13h. (Ashakbad and Mizusawa), 14h. (near Ashkabad (2), near Boulder City, and Pierce Ferry), 15h. (Tucson, Pierce Ferry, and near Hungry Horse), 16h. (Batavia), 17h. (College and Pierce Ferry), 18h. (Ashkabad), 19h. (near Grozny and Leninakan), 20h. (Ashkabad (2), Santa Lucia, and near Tucson), 22h. (Ashkabad, La Paz, near Berkeley, Branner, Lick, and San Francisco), 23h. (Ashkabad, Ottawa, Sitka, Victoria, Hungry Horse, College, near Berkeley, Branner, Lick, Santa Clara, and San Francisco).

Jan. 31d. 6h. 38m. 16s. I
22h. 58m. 54s. II
Epicentre 36°·9N. 121°·7W. (as on Jan. 1d.).

A = −·4213, B = −·6821, C = +·5978; δ = +12; h = −1.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
I Lick		0·4	6	i 0 11	− 2	i 0 17	− 4	—	—
II		0·4	6	i 0 13	0	i 0 21	0	—	—
I Santa Clara	N.	0·5	336	e 0 19	+ 5	e 0 20	− 3	—	—
II	N.	0·5	336	e 0 10	− 4	e 0 20	− 3	—	—
I Branner		0·6	323	i 0 15a	0	i 0 25	− 1	—	—
II		0·6	323	i 0 17	+ 2	i 0 28	+ 2	i 0 34	S_g
II San Francisco		1·0	325	i 0 24	+ 3	i 0 41	+ 5	—	—
I Berkeley		1·1	335	i 0 22k	0	i 0 37	− 2	—	—
II		1·1	335	i 0 23a	+ 1	i 0 41	+ 2	—	—
I Fresno		1·5	96	e 0 28	0	i 0 48	− 1	i 0 31	P_g
II		1·5	96	i 0 27	− 1	i 0 46	− 3	i 0 30	P_g
I Reno		3·0	29	e 1 0	P_g	e 1 41	S_g	—	—
II		3·0	29	e 1 1	P_g	e 1 40	S_g	—	—
II Mineral	Z.	3·4	1	i 1 2	P*	i 2 6	S_g	i 1 5	P_g
II Shasta Dam		3·8	352	e 1 14	P_g	—	—	—	—
II Pierce Ferry		6·2	94	e 1 58	P_g	—	—	—	—

Additional readings :—
Berkeley II iNZ = 26s.
Reno I eE = 1m.4s., iZ = 1m.51s., II eN = 1m.11s., eE = 1m.17s., iZ = 1m.32s. and 1m.37s., iN = 1m.45s., iZ = 1m.50s., iE = 1m.56s.
Mineral II iZ = 1m.11s.
Shasta Dam II iP = 1m.18s.

Jan. 31d. Readings also at 0h. (Brisbane, Andijan, Frunse, Stalinabad, Tashkent, Sverdlosvk, Pierce Ferry, Shasta Dam, Hungry Horse, College, Seven Falls, Stuttgart, Tamanrasset, La Paz, and near Bogotá), 1h. (Tamanrasset and near Ashkabad), 2h. (near Ashkabad (2)), 3h. (Boulder City (2), Pierce Ferry (2), Hungry Horse (2), Shasta Dam (2), College, and near Ashkabad), 7h. and 9h. (Ashkabad), 13h. (Ashkabad (2) and Piatigorsk), 14h. (Ashkabad (2), Boulder City, Pierce Ferry, Bogota, Huancayo, La Paz, La Plata, Santa Lucia, and Copiapo), 15h. (Pasadena, Tinemaha, Tucson, Boulder City, Berkeley, Reno, Shasta Dam, Hungry Horse, Logan, and Ottawa), 16h. (College and near Zürich), 19h. (near Ottawa), 20h. (near Andijan), 22h. (near Tacubaya), 23h. (Haiwee, Mount Wilson, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, College, Stuttgart, and near Apia (2)).

Feb. 1d. 18h. 15m. 52s. Epicentre 3°·6S. 135°·5E.

A = −·7119, B = +·6996, C = −·0623; δ = +12; h = +7;
D = +·701, E = +·713; G = +·044, H = −·044, K = −·998.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		28·7	264	i 5 59	− 2	i 10 55	+ 5	—	—	—
Brisbane		29·1	147	e 6 0	− 4	i 10 54	− 2	e 6 46	PP	i 14·7
Riverview		33·4	157	i 6 45k	+ 3	i 12 3	0	i 7 58	PP	—
Perth		33·7	211	i 11 52	?	i 12 16	+ 8	13 28	SS	i 16·3
Melbourne	E.	35·2	167	e 7 32	+34	i 12 31	0	—	—	—
Kagosima		35·3	352	6 59	0	—	—	—	—	—
Miyazaki		35·5	354	e 7 0	0	12 34	− 2	—	—	—
Koti		37·0	357	7 11	− 2	12 57	− 2	—	—	15·8
Hukuoka		37·3	353	7 14	− 2	13 2	− 2	—	—	18·2
Sumoto		37·7	0	i 7 18	− 1	13 16	+ 6	—	—	—
Osaka		38·0	0	e 7 24	+ 3	13 2	−12	—	—	17·6
Hukusima		41·4	7	7 48	− 2	14 6	+ 1	—	—	—
Sendai		41·9	7	7 33	−21	14 13	0	—	—	18·8
Mizusawa	E.	42·8	7	8 3	+ 2	e 14 30	+ 4	—	—	—
Akita		43·3	6	8 13	+ 8	15 0	+27	—	—	—
Vladivostok		46·6	357	i 8 30	− 2	i 15 23	+ 2	i 9 53	PcP	—
Auckland	N.	49·0	138	8 26	−24	15 53	− 2	16 4	PS	22·1
Arapuni	E.	50·2	139	—	—	16 14	+ 3	—	—	23·1
Wellington		51·4	143	8 19	−50	15 58	−30	8 37	pP	24·3
Tuai	N.	51·6	139	e 9 11	+ 1	14 36	?	e 11 2	PP	—
Calcutta	E.	52·9	302	e 9 26	+ 6	i 17 1	+13	i 20 43	SS	26·2
Apia		53·0	105	e 9 20	− 1	—	—	—	—	e 26·1
Colombo	E.	56·5	281	9 41	− 5	17 44	+ 7	—	—	28·5
Hyderabad	N.	60·0	292	e 10 12	+ 1	18 19	− 4	—	—	27·6
Irkutsk		61·6	339	10 20	− 2	18 40	− 3	—	—	—
Poona		64·5	292	i 10 40	− 1	e 19 20	+ 1	i 11 18	PcP	31·1
Bombay		65·6	292	e 10 45	− 3	e 19 30	− 3	e 12 9	PP	32·3
Almata		70·3	319	e 11 17	0	e 20 33	+ 4	—	—	—
Frunse		71·7	317	e 11 26	0	—	—	—	—	—
Andijan		72·4	314	e 11 31	+ 1	—	—	—	—	—
Obi-garm		73·7	312	i 11 35	− 3	i 21 5	− 3	—	—	—
Stalinabad		74·3	312	i 11 41?	0	i 21 17?	+ 2	—	—	—
Tashkent		74·8	314	i 11 44	0	i 21 17	− 3	i 14 30	PP	—
Tchimkent		74·9	315	i 11 43	− 1	i 21 21	− 1	—	—	—
Samarkand		76·0	312	e 11 53	+ 2	—	—	—	—	—
Ashkabad		82·1	309	e 12 26	+ 2	—	—	—	—	—
Sverdlovsk		84·8	328	i 12 37	0	i 23 2	− 3	i 15 55	PP	—
Tananarive		86·9	251	—	—	e 23 5	[− 8]	23 27	S	43·3
College		87·6	25	—	—	e 23 32	0	—	—	e 42·1
Baku		89·0	310	e 12 53	− 5	—	—	—	—	—
Grozny		92·3	313	13 36?	+23	i 23 50?	[+ 4]	i 17 34?	PP	—
Sitka		92·6	33	—	—	e 24 18	0	e 31 14	SS	e 37·9
Piatigorsk		94·2	314	13 17	− 5	24 3	{− 9}	—	—	—
Moscow		97·4	326	e 13 35	− 2	e 24 8	[− 6]	e 24 58	S	—
Ksara		100·0	303	e 13 51	+ 3	26 43	PS	—	—	—
Yalta		100·6	314	—	—	e 25 31	+ 6	—	—	—
Shasta Dam		101·5	50	i 13 55	0	—	—	—	—	—
Berkeley		101·9	53	—	—	e 25 56	+20	i 27 16	PS	e 54·5
Santa Clara		102·2	53	e 18 22	PP	e 43 48	Q	—	—	e 56·5
Helsinki		103·2	332	—	—	e 24 45	[+ 3]	e 25 47	S	e 54·1
Reno		103·6	51	e 14 10	+ 6	—	—	e 18 21	PP	—
Fresno	Z.	103·9	53	e 14 6	0	—	—	e 18 28	PP	—
Helwan		104·1	300	e 17 18	?	e 24 53	[+ 7]	e 18 28	PP	—
Istanbul		104·7	312	e 18 23	PP	25 2	[+13]	—	—	—
Pasadena		105·5	56	e 14 15	+ 1	i 24 58	[+ 5]	i 18 42	PP	e 43·2
Hungry Horse		106·2	41	e 14 16	P	i 18 40	PP	e 30 5	PKKP	—
Upsala		106·8	332	e 18 44	PP	e 24 57	[− 2]	e 26 20	S	e 44·1
Boulder City		108·0	54	e 14 29	P	—	—	—	—	—
Pierce Ferry		108·6	54	e 14 14	P	—	—	e 19 0	PP	—
Logan		109·2	47	e 18 20	[−11]	—	—	e 28 27	PS	e 49·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Saskatoon		109·7	35	—	—	e 28 30	PS	—	—	58·1
Belgrade		110·1	317	e 19 11k	PP	e 25 14	[+ 1]	e 31 12	PKKP	e 63·1
Ogyalla		110·8	321	e 19 15	PP	e 25 2	[−13]	—	—	—
Copenhagen		111·1	330	i 19 18	PP	25 23	[+ 6]	21 38	PPP	—
Scoresby Sund		111·6	353	—	—	26 14	{− 2}	29 8	PS	—
Tucson		111·9	57	e 18 34	[− 3]	e 35 0	SS	e 19 26	PP	e 49·9
Potsdam	Z.	112·2	326	e 19 20	PP	i 28 58	PS	e 35 27	SSP	e 58·1
Jena	N.	113·6	325	e 19 34	PP	—	—	—	—	—
Triest		114·4	319	e 19 49	PP	e 25 37	[+ 7]	e 29 35	PS	e 56·1
Stuttgart		116·0	324	e 18 51	[+ 6]	e 29 23	PS	e 19 50a	PP	e 58·1
Bologna		116·4	319	e 20 22	PP	—	—	—	—	—
Salo	Z.	116·5	320	e 18 49	[+ 3]	—	—	—	—	—
De Bilt		116·6	328	i 20 6	PP	e 29 38	PS	e 22 24	PPP	e 57·1
Rome		116·6	316	i 19 58k	PP	e 25 36	[− 2]	e 29 32	PS	—
Strasbourg		116·9	324	e 19 54	PP	e 25 50	[+11]	e 22 12	PKS	e 56·2
Aberdeen	E.	117·0	336	i 19 44	PP	i 29 48	PS	i 40 47	SSS	e 58·2
Uccle	Z.	117·7	328	e 20 10	PP	—	—	—	—	e 64·1
Durham		118·3	333	i 19 25	[+36]	i 32 57	?	i 23 6	PPP	—
Kew		119·8	330	e 20 22	PP	e 30 14	PS	e 22 42	PPP	e 48·1
Paris		119·8	326	e 18 53	[+ 1]	e 25 56	[+ 7]	i 20 18	PP	e 61·1
Clermont-Ferrand		121·0	322	e 20 26	PP	e 30 8?	PS	e 22 53	PPP	58·1
Jersey	E.	122·0	329	e 21 38	?	e 33 18	PKKS	—	—	63·6
St. Louis		125·8	44	e 20 56	PP	e 26 14	[+ 6]	e 22 12	PKS	—
Alicante		127·1	317	19 33	[+27]	26 25	[+13]	21 39	PP	e 59·7
Tamanrasset		128·0	297	e 19 10	[+ 2]	e 31 9	PS	e 21 7	PP	—
Toledo		128·6	320	e 19 10	[+ 1]	—	—	e 21 17	PP	69·4
Almeria		129·2	316	19 19	[+ 9]	26 25	[+ 7]	21 31	PP	72·0
Granada		129·8	317	21 24a	PP	26 45	[+26]	28 13	SKKS	77·2
Cleveland		129·8	36	—	—	e 31 30	PS	e 39 12	SS	—
Ottawa		130·2	28	e 19 14	[+ 2]	e 31 38	PS	—	—	67·1
Malaga	Z.	130·6	317	i 21 18a	PP	—	—	i 22 34	PKS	e 74·4
Lisbon		132·5	322	21 39?	PP	26 3	[−23]	22 49	PKS	55·3
Weston		134·6	28	i 19 28	[+ 7]	—	—	e 39 38	SS	—
Huancayo		145·6	118	e 19 45	[+ 5]	e 26 53	[+ 5]	e 23 8	PP	e 61·7
Bermuda		145·7	31	e 20 43	?	e 36 33	PPS	—	—	e 68·3
La Paz		149·3	132	i 19 50k	[+ 4]	i 26 27	[−26]	i 23 24	PP	71·4
Bogota		150·5	87	i 19 55	[+ 7]	e 27 27	[+33]	e 23 42	PP	69·1
San Juan		154·2	53	e 28 19	?	e 30 27	{−14}	e 43 35	SS	e 64·7

Additional readings :—
Brisbane iZ = 6m.5s., iQE? = 12m.16s.
Riverview iZ = 7m.4s., iPPN = 8m.2s., iPcPZ = 9m.22s., iSSE = 14m.4s., iSSSE = 14m.31s.
Vladivostok ePP = 10m.35s., iSS = 18m.56s.
Auckland PcSN = 12m.49s., SSN = 19m.30s., SSSN = 20m.58s.
Wellington iZ = 9m.8s., PcP = 9m.27s., i = 9m.58s., PPZ = 10m.28s., PPPZ = 11m.8s., e = 11m.22s. and 11m.42s., PcS = 12m.39s., PS = 16m.21s., SS = 20m.16s., SSS = 22m.32s., Q = 23m.8s.
Calcutta iE = 17m.17s., iSSSE = 22m.23s.
Apia e = 9m.31s.
Poona iE = 11m.27s., eE = 11m.51s., iPPE = 12m.58s., iPSE = 19m.33s., iEN = 20m.45s., SSN = 23m.24s., SSSN = 26m.17s., QN = 26m.55s.
Tashkent ePPP = 16m.3s.?
Sverdlovsk iScS = 23m.18s., iPS = 24m.6s.
Tananarive SS? = 29m.51s.
Sitka e = 29m.4s.
Berkeley iN = 32m.14s., eN = 38m.7s., iE = 38m.22s., eE = 49m.20s.
Helsinki e = 25m.27s.
Reno eE = 14m.17s., eN = 14m.20s., eZ = 18m.29s.
Helwan eZ = 17m.38s., eN = 26m.18s., eE = 27m.32s.
Pasadena eZ = 17m.43s., iEN = 26m.16s.
Hungry Horse i = 14m.28s. and 14m.57s.
Upsala eSKSN = 25m.2s., eS?N = 26m.32s., ePPS?E = 28m.38s., eSSE = 33m.8s.?, eSSN = 34m.8s.?, eSSSE = 37m.53s.
Copenhagen PS = 28m.43s., SS = 34m.50s., SSS = 39m.2s.
Tucson ePS = 28m.58s., eSSS? = 39m.52s.
Potsdam iZ = 19m.25s. and 19m.30s., eZ = 29m.20s.
Triest iSS = 35m.19s.
Stuttgart ePPP = 22m.8s., e = 23m.32s., ePPS = 30m.40s.
De Bilt eSS = 36m.8s.?

Continued on next page.

Rome ePPSE =30m.56s.
Strasbourg ePP =19m.58s., e =20m.39s., 21m.7s., 21m.14s., and 21m.20s., ePPP = 22m.29s., e? =23m.30s., 23m.47s., and 23m.55s., ePS =29m.39s., ePPS =30m.48s. and 30m.52s., e =31m.56s. and 34m.15s., eSS? =35m.15s., e =37m.28s. and 38m.50s., eSSS =40m.10s., and 40m.16s.
Aberdeen iE =32m.34s.
Kew ePPS?Z =32m.22s., eSSZ =36m.38s., eEN =44m.0s.
Paris ePS =29m.59s., ePPS =31m.56s., e =35m.26s., eSS =36m.56s., eSSS =41m.50s., e =45m.26s.
St. Louis ePS? =30m.52s., iPPS =32m.27s., iSS =37m.56s.
Alicante PKS =22m.53s., PPP =24m.29s., SKKS =28m.29s., PS =31m.33s., SS = 38m.21s., SSP =38m.55s., SSS =42m.39s., Q =52m.39s.
Tamanrasset e =32m.4s.
Almeria PKS =22m.49s., PPP =24m.15s., PPS =33m.13s., SS =38m.45s., SSS = 43m.35s.
Granada pPKP =22m.39s.k, pPP =24m.14s.k, PPS =32m.57s., SS =38m.54s; record wrongly interpreted.
Cleveland iPPSE =33m.6s.
Lisbon iPKS?EZ =22m.53s., E =27m.13s., SS?N =39m.50s.
Huancayo e =34m.48s., eSS =41m.59s.
Bermuda e =21m.50s. and 24m.18s.
La Paz SKKSN =30m.20s., SS =42m.48s.
San Juan e =46m.20s.
Long waves were also recorded at Bergen, Collmberg, La Plata, Fort de France, and other North American stations.

Feb. 1d. Readings also at 0h. (Hungry Horse and near Apia), 2h. (Tacubaya), 4h. (San Juan), 6h. (Ottawa), 7h. (Huancayo and La Paz), 9h. (Tucson, Hungry Horse, Boulder City, and near Pierce Ferry), 10h. (Klyuchi, Hungry Horse, Shasta Dam, Boulder City, and near Pierce Ferry), 11h. (Samarkand, near Andijan (2), Stalinabad (2), Obigarm, Tashkent, and Tchimkent), 12h. (Shasta Dam, Hungry Horse, near Boulder City, Pierce Ferry, and near Andijan), 13h. (Berkeley, Branner, Fresno, Lick, Mineral, Reno, Ukiah, Pierce Ferry, Hungry Horse, near Shasta Dam and near Stalinabad), 14h. (Haiwee, Mount Wilson, Tucson, Bermuda, Scoresby Sund, De Bilt, Kew, Paris, Clermont-Ferrand, Strasbourg, Stuttgart, and Tamanrasset), 15h. (near Tacubaya), 16h. (Zi-ka-wei), 17h. (Ashkabad, Hungry Horse, and near Nanking), 18h. (Basle), 22h. (near Tucson (2)).

Feb. 2d. 17h. 41m. 33s. Epicentre 52°·8N. 173°·2W. Depth of focus 0·030.

A = −·6029, B = −·0719, C = +·7945; δ = −11; h = −6;
D = −·118, E = +·993; G = −·789, H = −·094, K = −·607.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		15·5	294	e 4 28?	+60	e 7 20?	+66	—	—	—
College		17·7	37	i 3 49	− 4	e 6 58	− 3	i 15 10	ScS	e 8·9
Sitka		22·0	63	i 4 35	− 2	i 8 25	+ 5	—	—	i 9·3
Victoria		31·3	77	6 5a	+ 4	11 3	+12	7 15	PP	—
Seattle		32·4	78	e 5 56	−15	e 10 59	− 9	e 7 7	sP	e 12·2
Honolulu		33·6	153	e 6 18	− 3	e 11 32	+ 6	e 7 53	PPP	e 14·0
Mizusawa	E.	34·0	265	6 27	+ 3	7 6	pP	(7 6)	pP	—
Arcata		35·0	89	i 6 34a	+ 1	i 11 55	+ 7	i 8 15	PPP	—
Ferndale	E.	35·1	91	i 6 17	−17	e 11 33	−16	i 8 6	PPP	—
Shasta Dam		36·1	89	i 6 43	+ 1	i 12 9	+ 5	i 16 35	ScS	—
Ukiah		36·6	91	e 6 42	− 4	e 12 13	+ 1	e 13 11	sS	e 16·2
Mineral	Z.	36·8	89	i 6 48	0	i 12 16	+ 1	i 8 15	PP	—
Hungry Horse		36·9	72	i 6 50	+ 1	i 12 18	+ 1	i 16 40	ScS	—
Vladivostok		37·2	277	i 6 49	− 2	i 12 22	+ 1	i 7 32	pP	—
San Francisco	E.	37·9	92	i 6 58	+ 1	i 12 36	+ 4	—	—	—
Berkeley		38·0	92	i 6 59	+ 1	i 12 37	+ 4	i 7 52	pP	—
Branner		38·3	92	i 7 1	+ 1	i 12 38	0	e 12 43	?	—
Reno		38·4	88	i 7 3	+ 2	i 12 39	0	i 8 6	PP	—
Santa Clara		38·5	92	i 7 1	− 1	e 16 3	SSS	i 8 59	PPP	—
Lick		38·7	92	i 8 4	+60	i 13 39	+55	i 8 10	PP	—
Butte	N.	39·0	74	i 7 6	0	i 12 49	+ 1	i 8 46	PP	e 16·0
Saskatoon		39·3	64	i 7 9	0	12 56	+ 3	8 46	PP	21·4
Bozeman		40·1	74	i 7 15	0	i 13 4	0	e 8 47	PP	e 16·3
Fresno		40·2	91	i 7 7	− 9	i 13 12	+ 6	i 12 45	ScP	—
Tinemaha		40·9	90	i 7 25a	+ 3	i 13 26	+10	i 8 19	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Logan		41·9	80	i 7 28	− 2	i 13 16	−15	e 8 36	sP	e 16·3
Salt Lake City		42·4	81	i 7 20	−14	i 13 25	−13	i 8 5	pP	e 17·2
Pasadena		42·9	93	i 7 39a	+ 1	i 13 50	+ 5	i 8 30a	pP	—
Riverside		43·5	93	i 7 43a	0	i 17 20	S_cS	i 8 36	pP	—
Boulder City		43·7	88	i 7 45	0	i 14 1	+ 4	i 17 22	S_cS	—
Pierce Ferry		44·1	88	i 7 49	+ 1	i 14 9	+ 6	i 17 25	ScS	—
Irkutsk		47·5	305	e 8 14	0	e 14 52	+ 1	9 0	pP	—
Tucson		48·7	89	i 8 24	0	i 15 9	+ 1	i 9 5	pP	e 20·1
Lincoln	E.	51·3	71	i 8 42	− 1	i 15 42	− 1	e 10 42	PP	e 21·0
Scoresby Sund		55·3	12	i 9 11a	− 1	16 40	+ 3	i 10 1	pP	—
Chicago		55·7	65	i 10 13	P_cP	i 16 41	− 1	e 18 15	sS	e 22·6
St. Louis		56·5	69	i 9 18	− 3	i 16 51	− 2	i 10 8	pP	—
Little Rock		58·0	74	i 9 28	− 3	i 17 12	0	—	—	—
Ivigtut		58·2	28	i 9 31	− 2	i 17 16	+ 1	10 15	pP	—
Cincinnati		59·3	65	i 8 44	−56	i 16 26	−63	i 13 31	PPP	—
Cleveland		59·3	61	i 9 38	− 2	i 17 26	− 3	i 10 25	pP	—
Ottawa		59·5	55	9 39a	− 3	17 29	− 3	10 25	pP	30·8
Shawinigan Falls	N.	60·1	51	e 9 33	−13	—	—	—	—	—
Seven Falls	E.	60·6	50	9 46	− 3	17 48	+ 2	—	—	25·2
Pennsylvania	N.	61·7	59	i 11 5	pP	i 19 10	SS	i 19 57	S_cS	29·6
Sverdlovsk		62·2	330	i 10 0	0	18 9	+ 3	i 10 46	pP	—
Mobile		63·3	74	e 10 7	0	e 18 6	−14	e 14 9	PPP	e 31·1
Fordham		63·7	56	i 10 9	− 1	i 18 25	0	i 10 58	pP	—
Philadelphia		63·7	58	i 10 10	0	i 18 26	+ 1	i 10 54	pP	e 26·9
Weston		63·8	54	i 10 9	− 1	i 18 19	− 7	—	—	26·3
Columbia		65·0	66	e 10 17	− 1	e 18 39	− 1	e 19 49	sS	e 27·7
Tacubaya		65·2	90	e 10 19	0	i 18 47	+ 4	e 19 58	sS	—
Apia		66·3	178	10 28	+ 2	—	—	—	—	e 28·8
Almata		66·9	312	e 10 31	+ 1	—	—	—	—	—
Bergen		67·2	1	11 21	pP	20 7	+60	e 22 40	?	—
Upsala		67·4	354	11 14a	pP	i 19 9	− 1	e 23 30?	SS	—
Frunse		68·3	313	e 10 41	+ 2	e 19 25	+ 5	e 11 33	pP	—
Moscow		68·9	342	i 10 42	0	i 19 27	0	i 11 32	pP	—
Aberdeen	E.	70·2	6	—	—	i 19 46	+ 4	—	—	i 27·9
Tchimkent		70·9	316	i 10 55	+ 1	i 19 53	+ 3	—	—	—
Andijan		71·0	313	i 10 56	+ 1	i 19 57	+ 5	e 11 41?	pP	—
Copenhagen		71·8	357	i 10 59	− 1	i 20 3	+ 2	i 11 48	pP	—
Tashkent		71·9	315	e 11 0	0	i 20 4	+ 2	e 11 43	pP	—
Murgab		72·2	310	11 3	+ 1	20 10	+ 5	—	—	—
Obi-garm		73·8	313	i 11 9	− 3	e 20 23	0	—	—	—
Samarkand		74·2	316	e 11 16?	+ 2	e 20 29	+ 2	—	—	—
Stalinabad		74·4	314	i 11 16	+ 1	i 20 32	+ 2	e 11 57	pP	—
Bermuda		74·9	56	e 11 9	− 9	i 20 35	0	e 21 24	sS	e 30·0
Potsdam		75·1	356	i 11 19a	0	i 20 40	+ 3	i 12 6	pP	—
De Bilt		75·4	1	i 11 23a	+ 2	i 20 47	+ 6	i 12 11k	pP	—
Kew		75·9	5	i 11 23	− 1	e 20 47	+ 1	i 12 15	pP	e 28·4
Collmberg		76·1	357	e 11 24	− 1	e 20 50	+ 2	e 12 15	pP	—
Jena	N.	76·6	357	e 11 27	0	e 20 55	+ 1	i 12 19	pP	—
Calcutta	E.	77·3	290	e 15 45	PPP	i 22 35	PS	—	—	—
Prague		77·3	355	i 11 36	+ 5	i 21 2	+ 1	—	—	—
Jersey	E.	78·1	7	—	—	e 21 12	+ 2	—	—	—
Grozny		78·6	332	e 11 37	− 1	—	—	—	—	—
Piatigorsk		78·6	335	e 12 27?	pP	i 21 20	+ 5	—	—	—
Paris		78·7	3	i 11 38	− 1	e 21 18	+ 2	i 12 26	pP	e 34·4
Stuttgart		78·8	358	i 11 39a	0	e 21 18	+ 1	e 12 26	pP	—
Strasbourg		79·0	359	i 11 41	+ 1	i 21 23	+ 4	i 12 28	pP	32·5
Ogyalla		79·2	352	e 12 18	pP	e 21 32	+11	—	—	—
Theodosia		79·5	340	e 11 44	+ 1	21 28	+ 4	e 12 32?	pP	—
Simferopol		79·8	341	e 12 35	pP	—	—	—	—	—
Sotchi		79·9	336	e 11 48	+ 3	—	—	e 12 37	pP	—
Basle		80·0	0	i 11 46a	0	e 21 34	+ 4	e 12 39	pP	—
Baku		80·0	328	—	—	e 21 30	0	—	—	—
Zürich		80·2	359	i 11 46a	− 1	e 21 36	+ 4	e 12 35	pP	—
Yalta		80·3	340	i 11 46	− 1	i 21 34	+ 1	i 12 35	pP	—
Neuchatel		80·6	0	e 11 48	− 1	—	—	e 12 40	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chur		80·7	358	e 11 50a	+ 1	e 21 39	+ 2	e 12 42	pP	—
Clermont-Ferrand		81·8	3	i 11 55	0	i 21 53	+ 5	i 12 44	pP	35·4
Triest		81·8	355	i 11 55?	0	i 21 49?	+ 1	e 12 47?	pP	—
Erevan		81·8	331	e 12 47	pP	—	—	—	—	—
Salo		81·9	357	11 56a	0	i 21 51	+ 2	i 12 48	pP	—
Belgrade		82·1	350	e 11 56k	− 1	e 21 51	0	i 12 48	pP	—
Pavia		82·4	358	e 12 49	pP	—	—	—	—	—
Bologna		83·0	357	e 12 2a	+ 1	e 22 2	+ 2	e 12 51	pP	—
Padova		83·0	357	12 2	+ 1	21 53	− 7	—	—	—
Florence		83·7	357	i 12 6a	+ 1	e 22 4	− 3	e 12 55	pP	—
Istanbul		84·5	343	e 11 1	−68	—	—	i 11 51	pP	—
Brisbane		85·2	210	i 12 13	+ 1	i 22 22	+ 1	e 22 17	SKS	—
San Juan		85·4	66	i 12 14	+ 1	i 22 17	[+ 3]	i 22 29	S	e 42·6
Hyderabad	N.	86·9	295	—	—	e 22 25	[+ 1]	24 11	PS	—
Toledo		87·2	9	i 12 22	0	22 42	+ 2	13 9	pP	—
Poona		88·5	299	e 12 23	− 5	i 22 51	− 2	i 13 18	pP	—
Bombay		88·7	300	e 12 27	− 2	e 22 53	− 1	i 24 27	sS	—
Alicante		89·0	6	e 12 48	+18	23 1	+ 4	12 58	pP	e 41·7
Granada		89·9	8	i 14 9a	?	24 55	PS	16 51k	PPP	—
Ksara		89·9	336	e 13 24	pP	—	—	17 2	PPP	—
Malaga	z.	90·3	9	i 12 27	−10	i 23 11	+ 2	i 13 15	pP	41·3
Almeria		90·4	7	e 12 45	+ 8	23 9	− 1	16 21	PP	39·0
Fort de France		91·1	64	e 12 38	− 2	i 22 50	[+ 1]	—	—	—
Riverview		91·7	209	i 12 45k	+ 2	i 22 59	[+ 7]	i 13 34	pP	—
Bogota		91·9	80	i 12 47	+ 3	i 22 56	[+ 3]	i 23 26	S	—
Kodaikanal		93·3	292	—	—	e 21 7	?	—	—	—
Wellington		94·3	189	20 58	?	23 1	[− 6]	25 12	PS	50·4
Helwan		94·9	339	e 12 57	− 1	23 53	+ 4	13 52	pP	—
Huancayo		104·2	91	e 17 52	[− 1]	i 24 0	[+ 4]	i 25 19	S	e 45·1
Tamanrasset	z.	104·7	2	e 13 42	0	—	—	i 14 27k	pP	—
La Paz		112·0	92	e 18 11	[+ 3]	i 24 37	[+ 8]	i 18 58	PP	44·4

Additional readings :—
College iP$_c$S =11m.53s.
Victoria SS =13m.15s.
Seattle ePP =7m.18s., esS =12m.2s.
Arcata iN =6m.41s., iZ =7m.58s. and 12m.26s.
Shasta Dam iS$_c$P =12m.29s.
Ukiah ePP =8m.1s., eP$_c$P? =8m.45s.
Mineral eN =8m.21s., iSN =12m.20s., iZ =12m.31s., eN =16m.39s.
Hungry Horse iS$_c$P =12m.33s.
Vladivostok isS =13m.40s.
Berkeley iN =7m.13s., iPPN =8m.35s., iE =8m.53s., iN =10m.45s. and 15m.43s., iE = 15m.57s., eEN =16m.48s., iN =17m.41s.
Reno iE =7m.6s., i =7m.15s., iE =7m.18s., iZ =7m.27s., iPPN =7m.42s., iZ =12m.45s., iE =13m.18s.
Santa Clara iPPEZ =12m.37s., eSE =18m.22s.
Lick iZ =8m.58s.
Butte iN =10m.6s.
Saskatoon i =16m.53s.
Bozeman ipP? =7m.42s., ePPP =9m.31s., esPP? =9m.~~42s.~~, eS =12m.53s.
Tinemaha iS$_c$P =12m.50s., iS$_c$S =17m.8s.
Logan i =7m.48s., iS$_c$P =12m.50s., iS$_c$S =17m.6s.
Salt Lake City iPP =9m.7s., iPPP =9m.47s., eS$_c$P =12m.40s., iS$_c$S =17m.0s.
Pasadena iZ =7m.48s. and 7m.56s., isPZ =8m.49s., iP$_c$PZ =9m.19s., iS$_c$P =12m.56s., iS$_c$S =17m.16s.
Riverside iZ =17m.55s., iS$_c$P =12m.58s.
Boulder City iS$_c$P =13m.0s.
Pierce Ferry S$_c$P =12m.59s.
Irkutsk eSS =16m.4s.
Tucson isP =9m.30s., iP$_c$P? =9m.58s., iPP =10m.19s., epPP =11m.0s., iS$_c$P =13m.21s., eS$_c$S =17m.55s., eSS? =19m.7s.
Lincoln iS$_c$SE =18m.10s., eSS?E =19m.44s.
Chicago e =12m.19s., ePPP =12m.39s., eS$_c$P =13m.39s., iS$_c$S =18m.41s., eSS? =21m.1s.
St. Louis iP$_c$P? =10m.21s., ipP$_c$P? =11m.23s., i =12m.47s. and 13m.54s., isS =18m.11s., isSP? =18m.47s.
Ivigtut 18m.51s., 23m.51s.
Cincinnati i =12m.13s. and 18m.6s.
Cleveland eEN =13m.18s., iE =13m.30s., iPSE =18m.16s., isSEN =19m.7s., eSSEN = 21m.34s.
Ottawa PP =11m.50s., S$_c$S =18m.9s., SSS =23m.31s.

Continued on next page,

Sverdlovsk sS = 19m.29s.
Mobile e = 22m.6s.
Fordham i = 19m.16s.
Philadelphia e = 14m.0s., iS_cS = 19m.18s., i = 20m.13s.
Columbia ePPP = 14m.15s.
Bergen eP_cPZ = 11m.58s., eP_cSN = 15m.58s.
Upsala ipP = 11m.19s., sP = 11m.50s., epS?N = 19m.59s., ipSE = 20m.5s., eE = 21m.9s.
Moscow iPS = 20m.19s., epPS = 21m.33s.
Copenhagen e = 12m.9s. and 21m.9s.
Tashkent isS = 21m.26s.
Stalinabad esS = 21m.56s.
Bermuda e = 12m.19s., eS_cS = 20m.57s., eSS? = 25m.5s.
Potsdam eN = 11m.27s.?, iZ = 12m.3s.a and 12m.11s.a, iN = 12m.33s., eN = 13m.58s., iZ = 16m.42s., esS?Z = 21m.39s.
De Bilt eSSS = 30m.27s.?
Kew isPZ = 12m.27s., ipPPZ = 14m.59s., epSEN = 21m.51s., eSSN = 22m.22s.
Collmberg epPPZ = 14m.56s., epPPPZ = 16m.53s.
Jena eN = 13m.9s.
Paris i = 12m.42s., e = 18m.53s., pS = 22m.33s., sS = 22m.51s., eSS? = 25m.45s., eSSS? = 30m.45s.
Stuttgart iZ = 12m.43s., eZ = 13m.0s., epPPZ = 15m.13s., ePS = 22m.21s.
Strasbourg e = 11m.53s. and 12m.0s., ipP = 12m.33s., e = 12m.43s., esP = 12m.47s. and 12m.57s., i = 13m.24s. and 13m.43s., e = 13m.49s. and 13m.56s., ePP = 14m.29s., epPP = 15m.26s., e = 17m.48s., ePS = 22m.29s. and 22m.32s., isS = 22m.52s., i = 23m.36s., eSS? = 26m.30s., eSSS? = 29m.27s.
Zürich ePP = 15m.18s.
Clermont-Ferrand i = 12m.47s.
Salo eZ = 12m.43s., iZ = 13m.5s.
Belgrade e = 15m.33s.
Bologna e = 22m.13s.
Florence eSN = 22m.10s.
Brisbane iZ = 15m.32s.
San Juan ePP? = 15m.54s., eSS? = 28m.27s.
Toledo iZ = 12m.36s. and 13m.16s., sPZ = 13m.29s., ePPZ = 15m.49s.
Poona eP_cPE = 12m.40s., eE = 13m.34s., esPE = 13m.53s., iPPE = 15m.7s., iPPPE = 17m.0s., iPSEN = 24m.10s., isSEN = 24m.24s.
Alicante PP = 16m.21s., PPP = 18m.21s., S = 23m.29s., PS = 24m.17s., PPS = 24m.49s., SS = 28m.41s., SSS = 32m.31s.
Malaga PPZ = 16m.5s.
Almeria PPP = 18m.21s., S = 23m.30s., PPS = 25m.9s., SS = 29m.33s., SSS = 33m.9s.
Riverview iZ = 13m.50s., iE = 23m.32s., esPE = 24m.24s., ePSZ = 24m.42s., iZ = 25m.8s.
Bogota ePPEN = 16m.25s., iPSEN = 24m.40s.
Wellington e = 23m.8s., PS = 24m.27s.
Helwan sPZ = 14m.12s., PPZ = 16m.51s., eZ = 17m.27s., ipPPZ = 17m.39s., iZ = 17m.51s. and 19m.24s., SKKSEN = 23m.15s., eN = 24m.43s. and 26m.13s.
Huancayo iPP = 18m.4s., epPP = 18m.55s., esS = 26m.40s., eSS = 32m.46s., eSSS = 36m.43s.
Tamanrasset eZ = 17m.2s., ePPZ = 18m.2s., ipPPZ = 18m.52s.a, isPP?Z = 19m.6s.k, ePPPZ = 20m.19s., iZ = 29m.45s.
La Paz iPKPN = 18m.23s., iN = 28m.18s.

Feb. 2d. Readings also at 3h. (Pierce Ferry, Hungry Horse, and Shasta Dam), 5h. (Hungry Horse, near Huancayo, and near Tacubaya), 6h. (Ashkabad (2), College, and Tucson), 8h. (Pierce Ferry, Shasta Dam, Hungry Horse, and near Chur), 9h. (Shasta Dam, Hungry Horse, and College), 10h. (De Bilt, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Pasadena, Riverside, Tinemaha, and Tucson), 11h. (Ksara, Samarkand, Tchimkent, near Andijan, Kulyab, Obi-garm, Stalinabad, and near Tacubaya), 12h. (Ashkabad), 13h. (Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, near Ashkabad), 14h. (near Ashkabad), 15h. (Hungry Horse, Shasta Dam, and near Mizusawa), 16h. (Ccpiapo and Hungry Horse), 17h. (Ashkabad and near Ottawa), 18h. (Hungry Horse, Stuttgart, Andijan, and near Istanbul), 19h. (Stuttgart, near Ashkabad, and near Tucson (2)). 20h. (near Ashkabad (2), near Rome, and near Tucson), 21h. (Samarkand, Tashkent, near Andijan, Kulyab, Obi-garm, Stalinabad, Tchimkent, near Tucson, near Boulder City, and Pierce Ferry).

Feb. 3d. 16h. 29m. 15s. Epicentre 18°·9S. 173°·2W.

Felt in Kermadec Isles.
Seismological report, Observatory, Wellington, New Zealand, January-March, 1949, p. 5.

$A = -·9401$, $B = -·1121$, $C = -·3220$; $\delta = +4$; $h = +5$;
$D = -·118$, $E = +·993$; $G = +·320$, $H = +·038$, $K = -·947$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		5·3	16	e 1 23	+ 1	i 2 16	− 9	—	—	e 2·8
Auckland	N.	20·8	208	4 44	− 1	8 38	+ 5	5 34	PP	11·2
Wellington		24·6	203	5 19	− 4	—	—	e 5 57	PP	e 12·6
Kaimata		26·9	206	5 51	+ 6	—	—	—	—	—
Brisbane		32·1	248	e 6 29	− 2	—	—	—	—	e 16·2
Riverview		35·0	237	6 59	+ 3	e 12 29	+ 1	8 19	PP	e 17·4
Mount Wilson	z.	74·5	45	e 11 41	− 1	—	—	—	—	—
Riverside	z.	74·8	45	i 11 44	0	—	—	—	—	—
Shasta Dam		75·8	38	i 12 9	+19	—	—	—	—	—
Tinemaha	z.	76·0	43	i 11 52	+ 1	—	—	—	—	—
Boulder City		77·6	46	i 11 52	− 8	—	—	—	—	—
Tucson		78·4	50	e 12 4	0	—	—	e 12 35	pP	e 39·7
Vladivostok		79·7	323	i 12 10	− 1	e 22 17	+ 4	—	—	—
Hungry Horse		85·2	36	i 12 38	− 1	—	—	—	—	—
College		85·7	11	i 12 40	− 2	e 22 53	[−12]	—	—	e 39·6
Huancayo		93·4	104	e 15 8	?	e 23 57	[+ 5]	e 25 45	PS	e 45·4
La Paz		98·3	111	e 11 9	?	—	—	—	—	48·4
De Bilt		146·8	2	e 19 45?	[+ 3]	—	—	—	—	—
Collmberg	z.	147·3	353	e 19 46	[+ 3]	—	—	—	—	—
Jena	N.	147·8	354	e 19 50	[+ 6]	—	—	—	—	—
Paris		150·0	7	i 19 56	[+ 9]	—	—	—	—	e 84·8
Ksara		150·1	306	e 19 52	[+ 4]	—	—	23 28	PP	—
Stuttgart	z.	150·1	357	e 19 51	[+ 3]	—	—	—	—	—
Strasbourg		150·4	359	e 19 53	[+ 5]	—	—	—	—	—
Clermomt-Ferrand		153·0	7	e 20 3	[+11]	—	—	—	—	—
Salo	z.	153·2	353	e 20 10	[+18]	—	—	e 22 23	?	—
Helwan	z.	155·2	301	e 20 23	[+28]	—	—	—	—	—
Alicante		159·6	18	e 24 16	PP	—	—	—	—	—
Tamanrasset	z.	176·0	—	e 20 16	[+ 4]	—	—	—	—	—

Additional readings :—
Auckland iN =5m.48s., SSN =9m.23s.
Riverview eZ =8m.42s., iS_cSE =17m.23s.
Shasta Dam i =12m.27s.
Tucson e =13m.29s.
Huancayo ePS =25m.55s., eSS? =30m.57s.
Collmberg eE =19m.52s.
Jena eE =20m.5s.
Paris i =20m.25s.
Stuttgart eZ =20m.5s.
Strasbourg e =20m.6s., 20m.50s., and 20m.54s.
Helwan eZ =20m.33s. and 20m.51s.
Long waves were recorded at Arapuni, Philadelphia, and Kew.

Feb. 3d. 22h. 29m. 20s. Epicentre 46°·5N. 13°·0E. (as on 1937, Jan. 9d.).

Felt throughout the whole of Carniole, Haut Fioul, and Gail Valley (Carinthia). Intensity VIII at Paularo; V at Subio and Tolmezzo; IV at Claut. Macroseismic area in Austria more than 13,000 sq. km.

Suggested epicentres 46°·5N. 13°·1E. (Rome).
46°31′N. 13°11′E. (Triest).

Jahrbücher der Zentralanstalt für Meteorologie und Geodynamik. Jahrgang, 1949. Vienna, 1950. New Series, Vol. 86, p. E.1. Macroseismic chart, p. E.2.

$A = +·6731$, $B = +·1554$, $C = +·7231$; $\delta = +9$; $h = -4$;
$D = +·225$, $E = -·974$; $G = +·705$, $H = +·163$, $K = -·691$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest		1·0	149	e 0 18	− 3	i 0 32	− 4	i 0 23	P	—
Padova		1·4	216	0 27	0	0 47	+ 1	—	—	—
Salo		2·0	242	e 0 35a	0	i 0 59	− 3	i 1 6	S_g	—
Zagreb		2·2	108	e 0 37k	− 1	i 1 11	+ 5	e 0 40	P_g	i 1·5
Chur		2·4	279	e 0 37k	− 4	e 1 10	− 2	—	—	—
Ravensburg		2·6	299	e 0 48	+ 4	e 1 23	+ 6	e 0 52	P_g	—
Bologna		2·8	210	e 0 46	− 1	e 1 15	− 7	i 1 2	P_g	—
Prato		2·9	207	i 0 50	+ 2	i 1 20	− 4	—	—	—
Florence		3·0	204	e 1 2?	P_g	1 36?	S*	e 1 50?	P_g	—
Pavia		3·0	244	e 0 49	− 1	e 1 49	S_g	e 0 55	P*	—
Zürich		3·1	286	e 0 52a	+ 1	e 1 33	+ 4	e 1 45	S_g	—
Ebingen		3·2	302	e 0 54	+ 2	e 1 49	S_g	e 1 2	P*	—
Stuttgart		3·5	312	e 0 55k	− 2	e 1 38	− 2	i 1 12	P_g	—
Cheb		3·6	353	e 1 0	+ 2	i 1 56	S_g	—	—	—
Prague		3·7	15	e 1 7	P*	i 1 56	S*	—	—	—
Basle		3·8	285	i 1 1	0	e 1 56	S*	e 1 17	P_g	—
Ogyalla		3·8	67	e 1 3	+ 2	e 1 55	S*	—	—	—
Kalossa		4·1	88	e 1 39	P_g	e 2 15	S_g	—	—	—
Strasbourg		4·1	300	i 1 6a	+ 1	i 2 13	S_g	i 1 23	P_g	—
Neuchatel		4·2	276	e 1 6	− 1	e 2 22	S_g	—	—	—
Budapest	E.	4·3	74	1 25	P_g	—	—	—	—	2·3
Jena		4·5	342	e 1 9	− 2	e 2 5	0	e 1 31	P_g	—
Rome		4·6	185	—	—	e 2 24	S*	i 2 47	S_g	—
Collmberg		4·8	0	e 1 13	− 2	e 2 6	− 6	e 1 34	P_g	—
Raciborzu		5·0	42	—	—	e 2 17	− 1	e 2 37	S*	—
Belgrade		5·5	105	e 2 54k	S_g	—	—	—	—	—
Skalnate Pleso		5·6	59	e 1 16	−11	e 2 55	S*	—	—	—
Potsdam		5·9	0	—	—	e 3 0	S*	i 3 23	S_g	—
Clermont-Ferrand		6·9	267	i 1 43	− 2	i 3 48	S_g	—	—	—
Uccle	z.	7·1	310	e 3 20	S	(e 3 20)	+10	e 3 57	S_g	—
Paris		7·4	292	i 1 51	− 1	e 3 13	− 5	i 2 9	P*	—
De Bilt		7·6	320	—	—	i 4 18	S_g	—	—	—
Kew		10·1	304	e 2 40?	+12	—	—	—	—	—
Alicante		12·8	236	3 1	− 5	5 27	− 3	—	—	—
Almeria		15·0	236	e 3 15	−20	5 51	−32	3 35	P	—
Tamanrasset	z.	24·4	197	e 5 30	+ 9	—	—	—	—	—

Additional readings :—
Salo iE = 40s., iSN = 56s., iS*N = 1m.4s., i = 1m.9s.
Zagreb iP_gE = 56s., iPS_gE = 1m.3s., iP_gS_g = 1m.6s.
Ravensburg eS* = 1m.28s., iS_g = 1m.31s.
Bologna iN = 1m.11s., e = 1m.28s.
Florence eE = 1m.26s.?
Pavia e = 1m.13s.
Ebingen eS_g = 1m.57s.
Stuttgart iP = 1m.4s., iP_g = 1m.21s., i = 1m.25s., iS = 1m.42s., iS* = 1m.52s., iS_g = 2m.0s.
Strasbourg eP = 1m.11s., e = 1m.14s., iP = 1m.18s., eP_g = 1m.26s., i = 2m.7s., iS_g = 2m.22s.
Budapest PN = 1m.28s.
Jena eN = 1m.12s., ePN = 1m.18s., ePE = 1m.22s., eN = 1m.26s., eE = 1m.29s., eS_gEN = 2m.21s.
Collmberg eE = 1m.52s., eS_gZ = 2m.31s., eEN = 2m.34s.
Raciborzu iN = 2m.41s.
Belgrade e = 3m.13s., 3m.40s., and 3m.50s.

Continued on next page,

Potsdam eE =3m.4s., iZ =3m.8s.k, iN =3m.12s. and 3m.15s., iZ =3m.31s., iN =3m.38s., iZ =3m.48s., iN =4m.2s. and 4m.38s.
Clermont-Ferrand i =3m.55s.
Uccle eZ =4m.7s., iZ =4m.14s.
Paris S =3m.44s., iS_g =4m.9s.
Almeria P_cP =6m.34s.

Feb. 3d. Readings also at 0h. (near Andijan), 1h. (near Ashkabad, near Ottawa, near Tacubaya and Manzanillo), 2h. (near Copiapo), 3h. (Obi-garm, near Stalinabad, Hungry Horse, and near Shasta Dam), 7h. (Boulder City, Hungry Horse, Logan, and near Ashkabad (2)), 9h. (near Ashkabad), 11h. (Ashkabad, Hungry Horse, Shasta Dam and Wellington), 14h. (near Ashkabad), 15h. (Strasbourg, near Alicante, and near Tucson), 16h. (near Obi-garm), 19h. (Wellington), 20h. (Bogota and College), 21h. (La Paz, near Huancayo, and near Tucson).

Feb. 4d. 15h. 44m. 42s. Epicentre 38°·0N. 21°·0E. (as on 1948, Dec. 28d.).

Strasbourg suggests foreshock of Feb. 5d. The determination is tentative.

A = +·7375, B = +·2831, C = +·6131 ; δ = −6 ; h = −1 ;
D = +·358, E = −·934 ; G = +·572, H = +·220, K = −·790.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		3·8	312	e 1 0	− 1	e 2 22	S_g	—	—	—
Sofia		5·1	21	e 1 16	− 4	i 2 24	+ 4	—	—	—
Belgrade		6·8	357	e 1 43k	− 1	e 3 16	+13	2 18	P_g	—
Istanbul		7·0	61	e 2 4	P*	3 31	S*	—	—	—
Bucharest		7·4	30	e 2 24	P_g	i 3 28	+10	i 3 40	S*	—
Rome	N.	7·6	304	—	—	e 3 56	S*	—	—	e 4·6
Kalossa		8·7	351	—	—	e 4 9	+19	e 4 45	S_g	—
Florence	N.	9·4	311	—	—	e 4 49	S*	—	—	e 6·6
Padova		9·4	316	e 3 9	P_g	—	—	—	—	e 5·7
Triest		9·4	327	e 1 55	?	e 4 37	S*	—	—	—
Bologna		9·8	315	e 2 49	?	e 4 35	+18	—	—	—
Salo		10·9	318	e 2 55	+15	e 4 46	+ 2	—	—	—
Ksara		12·8	105	e 4 27	?	—	—	—	—	e 7·5
Prague		13·0	341	i 1 3	?	—	—	—	—	e 6·8
Basle	z.	13·7	319	e 4 18	+60	—	—	—	—	—
Stuttgart		13·7	326	e 3 16	− 2	e 6 18	+26	—	—	e 8·0
Strasbourg		14·3	322	e 3 26	0	e 6 56	+50	e 3 35	PP	e 8·1
Clermont-Ferrand		15·4	306	3 51	+11	—	—	—	—	9·3
Paris		17·2	315	i 4 10	+ 7	—	—	—	—	—
De Bilt		17·9	327	—	—	i 7 48	+18	—	—	e 9·3
Tamanrasset		20·2	226	e 4 48	+ 9	—	—	e 4 59	PP	e 10·2
Hungry Horse		85·2	332	i 12 36	− 3	—	—	—	—	—

Additional readings :—
Sofia e =1m.59s. and 2m.12s.
Strasbourg e =4m.0s., 7m.22s., and 7m.57s.
Long waves were also recorded at Alicante and Kew.

Feb. 4d. Readings also at 0h. (Toledo, near Malaga, and near Ashkabad), 2h. (Samarkand, near Kulyab, Stalinabad, and near Tucson), 4h. (La Paz), 8h. (Batavia), 10h. (Boulder City, Shasta Dam, Hungry Horse, Logan, and Tucson), 11h. (Logan), 13h. (Andijan, near Kulyab and Stalinabad), 14h. (Hungry Horse and near Alicante), 16h. (near Tacubaya), 19h. (Bozeman), 20h. (Auckland and Wellington), 21h. (Ashkabad), 22h. (Toledo, Zagreb, and near Hungry Horse), 23h. (Alicante and near Shasta Dam).

Feb. 5d. 0h. 28m. 15s. Epicentre 39°·8N. 29°·6E. (as on 1948, Nov. 13d.).

Felt in districts of Eskisehir, Kütahye, Bözöyük, Kokaeli, Bursar, where a number of buildings were destroyed.

Monthly Seismological bulletin from Istanbul, Feb. 1949. Epicentre suggested by Strasbourg.

$A = +\cdot6698$, $B = +\cdot3805$, $C = +\cdot6376$; $\delta = -5$; $h = -2$;
$D = +\cdot494$, $E = -\cdot869$ $G = +\cdot554$, $H = +\cdot315$, $K = -\cdot770$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		1·3	342	i 0 24	− 1	i 0 41	− 3	—	—	—
Bucharest		5·3	330	e 1 22	0	i 2 25	0	i 1 54	P_g	—
Sofia		5·5	303	e 1 24	− 1	i 2 54	S*	—	—	—
Yalta		5·8	35	1 29	0	i 2 38	0	—	—	—
Simferopol		6·1	31	e 1 35	+ 1	2 47	+ 2	—	—	—
Campulung		6·4	329	e 1 33	− 5	—	—	—	—	—
Theodosia		6·8	37	e 1 44	0	—	—	—	—	—
Ksara		7·8	138	e 1 58	0	4 18?	?	—	—	—
Belgrade		8·4	309	e 2 3a	− 3	e 3 40	− 3	i 4 24	S*	—
Sotchi		8·5	60	e 2 15	+ 8	—	—	—	—	—
Helwan		10·0	172	i 2 29	+ 2	e 4 19	− 3	—	—	—
Kalocsa		10·3	314	—	—	e 4 24	− 6	—	—	6·1
Budapest		10·8	319	e 4 27	S	(e 4 27)	−15	e 5 30	S*	6·2
Piatigorsk		10·9	63	2 49	+ 9	—	—	—	—	e 5·8
Erevan		11·4	83	e 3 0	+17	—	—	—	—	e 6·6
Skalnate Pleso		11·5	328	e 3 20	+32	—	—	—	—	e 6·8
Zagreb		11·7	306	3 45?	+54	e 6 20	L	—	—	(e 6·3)
Grozny		12·6	68	i 3 13	+10	—	—	—	—	e 7·8
Triest		13·0	302	e 3 19	+10	e 6 55?	SS	e 4 0	PP	e 7·5
Raciborzu		13·1	326	e 2 47	−23	—	—	—	—	e 7·2
Rome	N.	13·1	284	—	—	e 5 53	+15	—	—	6·9
Florence		14·3	292	—	—	e 6 40	+34	—	—	e 8·2
Bologna		14·4	295	e 3 16	−11	e 6 9	0	e 3 57	PP	—
Prague		14·8	319	e 4 20	+48	—	—	—	—	—
Salo		15·2	299	e 3 36?	− 2	e 5 55	−33	—	—	—
Chur		16·2	302	e 3 47k	− 3	—	—	—	—	e 8·3
Jena		16·8	317	e 4 2	+ 4	—	—	—	—	e 9·1
Moscow		16·8	18	e 3 52?	− 6	—	—	—	—	—
Potsdam		17·0	324	e 3 58	− 3	—	—	—	—	e 9·8
Zürich		17·0	303	e 3 58	− 3	—	—	—	—	e 8·8
Stuttgart		17·1	308	e 3 59	− 3	—	—	—	—	e 8·8
Basle		17·7	304	e 4 8	− 2	—	—	—	—	e 10·0
Neuchatel		17·9	301	e 4 11	− 1	—	—	—	—	e 10·0
Strasbourg		17·9	309	i 4 14k	+ 2	e 7 29	− 1	i 4 28	PP	e 8·8
Copenhagen		19·5	331	4 32	+ 1	—	—	—	—	—
Clermont-Ferrand		20·3	296	i 4 39	− 1	8 30	+ 7	e 4 59	PP	—
Uccle	z.	20·8	310	e 5 2	+17	—	—	—	—	e 12·8
Paris		21·3	304	i 4 46	− 4	i 8 7	−36	e 9 18	SS	e 11·8
Ashkabad		22·4	85	e 5 1	− 1	—	—	—	—	—
Alicante		23·4	278	5 22	+11	e 9 30	+ 9	5 47	PP	e 11·3
Kew		23·8	310	i 5 15	0	e 9 31	+ 3	—	—	e 12·8
Almeria		25·2	274	e 5 58	+29	10 40	+48	6 48	PPP	13·9
Toledo	z.	25·7	281	(i 5 31)	− 2	i 5 31	P	—	—	—
Granada		26·0	276	e 5 41	+ 5	e 10 15	+ 9	—	—	14·4
Sverdlovsk		26·4	39	i 5 44	+ 4	10 20	+ 8	—	—	—
Tamanrasset	z.	26·5	238	i 5 39a	− 2	e 9 59	−15	e 6 21	PP	—
Samarkand		28·6	77	e 6 5	+ 5	—	—	—	—	—
Tchimkent		30·1	71	—	—	i 11 7	− 5	—	—	—
Stalinabad		30·2	79	i 6 15	+ 1	11 17	+ 4	—	—	—
Andijan		32·4	74	e 6 33	− 1	e 11 38	−10	—	—	—
College		75·7	359	i 11 47	− 2	—	—	—	—	—
Hungry Horse		86·5	337	i 12 43	− 3	—	—	—	—	—
Boulder City		97·8	332	i 13 39	+ 1	—	—	—	—	—

Additional readings :—
Bucharest eP*N = 1m.37s., eEN = 1m.44s., iS*EN = 2m.44s., iS_gE = 2m.55s., iS_gN = 2m.58s.
Sofia i = 2m.17s., e = 2m.34s.

Continued on next page.

Helwan iZ = 2m.37s., eZ = 4m.36s., eN = 6m.31s.
Kalossa eN = 4m.33s., eE = 5m.6s., eN = 5m.10s. and 5m.45s.
Rome eS?N = 6m.10s., eN = 6m.41s.
Stuttgart iPZ = 4m.3s.a, eZ = 5m.16s.
Strasbourg ePPP = 4m.40s., e = 5m.16s., eSSS = 8m.5s., e? = 8m.19s.
Clermont-Ferrand ePPP = 5m.12s.
Uccle eZ = 11m.42s. and 12m.12s.
Paris i = 4m.59s.
Alicante SS = 10m.8s., SSS = 10m.22s.
Kew eE = 9m.37s.
Almeria P_cP = 9m.10s., SS = 12m.12s., P_cS = 12m.52s.
Toledo ePZ = 1m.12s., iZ = 1m.22s. and 2m.30s.
Tamanrasset iZ = 5m.46s.a and 5m.57s.k, ePPPZ = 6m.34s., eZ = 8m.6s.
College i = 11m.51s. and 12m.35s.
Long waves were also recorded at Padova, Pavia, Collmberg, and De Bilt.

Feb. 5d. 8h. 55m. 20s. Epicentre 31°·2N. 79°·9E. (as on 1947, Aug. 19d.).

Calcutta readings do not fit this determination. If these were suited a very different time of origin would be required and would, therefore, be very much at variance with the majority of recording stations.

A = +·1503, B = +·8436, C = +·5155; δ = −1; h = +2;
D = +·985, E = −·175; G = +·090, H = +·508, K = −·857.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Dehra Dun	N.	1·8	247	i −0 6a	−38	i 0 24	−32	—	—	—
Murgab		8·7	327	2 13	+ 3	3 46	− 4	—	—	—
Kulyab		10·7	311	e 2 38	0	4 38	− 1	—	—	—
Andijan		11·3	329	e 2 42	− 4	e 4 48	− 6	—	—	—
Obi-garm		11·3	315	e 2 40?	− 6	e 4 41?	−13	—	—	—
Calcutta	E.	11·5	137	e 2 5	−43	i 3 51	−68	—	—	—
Stalinabad		11·7	312	e 2 50?	− 1	e 4 55?	− 9	—	—	—
Almata		12·3	350	e 3 3	+ 4	—	—	—	—	—
Frunse		12·4	341	e 2 59	− 2	—	—	—	—	—
Tashkent		13·2	323	—	—	e 5 25	−15	—	—	—
Bombay		13·8	209	i 3 25	+ 6	e 6 9	+15	6 25	SS	6·6
Hyderabad	N.	13·8	186	3 18	− 1	e 6 11	+17	6 52	SS	7·4
Poona		13·8	205	e 3 15	− 4	i 5 48	− 6	e 3 47	PP	—
Tchimkent		13·8	326	e 3 19	0	—	—	—	—	—
Ashkabad		19·0	297	e 4 24	− 2	—	—	—	—	—
Irkutsk		27·6	34	e 6 9?	+18	—	—	—	—	—
Sverdlovsk		28·9	339	e 6 5	+ 2	10 51	− 2	—	—	—
Grozny		29·5	304	e 6 2	− 6	—	—	—	—	—
Stuttgart		55·0	311	e 9 33	− 2	—	—	—	—	e 30·7
Tamanrasset	Z.	65·7	283	e 10 44	− 4	—	—	e 13 0	PP	—
College		77·3	19	i 11 52	− 6	—	—	—	—	—

Additional readings :—
Dehra Dun iN = 10s.
Bombay EN = 5m.55s., SSSEN = 6m.29s.
Hyderabad N = 6m.26s.
Poona eE = 3m.19s., 3m.24s., and 4m.10s., iEN = 6m.2s., iSSEN = 6m.12s.
Long waves were also recorded at Kodaikanal, Ksara, De Bilt, and Alicante.

Feb. 5d. 15h. 24m. 17s. Epicentre 38°·0N. 21°·0E. (as on 4d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		3·8	312	e 1 48	S	(e 1 48)	+ 1	3 8	?	—
Messina		4·3	274	—	—	e 2 20	S_g	—	—	—
Sofia		5·1	21	e 1 15	− 5	e 2 14	− 6	e 2 53	S_g	—
Belgrade		6·8	357	e 1 39a	− 5	e 2 52	−11	e 2 18	P_g	—
Istanbul	E.	7·0	61	e 1 47	+ 1	3 27	S*	—	—	—
Bucharest	N.	7·4	30	e 1 49	− 3	e 3 21	+ 3	—	—	—
Rome		7·6	304	e 2 11	P*	e 3 38	+15	e 4 16	S_g	—
Zagreb		8·6	336	2 13	+ 4	e 3 39	− 9	e 4 38	S_g	—
Florence		9·4	311	e 2 13	− 5	e 4 4	− 3	—	—	—
Padova		9·4	316	e 3 2	P_g	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest		9·4	327	e 2 17	− 1	e 4 1	− 6	3 0	P_g	i 5·4
Prato		9·5	311	e 3 3	P_g	e 5 17	S_g	—	—	—
Bologna		9·8	315	e 2 34	+10	e 4 20	+ 3	—	—	—
Ogyalla		10·1	348	e 2 5	?	—	—	—	—	e 6·2
Salo		10·9	318	e 2 39	− 1	e 4 39	− 5	—	—	—
Pavia		11·4	313	e 3 43?	+56	—	—	—	—	—
Helwan		11·8	130	e 4 37	?	e 5 17	+11	—	—	—
Yalta		11·8	53	e 2 46	− 7	7 30	L	—	—	(7·5)
Chur		12·2	320	e 2 55	− 3	e 5 11	− 5	—	—	—
Basle		13·7	319	e 3 22	+ 4	e 6 6	+14	—	—	e 8·7
Stuttgart		13·7	326	e 3 15	− 3	e 7 8	L	—	—	(e 7·1)
Strasbourg		14·3	322	i 3 34	+ 8	—	—	—	—	e 8·2
Collmberg	E.	14·4	340	e 3 32	+ 5	—	—	—	—	e 8·9
Jena	N.	14·5	336	e 3 29	+ 1	—	—	—	—	e 8·4
Clermont-Ferrand		15·4	306	e 3 47	+ 7	—	—	—	—	10·2
Potsdam		15·4	341	e 3 42	+ 2	—	—	—	—	e 9·1
Alicante		16·9	278	e 5 12	?	9 48	L	—	—	(9·8)
Paris		17·2	315	i 4 6	+ 3	—	—	i 4 20	PP	e 8·2
Copenhagen		18·6	345	4 17	− 4	—	—	—	—	—
Toledo		19·6	284	e 4 34	+ 2	e 8 58	+50	—	—	—
Tamanrasset	z.	20·2	226	e 4 35	− 4	—	—	i 5 17k	PPP	—
Upsala		22·0	356	e 4 46?	−12	—	—	—	—	e 13·4
Ottawa	z.	68·3	312	e 11 2	− 3	—	—	—	—	—
College		77·1	355	i 11 51	− 6	—	—	—	—	—
Hungry Horse		85·2	332	i 12 35	− 4	—	—	—	—	—

Additional readings :—
Messina eS = 3m.11s.
Bucharest eE = 3m.2s.
Rome eN = 4m.38s., iN = 4m.52s.
Zagreb e = 4m.9s., eE = 5m.8s., i = 5m.18s.
Triest iS_gS_g = 5m.9s.
Helwan eZ = 4m.53s.
Stuttgart eZ = 3m.31s. and 4m.1s.
Strasbourg i = 4m.9s., e = 4m.52s.
Collmberg eE = 4m.34s.
Jena eEN = 3m.35s.
Clermont-Ferrand i = 4m.13s.
Potsdam iZ = 3m.45s.
Paris i = 4m.10s. and 4m.30s.
Toledo e = 4m.50s. and 7m.4s.
Tamanrasset iZ = 4m.42s.s.
Hungry Horse i = 12m.40s.
Long waves were also recorded at Ksara, Budapest, De Bilt, and Granada.

Feb. 5d. 20h. 18m. 37s. Epicentre 19°·6N. 69°·4W. Depth of focus 0·020.
(as on 1946, November 14d.).

$A = +·3317$, $B = -·8825$, $C = +·3334$; $\delta = -1$; $h = +5$;
$D = -·936$, $E = -·352$; $G = +·117$, $H = -·312$, $K = -·943$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		3·3	111	e 0 50	− 2	i 1 29	− 3	—	—	i 2·0
Fort de France		9·2	120	e 2 6	− 4	—	—	—	—	—
Bogota		15·6	198	i 3 27	− 5	e 6 6	−14	e 6 27	SS	—
Weston		22·8	357	i 5 5	+16	i 8 56	+13	—	—	—
Harvard		22·9	357	i 4 55	+ 5	i 8 58	+13	—	—	—
St. Louis		26·2	321	e 5 26	+ 4	e 10 2	+22	—	—	e 12·7
Ottawa	z.	26·3	350	e 5 25	+ 3	e 10 28	+47	—	—	—
La Paz		35·9	178	i 6 51	+ 5	—	—	i 8 9	PP	17·9
Tucson		39·1	298	e 7 11	− 2	—	—	e 8 44	PP	e 26·8
Logan		42·1	313	e 7 28	−10	—	—	e 8 9	pP	—
Boulder City		43·0	303	i 7 43	− 2	—	—	—	—	—
Riverside	z.	44·8	300	e 7 58	− 1	—	—	—	—	—
Pasadena	z.	45·4	300	e 8 2	− 2	—	—	—	—	—
Hungry Horse		45·9	320	i 8 7	− 1	—	—	—	—	—
Tinemaha	z.	45·9	304	i 8 6	− 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shasta Dam		49·6	308	i 8 34	− 2	—	—	—	—	—
Granada		59·4	57	9 23	−25	—	—	—	—	29·3
Almeria		60·3	58	9 40	−14	18 0	+ 6	11 56	PP	28·9
Alicante		61·8	56	9 46	−18	e 17 50	−23	—	—	e 28·6
College		67·5	334	i 10 41	0	—	—	—	—	—
Tamanrasset	Z.	69·2	72	e 11 4	+13	—	—	—	—	—

Additional readings :—
San Juan i = 1m.38s.
Tucson i = 7m.16s.
Almeria PPP = 13m.26s., SS = 21m.56s.
Long waves were also recorded at Bermuda, Philadelphia, Chicago, and Berkeley.

Feb. 5d. Readings also at 0h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Shasta Dam, Hungry Horse, College, near Bogota, near Apia, and near Istanbul), 1h. (Paris, Strasbourg, Stuttgart, and Tamanrasset), 2h. (near Andijan and near Istanbul), 4h. (Ashkabad), 5h. (Auckland, Boulder City (2), Shasta Dam, Hungry Horse (2), near Logan, and near Istanbul), 7h. (Ashkabad, College, Hungry Horse, Shasta Dam, and near Klyuchi), 8h. (Auckland, Wellington, Pasadena, Tinemaha, Tucson, Boulder City, and Hungry Horse), 10h. (near Ashkabad (2), and near Batavia), 12h. (Hungry Horse and Shasta Dam), 13h. (Ashkabad), 15h. (Copiapo, Ottawa, and near Cleveland), 17h. (Wellington, Andijan, Samarkand, near Obi-garm, and Stalinabad), 18h. (Kulyab and near Stalinabad), 19h. (Samarkand, near Andijan, Obi-garm, Kulyab, Stalinabad, and Tchimkent), 20h. (Ottawa, Stalinabad, near Kulyab, and Obi-garm).

Feb. 6d. 9h. 16m. 25s. Epicentre 18°·5N. 146°·0E. Depth of focus 0·020.
(as on 1943, March 15d.).

A = −·7867, B = +·5307, C = +·3154; δ = +2; h = +5;
D = +·559, E = +·829; G = −·261, H = +·176, K = −·949.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		27·3	337	i 6 14	PP	e 10 0	+ 2	i 11 0	SS	—
Brisbane	Z.	46·2	172	i 8 7	− 3	i 14 43	− 1	i 10 53	PPP	—
Irkutsk		46·8	326	e 9 59	PP	e 14 52	0	18 41	SS	—
Riverview		52·3	175	—	—	i 16 5	− 3	e 19 52	SS	23·3
Auckland	N.	61·4	154	—	—	18 10	+ 2	—	—	—
College		63·3	26	i 10 14	0	—	—	i 10 55	pP	—
Tuai	N.	63·8	153	10 7	−10	18 34	− 4	—	—	—
Kaimata		65·1	159	10 25	− 1	18 49	− 5	—	—	—
Wellington		65·2	157	10 22	− 4	18 45	−10	e 11 22	—	—
Tchimkent		67·8	309	—	—	i 19 26	0	—	—	—
Obi-garm		68·1	305	e 11 12?	pP	—	—	—	—	—
Tashkent		68·2	308	e 11 20	pP	—	—	—	—	—
Stalinabad		68·9	305	i 10 50	+ 1	i 19 39	0	—	—	—
Sverdlovsk		72·2	326	e 11 10	+ 1	e 20 15	− 2	—	—	—
Mineral	Z.	80·0	51	i 11 55	+ 2	—	—	—	—	—
Berkeley		80·2	54	i 11 57k	+ 3	i 21 51	+ 7	—	—	e 39·1
Lick		80·8	54	i 13 0	+63	—	—	i 15 2	PP	—
Reno		81·6	52	i 12 4k	+ 3	—	—	i 12 14	P	—
Fresno		82·4	54	i 12 8	+ 3	i 22 13	+ 7	—	—	—
Hungry Horse		82·8	41	i 12 10	+ 3	e 22 11	+ 1	i 12 52	pP	—
Tinemaha		83·5	54	i 12 16k	+ 5	—	—	i 12 57	pP	—
Pasadena		84·5	56	12 18k	+ 2	i 22 27	0	i 13 2	pP	e 33·6
Moscow		84·8	328	e 13 10	+53	23 38	ScS	—	—	—
Riverside	Z.	85·2	56	i 12 21k	+ 2	—	—	i 13 4	pP	—
Boulder City		86·5	53	i 12 27	+ 1	—	—	i 13 11	pP	—
Logan		86·6	47	i 12 24	− 2	e 22 47	− 1	i 13 6	pP	—
Tucson		90·9	56	i 12 49	+ 2	e 24 42	SP	i 13 31	pP	—
Tamanrasset	Z.	123·7	315	e 19 51	PP	—	—	e 21 2	pPP	—
La Paz	Z.	147·4	91	e 19 18	[− 4]	—	—	i 19 27	pPKP	—

Additional readings :—
Brisbane iE = 14m.40s.
College iP_cP? = 10m.31s.
Wellington eZ = 9m.57s.

Continued on next page.

Berkeley iPZ =12m.57s.k, iZ =13m.39s.
Lick iPPZ =13m.42s.
Hungry Horse ePP? =15m.14s.
Tinemaha iPPZ =15m.30s.
Logan ePP =15m.50s., eSKS? =22m.35s., eSP =23m.47s.
Tucson ePP? =16m.16s.
Tamanrasset ePPZ =20m.26s.
La Paz iE =20m.45s.

Feb. 6d. Readings also at 1h. (near Stalinabad), 3h. (Copiapo), 4h. (Mount Wilson, Tinemaha, and Hungry Horse), 6h. (Ashkabad), 7h. (near Ashkabad), 8h. (Ashkabad, Belgrade, Sofia, Zagreb, Bologna, Messina, Padova, Rome, Salo, Triest, Stuttgart, Tamanrasset, near Shasta Dam and Hungry Horse), 9h. (Hungry Horse), 10h. (near Alicante (3)), 13h. (Stuttgart and Tucson), 16h. (Collmberg, Strasbourg, Stuttgart, College, Hungry Horse, Shasta Dam, and near Apia), 17h. (Shasta Dam), 22h. (Erevan, and near Tacubaya), 23h. (Ksara and near Istanbul).

Feb. 7d. Readings at 0h. (Ashkabad (2)), 1h. (near Ashkabad, Boulder City, Hungry Horse, and near College), 2h. (Mount Wilson), 3h. (Ashkabad), 4h. (College and near Alicante), 6h. (Ashkabad, Ottawa, Shasta Dam, and near Istanbul), 9h. (Ashkabad, Almata, Frunse, Obi-garm, Stalinabad, Tchimkent, Irkutsk, Tashkent, Hungry Horse, and Shasta Dam), 10h. (Andijan, near Obi-garm, Kulyab, Stalinabad, near Ashkabad (2), Boulder City, Tucson, near Tacubaya and Puebla), 11h. (College, Hungry Horse and Stuttgart), 12h. (Logan and near Ashkabad), 14h. (Granada (2)), 15h. (Ashkabad and Shasta Dam), 17h. (Ashkabad), 18h. (Bogota and near Balboa Heights), 19h. (Brisbane), 20h. (near Ashkabad, near Tucson, and near Tacubaya), 21h. (Bucharest, Sofia, near Istanbul, and near Tucson), 22h. (near Ashkabad), 23h. (near Ashkabad and near Tacubaya).

Feb. 8d. 4h. Shock apparently from the same neighbourhood as that of 5d. 20h. The readings do not suggest a repetition from that epicentre.

San Juan eP =32m.8s., i =32m.15s., iS? =32m.32s., iL =33m.4s.
Fort de France eP =33m.21s.
Bogota eP =34m.58s., iS =37m.32s., iP_cP =37m.59s., eEN =39m.8s.
Weston iP =36m.58s., iS =41m.14s.
Ottawa eZ =37m.26s. and 42m.37s.
Tucson eP =39m.8s., e =40m.39s.
Boulder City iP =39m.37s.
Hungry Horse iP =40m.4s.
Tinemaha iPZ =40m.5s., iZ =40m.24s.
Shasta Dam iP =40m.30s.
College iP =42m.34s.
Seven Falls eE =43m.13s.

Feb. 8d. Readings also at 1h. (Clermont-Ferrand), 3h., 4h., and 5h. (near Ashkabad), 12h. (Sofia), 13h. (Santa Lucia, Catania, and near Messina), 17h. (near Tacubaya), 18h. (Hungry Horse and Shasta Dam), 19h. (Ottawa), 21h. (Hungry Horse, near Ottawa, and near Tucson).

Feb. 9d. 13h. Undetermined shock.

Taranto eP =28m.16s.
Sofia eP =29m.55s., e =30m.35s. and 31m.4s., iS_g =31m.19s.
Istanbul eP =30m.2s., iS_g =30m.50s.
Bucharest eN =30m.24s., 30m.33s., and 30m.47s., eE =30m.55s. and 31m.3s., eN =31m.25s., L?EN = =31·6m.
Belgrade eP =31m.2s.$_s$, eP_g =31m.24s., eS? =32m.10s.
Cheb eP? =31m.44s., eS? =35m.16s.
Rome eZ =31m.18s., eSN =32m.49s., eQN =34m.0s.
Zagreb eP =31m.23s., eE =34m.6s., e =34m.37s.
Bologna e =32m.23s. and 35m.32s.?
Stuttgart eZ =32m.32s.
Strasbourg eP =32m.42s., L =37m.
Triest eP_gP_g? =32m.50s., iS? =33m.49s., iS_gS_g? =34m.47s., iQ? =34m.56s.
Ksara e =33m.2s. and 34m.46s.
Tamanrasset ePZ =33m.59s.
Budapest eEN =34m.15s., LE =34m.30.
Padova e =35m.55s.
Helwan eZ =36m.12s. and 40m.25s.
Alicante eS_g =38m.24s., eL =41m.26s.
Hungry Horse eP =40m.28s., e =41m.32s.
Long waves were also recorded at De Bilt and Almeria.

Feb. 9d. 17h. 30m. 49s. Epicentre 39°·9S. 174°·2E. Depth of focus 0·025.

Felt throughout both Islands. Intensity VI near the epicentre.

R. C. Hayes.
Earthquake Origins in New Zealand during 1949. New Zealand Journal of Science and Technology, Sect. B., Vol. 31, No. 4. Jan., 1950, p. 443, with Isoseismic chart in an appendix. Epicentre as adopted.

$A = -·7653$, $B = +·0777$, $C = -·6389$; $\delta = -9$; $h = -2$;
$D = +·101$, $E = +·995$; $G = +·636$, $H = -·065$, $K = -·769$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Plymouth	E.	0·8	353	0 31	+ 3	0 51	+ 1	—	—	—
Wellington		1·5	163	0 37	+ 4	1 2	+ 3	—	—	—
Havelock North		2·1	84	0 11?	−28	0 40	−30	—	—	—
Tuai	N.	2·5	70	0 45	+ 1	1 17	− 1	—	—	—
Auckland	N.	3·1	9	0 48	− 3	1 25	− 5	—	—	—
Kaimata		3·4	218	1 11?	+16	1 50	+13	—	—	—
Riverview		19·4	281	i 4 13k	0	i 7 44	+ 7	i 4 39	PP	i 10·2
Brisbane		21·5	299	i 4 34	0	i 8 21	+ 5	i 5 42	sP	i 9·5
Batavia		68·7	281	—	—	i 19 31	0	—	—	—
Vladivostok		91·1	330	i 12 40	− 4	i 23 24	+ 2	—	—	—
Shasta Dam		98·8	44	e 13 12	− 7	—	—	—	—	—
Ottawa	Z.	129·8	59	e 18 42	[− 5]	—	—	—	—	—
Sverdlovsk		134·6	315	—	—	38 56	SS	—	—	—
Piatigorsk		143·8	293	e 19 9	[− 3]	—	—	—	—	—
Tamanrasset	Z.	160·4	212	e 19 36	[0]	—	—	—	—	—

Additional readings :—
Riverview isPE = 5m.10s., iE = 7m.50s., iZ = 7m.54s., iEZ = 8m.43s.
Brisbane iZ = 4m.48s., iN = 4m.57s., iZ = 5m.34s. and 5m.51s., iE = 6m.27s. and 8m.37s., iN = 8m.41s. and 13m.16s.

Feb. 9d. Readings also at 0h. (College, Tucson, and near Stalinabad), 2h. (Bologna), 3h. (Pavia, Padova, Prato, Stuttgart, near Florence, Salo, and Zürich), 5h. (near Florence), 6h. (near Alicante), 7h. (near Alicante (2) and near Mizusawa), 8h. (near Berkeley, Branner, and Lick), 9h. (Shasta Dam), 10h. (Basle), 11h. (near Alicante), 12h. (Santa Lucia, Shasta Dam, and near Alicante), 13h. (Bogota), 14h. (Ashkabad, near Berkeley (2), Branner (2), Lick (2), San Francisco (2), and Mineral), 15h. (Ashkabad), 16h. (Copiapo and near Alicante), 17h. (Hungry Horse, near Ottawa, near Granada, near Andijan, and Obi-garm), 18h. (Almata, Kulyab, near Andijan, Murgab, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 19h. (Tchimkent, near Andijan, Kulyab, Obi-garm, Samarkand, Stalinabad, and Tashkent), 20h. (Andijan and near Murgab), 21h. (Ashkabad and Santa Clara), 22h. (Ashkabad, Boulder City, Hungry Horse).

Feb. 10d. 31h. 56m. 36s. Epicentre 15°·8S. 172°·8W.

Intensity V at Apia. Preliminary Seismological Bulletin, Western Samoa, Jan.-March, 1949, p. 3.

Suggested epicentres :—16°·0S. 171°·5W. (Wellington).
15°·75S. 172°·75W. (Strasbourg).

$A = -·9551$, $B = -·1207$, $C = -·2706$; $\delta = +1$; $h = +6$;
$D = -·125$, $E = +·992$; $G = +·268$, $H = +·034$, $K = -·963$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		2·2	26	i 0 38	0	0 58	− 8	—	—	—
Auckland	N.	23·7	205	5 23	+ 9	e 9 42	+15	i 6 6	PP	—
Arapuni	E.	24·4	203	—	—	e 9 54	+15	—	—	—
Tuai	N.	24·6	199	6 1	+38	—	—	—	—	13·2
New Plymouth	E.	25·9	203	5 25	−10	—	—	—	—	—
Wellington		27·6	201	5 53	+ 2	—	—	7 6	PP	14·4
Kaimata		29·9	204	6 12	0	—	—	—	—	—
Brisbane	E.	33·7	244	i 6 43	− 2	—	—	—	—	i 17·0
Riverview		37·1	234	i 7 14a	0	i 13 10	+ 9	i 8 42	PP	e 17·6
Perth		66·2	242	—	—	i 21 52	SS	—	—	i 34·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Branner	z.	71·2	41	i 11 25	+ 2	—	—	—	—	—
Santa Clara		71·3	41	e 11 27	+ 4	e 20 50	+ 9	11 40	pP	e 32·7
Berkeley		71·4	41	i 11 26	+ 2	i 20 46	+ 4	i 14 37	PP	e 33·6
Lick	z.	71·5	41	i 11 27	+ 3	—	—	—	—	—
Pasadena		71·9	46	i 11 28k	+ 1	i 20 51	+ 3	—	—	e 30·1
Fresno	z.	72·3	43	i 11 32	+ 3	—	—	—	—	e 32·5
Riverside		72·3	46	e 11 32	+ 3	—	—	—	—	—
Shasta Dam		73·1	38	i 11 36	+ 2	—	—	—	—	—
Mineral	z.	73·4	39	i 11 38	+ 2	—	—	—	—	—
Tinemaha		73·5	43	e 11 40	+ 4	—	—	—	—	—
Reno	z.	73·9	41	i 11 43k	+ 4	—	—	—	—	—
Boulder City		75·2	46	i 11 50	+ 4	—	—	—	—	—
Pierce Ferry		75·8	46	i 11 54	+ 4	—	—	—	—	—
Tucson		76·1	51	i 11 56	+ 5	e 21 40	+ 5	e 14 42	PP	e 34·8
Vladivostok		77·5	332	e 11 59	0	i 21 46	− 4	e 14 43	PP	—
Salt Lake City		79·7	43	i 12 6	− 5	e 22 8	− 5	e 15 34	PP	e 36·1
Logan		80·2	42	i 12 15	+ 1	i 22 21	+ 2	e 22 46	S_cS	e 36·4
Butte	N.	82·0	38	e 12 20	− 3	e 22 39	+ 2	—	—	e 38·0
Hungry Horse		82·5	35	i 12 57	+31	—	—	e 39 18	P'P'	—
College		82·6	11	i 12 27	+ 1	i 22 40	− 3	—	—	e 36·7
Rapid City	E.	86·9	43	i 12 54	+ 6	i 23 31	+ 5	e 16 32	PP	e 40·9
Huancayo		93·8	104	e 13 31	+11	e 24 10	[+16]	e 17 44	PP	e 45·2
St. Louis		94·1	51	i 13 22	0	i 24 34	+ 3	i 23 57	SKS	—
Irkutsk		98·1	322	e 13 53?	+13	25 7	+ 3	e 24 12?	SKS	—
La Paz		99·1	110	14 10	+26	i 25 5	− 8	18 14	PP	48·4
Bogota		99·6	88	e 18 11	PP	e 25 23	+ 6	e 24 9	SKS	33·4
Columbia		100·1	57	—	—	e 24 38	[+11]	—	—	e 40·1
Philadelphia		105·7	52	e 18 36	[+11]	e 24 59	[+ 5]	e 27 56	PS	e 43·0
Fordham		106·8	51	—	—	i 25 5	[+ 6]	e 27 59	PS	52·4
Weston		108·9	50	—	—	i 25 17	[+ 9]	i 28 30	PS	—
San Juan		110·3	76	e 19 28	PP	e 25 20	[+ 7]	e 28 50	PS	e 42·3
Kodaikanal	E.	111·6	275	—	—	e 23 54	?	—	—	—
Bermuda		113·4	61	e 19 41	PP	e 25 4	[−22]	e 29 14	PS	e 53·7
Bombay		117·6	283	e 20 22	PP	—	—	—	—	—
Tashkent		121·2	309	e 18 59	[+ 4]	e 25 53	[− 1]	e 20 40	PP	—
Stalinabad		121·8	306	e 19 2	[+ 6]	26 0	[+ 4]	e 20 46	PP	—
Sverdlovsk		122·8	328	e 19 0	[+ 2]	e 26 1	[+ 2]	i 20 41	PP	—
Moscow		133·8	336	e 19 23	[+ 4]	23 1	PKS	e 21 51	PP	—
Copenhagen		140·0	355	e 19 49	[+18]	23 11	PKS	—	—	69·4
Potsdam	z.	143·2	354	i 19 51a	[+15]	—	—	i 23 2k	PP	e 69·4
Yalta		143·4	326	e 19 47	[+11]	—	—	e 22 55	PP	—
De Bilt		143·7	2	e 19 51?	[+14]	—	—	—	—	e 67·4
Kew		143·9	7	e 19 54	[+17]	e 22 54	PKS	e 24 2	PP	e 66·4
Raciborzu	z.	144·7	348	e 19 41	[+ 2]	—	—	—	—	—
Jena	N.	144·8	354	e 19 43	[+ 4]	—	—	—	—	—
Prague		145·3	351	e 19 29	[−11]	e 23 54	PKS	—	—	—
Cheb		145·6	354	e 18 29	[−71]	—	—	e 21 20	?	—
Ogyalla		146·8	346	19 55	[+13]	—	—	e 23 12	PP	—
Paris		146·9	5	i 19 47	[+ 5]	—	—	i 19 59	PKP_2	e 74·4
Stuttgart		147·1	357	e 19 46	[+ 3]	—	—	i 20 0	PKP_2	e 73·4
Strasbourg		147·3	358	i 19 48	[+ 5]	e 33 44	PS	i 20 2	PKP_2	e 68·4
Istanbul		148·5	327	19 50	[+ 5]	—	—	—	—	—
Zürich		148·5	358	e 19 51k	[+ 6]	—	—	—	—	—
Ksara		148·5	309	e 19 51	[+ 6]	—	—	23 26	PP	—
Neuchatel		148·9	359	e 19 53	[+ 7]	—	—	—	—	—
Belgrade		149·0	341	e 19 54k	[+ 8]	e 33 52	PS	—	—	e 78·6
Chur		149·0	357	e 19 43	[− 3]	—	—	—	—	—
Triest		149·7	351	i 19 55	[+ 8]	e 42 34	SS	i 20 24	PKP_2	—
Clermont-Ferrand		149·9	5	i 19 54	[+ 7]	—	—	i 23 40	PP	72·9
Salo		150·2	353	e 19 51	[+ 3]	—	—	—	—	—
Padova		151·1	352	e 20 5	[+16]	—	—	e 20 58	PKP_2	—
Bologna	z.	151·2	353	e 19 54	[+ 5]	—	—	—	—	—
Florence	z.	151·9	353	e 20 2	[+12]	—	—	—	—	—
Rome	E.	153·6	350	e 19 43	[−10]	e 36 54	PPS	e 20 24	PKP_2	e 73·0
Helwan	z.	153·8	306	19 57	[+ 4]	23 30	PKS	20 18	PKP_2	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Toledo	z.	154·1	20	e 20 0	[+ 7]	e 26 49	[−10]	e 20 19 PKP$_3$	e 78·4
Alicante		156·5	15	20 31	PKP$_3$	31 24	{+30}	24 16 PKS	e 73·8
Granada		156·6	22	20 34 a	PKP$_3$	27 31	[+30]	20 48 k pPKP$_3$	73·8
Malaga	z.	156·7	23	i 19 58 k	[+ 1]	26 18	[−43]	i 20 26 k PKP$_3$	76·3
Almeria		157·4	20	i 20 15	[+17]	27 13	[+11]	20 47 PKP$_3$	81·8
Algiers		158·8	8	e 20 43	PKP$_3$	e 30 17	{−49}	e 24 31 PP	—
Tamanrasset		172·9	12	e 20 17	[+ 6]	—	—	e 21 42 PKP$_3$	—

Additional readings :—
New Plymouth iE =5m.44s.
Wellington iZ =6m.48s., e =11m.18s., SS? =12m.50s.
Brisbane iZ =6m.57s. and 7m.52s., iE =8m.3s., iZ =8m.6s., iE =8m.21s., iN =14m.41s.
Riverview iZ =8m.57s., iPPPN =9m.6s., iZ =9m.12s., iE =10m.45s. and 12m.45s., eZ = 13m.15s., iE =13m.26s., eN =14m.52s.
Berkeley iE =11m.34s. and 12m.21s., iN =12m.25s., eQN =31m.36s., eQE =32m.6s.
Pasadena i =11m.31s., iZ =12m.16s.
Reno iE =11m.48s., iZ =11m.54s.
Boulder City i =13m.30s.
Tucson i =12m.7s., iS =21m.43s., eS$_c$S? =22m.21s.
Vladivostok iP$_c$P =12m.9s., iS$_c$S =22m.8s., iPS =22m.43s., SSS =30m.37s.
Salt Lake City e =12m.30s., iS =22m.36s.
Logan i =12m.32s.
College i =22m.9s.
Rapid City iE =13m.2s., iSKSE =23m.19s.
Huancayo iS =24m.54s., eSS =31m.14s.
St. Louis e =18m.1s., iPS =25m.59s.
Irkutsk eSS =31m.42s.
La Paz iSKSE =24m.43s., SS =32m.14s., QN =42m.24s.
Bogota eSKKSN =25m.3s.
Philadelphia e =19m.31s. and 22m.57s.
San Juan eS =27m.3s.
Bermuda e =26m.42s., eS? =27m.41s., ePPS =30m.14s.
Tashkent ePS =30m.24s., iSS =37m.0s.
Stalinabad eSS =37m.0s., SSS =40m.12s.
Sverdlovsk ePS =30m.37s., eSS =37m.12s.
Moscow ePPP =24m.42s., eSS =39m.30s.
Copenhagen 23m.25s.
Potsdam eZ =22m.24s.?
Kew ePKP$_3$Z =20m.3s.
Raciborzu eE =20m.6s. and 22m.7s.
Jena eEN =20m.49s.
Paris i =20m.12s., 20m.16s., and 21m.2s., e =21m.38s. and 22m.11s.
Stuttgart iPKP$_3$Z =20m.12s.a.
Strasbourg iPKP$_3$ =20m.6s., i =20m.36s., 20m.58s., and 21m.36s., e =22m.25s., 23m.47s., and 24m.59s., eSSS? =49m.44s., e =54m.2s. and 57m.30s.
Zürich e =20m.51s., 22m.4s., and 22m.40s.
Belgrade e =21m.43s. and 25m.32s.
Triest eSSS =48m.41s.
Clermont-Ferrand i =20m.20s. and 20m.34s.
Salo eZ =19m.57s., e =20m.16s., 21m.1s., and 22m.30s.
Rome iE =20m.42s. and 23m.6s., ePPE =23m.32s., ePSKSE =33m.56s., eSSE = 43m.56s.
Helwan eZ =20m.6s. and 21m.11s., PPZ =24m.3s., iZ =24m.36s., SSN =43m.36s.
Toledo iZ =20m.31s., ePPZ =23m.49s.
Alicante PKP$_2$ =21m.10s., PP =24m.50s., PPP =28m.40s., SKSP =35m.0s., SS = 44m.24s., SSP =45m.48s., SSS =50m.32s.
Granada PKP$_2$ =21m.16s.k, SKP =23m.48s., PP =25m.3s., SS =43m.30s.
Malaga iPPZ =24m.0s., PPPZ =28m.6s.
Almeria PKS =23m.43s., PP =24m.27s., PPP =27m.59s., SKKS =31m.11s.
Algiers ePKP$_2$ =20m.54s., e =28m.17s., ePSKS =35m.47s., e =38m.24s.?
Tamanrasset ePPZ =25m.33s., ePPPZ =29m.31s.
Long waves were also recorded at Honolulu, Fort de France, Ivigtut, Scoresby Sund, and other American and European stations.

Feb. 10d. Readings also at 0h. (Shasta Dam, Samarkand, near Obi-garm, and Stalinabad), 3h. (near Ashkabad), 4h. (near Pierce Ferry), 5h. (near Ashkabad), 6h. (Santa Clara and Shasta Dam), 8h. (near Messina), 11h. (near Alicante and near Murgab), 12h. (La Paz, near Granada, and near Andijan), 13h. (Hungry Horse), 14h. (Samarkand, Tchimkent, near Andijan, Murgab, and Stalinabad), 15h. (Ashkabad (2)), 16h. (near Tucson), 17h. (near Alicante), 20h. (Andijan, near Kulyab, Obi-garm, Samarkand, and Stalinabad), 21h. (Hungry Horse, Branner, San Francisco, near Berkeley, and Lick), 22h. (Rome and near Mizusawa), 23h. (near Istanbul, near Tucson, near Boulder City, and Pierce Ferry).

Feb. 11d. 3h. 51m. 29s. Epicentre 34°·0N. 39°·0W.

Rough.

A = +·6457, B = −·5228, C = +·5566; δ = +5; h = 0;
D = −·629, E = −·777; G = +·433, H = −·350, K = −·831.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Granada		28·9	73	e 3 13	?	—	—	—
Paris		34·0	52	e 6 46	− 2	—	—	—
Stuttgart	z.	38·4	52	e 7 25	0	—	—	—
Tamanrasset	z.	40·4	94	e 7 42	+ 1	—	—	—
Hungry Horse		56·1	310	i 10 11	+28	—	—	—
La Paz		57·4	214	9 55	+ 2	i 17 55	+ 6	29·0
Tucson		59·0	291	e 9 52	−12	—	—	—
Pierce Ferry		60·0	296	i 10 11	0	—	—	—
Boulder City		60·6	296	i 10 15	0	—	—	—
Pasadena	z.	63·9	295	e 10 37	0	—	—	—
Shasta Dam		64·3	303	i 10 37	− 2	—	—	—

Additional readings :—
Paris i = 6m.51s.
Tamanrasset eZ = 8m.11s.
Long waves were also recorded at Bermuda, San Juan, De Bilt, Rome, and Punta Arenas.

Feb. 11d. 7h. 23m. 45s. Epicentre 35°·0S. 108°·5W.

Rough.

A = −·2605, B = −·7786, C = −·5710; δ = +12; h = 0;
D = −·948, E = +·317; G = +·181, H = +·541, K = −·821.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Santa Lucia		31·1	99	e 6 25	+ 3	e 11 29	+ 1	e 13 26 SS	e 14·6
Puntas Arenas	N.	32·0	137	—	—	e 13 19	SS	— —	16·3
Huancayo		37·7	61	e 7 20	+ 1	e 13 14	+ 4	i 8 43 PcP	e 15·9
La Paz		40·4	74	i 7 41	0	i 13 51	+ 1	9 15 PP	19·2
Bogota		51·0	47	e 8 58	− 8	e 16 13	− 9	— —	24·2
Wellington		58·8	239	i 10 15	+13	—	—	— —	29·2
San Juan		66·6	44	e 11 26	+32	e 19 38	− 7	e 26 59 SSS	e 28·1
Tucson		66·9	358	i 10 56	0	e 20 55	ScS	e 13 44 PP	e 32·7
Pasadena		69·4	352	i 11 13	+ 1	—	—	— —	e 32·2
Boulder City		70·8	355	i 11 21	+ 1	—	—	— —	—
Pierce Ferry		70·9	356	e 11 18	− 3	—	—	— —	—
Tinemaha		72·2	353	e 11 33	+ 4	—	—	— —	—
Reno		74·9	342	e 11 47	+ 3	—	—	— —	—
St. Louis		75·2	15	i 11 45	− 1	e 21 15	−10	e 22 4 PS	—
Shasta Dam		76·4	350	i 11 53	0	—	—	— —	—
Riverview		78·8	237	—	—	e 22 23	+19	e 23 25 PPS	e 36·8
Hungry Horse		83·1	357	i 12 29	0	—	—	e 15 21 PP	—
Stuttgart	z.	132·9	53	e 19 21	[+ 3]	—	—	e 21 42 PP	—
Helwan	z.	145·9	87	19 45	[+ 4]	—	—	— —	—
Istanbul		146·3	67	e 19 45	[+ 4]	—	—	— —	—
Ksara		150·7	82	e 19 46?	[− 2]	—	—	33 44 PS	—

Additional readings :—
Santa Lucia eN = 12m.31s., eE = 14m.5s.
Punta Arenas N = 14m.32s.
Huancayo e = 7m.29s.
La Paz SSN = 16m.45s.
Wellington PZ = 10m.37s.
Pasadena i = 11m.32s.
Pierce Ferry iP = 11m.22s.
Reno iZ = 12m.13s.
St. Louis e = 25m.34s.
Riverview eSSEZ? = 27m.43s., eE = 34m.3s.
Helwan iZ = 20m.7s. and 20m.17s.
Long waves were also recorded at Arapuni, Auckland, and Granada.

Feb. 11d. 21h. 5m. 21s. Epicentre 37°·1N. 117°·8W.

Intensity VI at Ash Mountain, Bakersfield, Big Pine, Fresno, Lone Pine, Olancha, etc. Macroseismic area 18,000 sq. miles. Epicentre 37°05′N., 117°45′W.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949, serial No. 748, Washington, 1951, p. 9, with macroseismic chart, p. 12.

$A = -·3729$, $B = -·7072$, $C = +·6006$; $\delta = -9$; $h = -1$;
$D = -·885$, $E = +·466$; $G = -·280$, $H = -·531$, $K = -·800$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		0·3	262	i 0 8k	− 3	—	—	—	—	—
Haiwee		1·0	188	i 0 18k	− 3	—	—	—	—	—
Fresno		1·6	283	i 0 30	0	—	—	—	—	—
Boulder City		2·6	115	i 0 45	+ 1	—	—	—	—	—
Reno	z.	2·9	328	0 51s	+ 3	—	—	i 0 57	P_g	—
Pasadena		3·0	187	i 0 48k	− 2	i 1 33	S*	—	—	—
Lick		3·1	276	i 0 51	0	i 1 38	S*	i 0 56	P*	—
Riverside		3·1	174	i 0 50k	− 1	i 1 38	S*	—	—	—
Pierce Ferry		3·2	107	i 0 53	+ 1	—	—	—	—	—
Santa Clara		3·3	276	i 0 58	+ 5	e 1 43	S*	i 1 8	P_g	—
Branner		3·5	277	i 0 58	+ 1	—	—	i 1 3	P*	—
Berkeley		3·6	284	i 0 59k	+ 1	i 1 49	S*	i 1 11	P_g	—
San Francisco		3·8	282	i 1 3	+ 2	i 1 47	0	i 1 13	P_g	—
Mineral		4·4	319	i 1 12	+ 2	i 2 28	S_g	i 1 15	P*	i 2·7
Ukiah		4·7	297	—	—	e 2 26	S*	—	—	e 2·7
Shasta Dam		5·1	317	e 1 15	− 5	—	—	i 1 20	P	i 2·7
Salt Lake City		5·9	49	e 1 24	− 7	e 2 22	−18	—	—	e 2·6
Ferndale		6·1	306	i 3 9	S*	i 3 25	S_g	—	—	—
Arcata		6·2	310	i 2 1s	P_g	i 3 6	S*	i 3 26	S_g	—
Logan		6·5	43	e 1 41	+ 2	i 2 52	− 3	i 2 2	P_g	i 3·3
Tucson		7·5	128	i 1 53	0	i 3 2	−18	i 2 22	P_g	i 3·4
Butte	N.	9·7	22	e 3 21	+59	i 5 43	?	i 5 11	?	e 6·3
Bozeman		10·0	28	e 3 12	+45	—	—	—	—	e 4·5
Hungry Horse		11·6	12	i 2 52	+ 2	—	—	—	—	—
Rapid City	E.	13·1	53	i 3 13	+ 3	e 5 7	−31	i 3 16	PP	e 6·0
Lubbock		13·4	100	3 26	PP	7 8	L	—	—	(7·1)
Lincoln	E.	16·9	71	e 4 1	+ 2	—	—	—	—	e 9·1
St. Louis		21·8	77	e 4 55	− 1	i 9 4	+12	i 9 19	SS	—
College		33·0	337	i 6 40	+ 1	—	—	—	—	—

Additional readings and note :—
Reno iN = 0m.54s. and 1m.3s.
Lick iEN = 1m.32s.
Santa Clara e = 1m.19s.
Branner iN = 1m.8s.
Berkeley eN = 1m.2s., iN = 1m.6s., iE = 1m.15s. and 1m.18s., iZ = 1m.23s.
San Francisco iN = 1m.6s.
Ferndale readings were given as iPE and iPN respectively.
Arcata iN = 2m.33s.
Tucson i = 2m.3s.
St. Louis iPZ = 4m.59s.
Long waves were also recorded at Chicago, Columbia, Seattle, Sitka, and Tacubaya.

Feb. 11d. Readings also at 3h. (Samarkand, Tchimkent, near Andijan, Kulyab, Murgab, Obi-garm, and Stalinabad), 6h. (Andijan, Samarkand (2), Tashkent, near Kulyab, Murgab, Obi-garm (2), and Stalinabad (3)), 7h. (Copiapo, Pasadena, Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse), 9h. (Tucson, Boulder City, and Pierce Ferry), 12h. (near Copiapo and Santa Lucia), 13h. (near Ashkabad), 14h. (Balboa Heights, Bogota, Pierce Ferry, Hungry Horse, Tamanrasset, Clermont-Ferrand, Paris, and Stuttgart), 15h. (Hungry Horse, Boulder City, and Shasta Dam), 16h. (Frunse, Tchimkent, near Andijan, Murgab, Obi-garm, and Stalinabad), 17h. (Saskatoon), 19h. (near Ashkabad), 22h. (Hungry Horse and Sitka).

Feb. 12d. Readings at 2h. (Rome, Tacubaya, Fresno, near Berkeley, Branner, Lick, San Francisco, Santa Clara, and near Shasta Dam), 3h. (Hungry Horse, Tucson, Pierce Ferry, Huancayo, and near La Paz), 5h. (Tucson, Shasta Dam, near Boulder City and Pierce Ferry), 11h. (Boulder City, Shasta Dam, and Hungry Horse), 13h. (near Copiapo), 14h. and 15h. (Ashkabad), 17h. (near Alicante, near Ashkabad and near Murgab), 19h. (near Triest), 20h. (near Ashkabad), 22h. (near Berkeley, Branner, and Lick), 23h. (near Ashkabad (2) and near Triest).

Feb. 13d. 18h. 24m. 17s. Epicentre 32°·8S. 178°·1W.

U.S.C.G.S. and Strasbourg suggest a depth of 60km.

$A = -·8418$, $B = -·0279$, $C = -·5391$; $\delta = +3$; $h = +1$;
$D = -·033$, $E = +·999$; $G = +·539$, $H = +·018$, $K = -·842$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	7·1	233	1 46	− 2	3 9	− 1	—	—	—
Tuai	N.	7·1	211	1 43	− 5	3 1	− 9	—	—	—
New Plymouth	E.	8·9	223	2 17	+ 5	3 23	−32	—	—	—
Wellington		10·3	212	2 25	− 6	4 8	−19	15 52	S_cS	—
Kaimata		12·8	217	3 5	− 1	5 12	−18	—	—	—
Apia		19·8	20	4 37	+ 2	e 8 5	− 8	e 4 54	PP	—
Brisbane		25·5	274	i 5 33	+ 1	i 9 59	+ 2	i 6 9	PP	—
Riverview		25·7	258	i 5 36a	+ 3	i 10 5	+ 4	i 5 46	pP	e 11·7
Melbourne	E.	30·4	250	i 6 14	− 2	—	—	—	—	—
Honolulu		57·2	23	e 9 51	0	i 17 51	+ 5	e 18 24	sS	e 24·6
Batavia		74·1	273	i 11 37	− 3	e 20 57	−15	—	—	39·7
Mizusawa		81·0	329	12 44	+26	21 43	−44	—	—	—
Santa Lucia	N.	85·1	126	12 35	− 4	23 0	[− 1]	—	—	38·7
Branner	Z.	87·2	41	i 12 50	+ 1	—	—	—	—	—
Pasadena		87·2	46	i 12 50a	+ 1	e 23 13	[− 2]	i 13 2	pP	36·1
Santa Clara		87·2	41	i 12 49	0	e 23 39	+11	i 13 4	pP	e 40·0
Berkeley		87·4	41	i 12 51a	+ 1	i 23 35	+ 5	i 16 21	PP	e 40·1
Lick	N.	87·4	41	e 12 51	+ 1	—	—	—	—	—
Riverside		87·6	46	e 12 52	+ 1	—	—	—	—	—
Ukiah		87·8	39	—	—	e 24 35	PS	—	—	e 39·3
Fresno		88·0	43	i 12 54	+ 1	e 23 38	+ 2	—	—	—
Vladivostok		88·3	326	i 12 55	0	e 23 18	[− 4]	i 23 48	S_cS	—
Arcata	Z.	88·6	38	e 12 57a	+ 1	—	—	—	—	—
Copiapo	N.	89·0	121	12 4	−54	23 11	[−16]	—	—	39·7
Tinemaha		89·2	44	i 12 58	− 1	—	—	i 13 13	pP	—
Shasta Dam		89·4	39	i 14 0	+60	—	—	—	—	—
Mineral		89·6	40	i 13 0	− 1	—	—	—	—	e 42·7
Reno		90·0	41	i 13 3a	0	e 23 53	− 1	—	—	—
Boulder City		90·5	47	i 13 5	0	—	—	—	—	—
Klyuchi		90·6	348	e 16 36?	PP	—	—	—	—	—
Tucson		90·6	51	i 13 5	0	e 24 5	+ 5	i 13 32	pP	e 38·2
Pierce Ferry		91·1	47	i 13 7	− 1	—	—	—	—	—
Tacubaya		91·4	68	i 13 13	+ 4	e 24 11	+ 4	i 13 38	pP	e 41·5
La Plata		92·3	135	13 9	− 4	23 37	[− 9]	16 49	PP	39·4
Huancayo		94·1	107	e 13 21	− 1	e 24 19	{+ 7}	17 19	PP	e 38·7
Victoria		94·5	33	e 13 27	+ 4	(24 7)	[+ 9]	—	—	24·1
Salt Lake City		95·3	44	e 13 16	−11	e 23 58	[− 5]	i 17 31	PP	e 39·9
Logan		96·0	43	i 13 27	− 3	e 24 8	[+ 1]	e 17 33	PP	e 41·5
La Paz		97·1	115	i 13 34a	− 1	i 24 3	[− 9]	i 17 30	PP	44·7
Butte	N.	98·3	39	e 17 20	PP	e 26 33	PS	e 36 9	SSS	e 42·3
Bozeman		98·9	41	e 14 30	sP	e 24 25	[+ 3]	e 17 49	PP	e 42·5
Hungry Horse		99·0	37	i 13 42	− 2	—	—	i 18 25	sPP	—
College		100·2	12	—	—	e 24 16	[−12]	e 25 54	pS	e 46·0
Colombo	E.	103·8	269	17 35	PP	24 43	[− 2]	(e 32 55)	SS	e 32·9
Bogota		104·3	93	e 18 35	PP	e 27 57	PS	e 21 11	PPP	62·7
Calcutta	E.	104·7	287	e 17 33	PP	i 24 46	[− 3]	i 33 12	SS	50·4
Saskatoon		105·0	37	—	—	e 26 13	+11	e 27 53	PS	53·7
Kodaikanal	E.	107·6	271	14 26	P	25 6	[+ 4]	19 6	PP	—
St. Louis		108·1	55	e 14 21	P	i 25 26	[+22]	e 18 52	PP	—
Irkutsk		108·3	321	19 10	PP	25 4?	[− 1]	21 46	PPP	—
Hyderabad	N.	110·3	278	e 19 5	PP	25 9	[− 4]	28 47	PS	—
Chicago		111·3	52	e 19 18	PP	e 27 18	S	i 28 48	PS	e 52·4
Tananarive		112·6	227	e 19 18	PP	e 25 30	[+ 7]	e 26 27	SKKS	52·7
Columbia		112·7	63	—	—	e 28 54	PS	—	—	e 47·4
Poona		114·7	276	19 56	PP	25 24	[− 7]	22 24	PPP	—

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Cleveland		115·4	55	i 19 10	PP	i 29 27	PS	e 35 52	SS	55·6
Bombay		115·7	276	e 18 15	[−29]	e 25 30	[− 5]	e 19 53	PP	52·7
New Kensington	E.	116·3	57	e 19 40	PP	e 25 43	[+ 6]	e 29 45	PS	e 58·4
Pennsylvania	N.	117·7	57	i 20 5	PP	e 29 53	PS	—	—	50·8
San Juan		117·9	85	—	—	e 29 55	PS	i 36 40	SS	e 50·2
Philadelphia		119·3	59	e 20 11	PP	e 25 58	[+10]	29 52	PS	e 49·8
Fort de France		120·4	92	e 18 47	[− 6]	—	—	—	—	—
Fordham		120·5	58	i 18 54	[0]	i 30 12	PS	i 20 20	PP	—
Ottawa		120·7	52	i 18 52	[− 2]	30 9	PS	e 20 32	PP	56·7
Murgab		122·5	297	18 57	[− 1]	—	—	—	—	—
Harvard		122·7	57	i 18 57	[− 1]	—	—	e 46 13	Q	e 58·7
Weston		122·8	57	i 18 57	[− 1]	e 27 48	{+15}	e 20 49	PP	—
Frunse		123·3	303	e 19 2	[+ 3]	—	—	—	—	—
Andijan		124·4	299	e 19 2	[+ 1]	—	—	—	—	—
Seven Falls	E.	124·4	51	e 19 0	[− 1]	e 31 3	PS	e 20 59	PP	57·7
Bermuda		124·8	70	e 16 48	?	e 37 48	SS	e 20 43	PP	e 51·7
Obi-garm		125·8	296	i 18 30?	[−34]	i 27 17?	{−36}	i 20 27?	PP	—
Stalinabad		126·4	296	i 19 5	[0]	i 27 52	{− 4}	—	—	—
Tashkent		126·8	300	i 19 5	[− 1]	i 26 9	[− 2]	e 21 9?	PP	—
Tchimkent		126·8	301	i 19 5	[− 1]	—	—	—	—	—
Samarkand		128·1	297	e 19 13	[+ 5]	—	—	—	—	—
Halifax		128·8	56	i 22 30	PKS	—	—	—	—	63·7
Sverdlovsk		133·7	319	i 19 18	[− 1]	28 36	{− 7}	i 23 6	PKS	—
Ivigtut		137·2	33	23 0	PKS	32 35	PS	40 37	SS	71·7
Scoresby Sund		140·0	12	19 25	[− 5]	34 55	PPS	22 27	PP	—
Baku		141·1	295	e 20 2	[+30]	—	—	—	—	—
Grozny		144·3	300	e 19 40	[+ 2]	—	—	—	—	—
Erevan		145·2	294	i 19 42	[+ 3]	—	—	—	—	—
Leninakan		145·7	295	i 20 6?	[+26]	—	—	—	—	—
Moscow		146·2	323	i 19 43	[+ 2]	i 29 57	{ 0}	i 23 13	PKS	—
Piatigorsk		146·2	302	i 19 46	[+ 5]	27 2	[+13]	—	—	—
Sotchi		148·6	301	e 19 50	[+ 5]	e 26 55	[+ 3]	e 33 41	PS	—
Helsinki		148·7	339	e 19 48	[+ 3]	e 30 7	{− 4}	e 20 5	pPKP	e 61·7
Upsala		151·0	344	19 58	[+ 9]	e 30 19	{− 5}	i 20 17	PKP_3	e 62·7
Theodosia		151·4	305	e 19 52	[+ 2]	—	—	—	—	—
Ksara		151·7	281	i 19 49	[− 1]	33 39	PSKS	—	—	—
Yalta		152·4	304	i 19 50	[− 1]	e 30 30	{− 1}	—	—	—
Helwan		154·7	271	i 19 53a	[− 1]	30 40	{− 4}	23 55	PP	—
Aberdeen	E.	155·5	5	—	—	i 30 53	{+ 5}	i 43 43	SS	e 79·1
Copenhagen		156·0	346	i 19 55	[− 1]	31 9	{+18}	i 20 51	pPKP	71·7
Istanbul		156·8	299	i 19 54	[− 3]	—	—	i 24 16	PP	—
Bucharest	N.	157·9	309	e 20 37	PKP_3	e 28 54	?	e 24 31	PP	—
Potsdam		158·8	342	i 19 59a	[0]	i 31 29	{+23}	i 24 16a	PP	e 73·7
Raciborzu		158·9	331	e 20 0	[0]	—	—	e 24 17	PP	—
Collmberg		159·8	339	e 20 0	[0]	e 31 7	{− 4}	e 24 22	PP	e 78·0
Budapest		160·4	323	19 59	[− 2]	e 31 13	{− 1}	e 20 41	PKP_3	e 72·7
Prague		160·4	336	e 20 3	[+ 2]	—	—	e 24 5	PP	—
Sofia		160·4	307	e 20 2	[+ 1]	e 30 54	{−20}	e 23 31	PKS	—
Jena		160·5	340	e 19 59	[− 2]	e 31 11	{− 4}	e 20 51	PKP_3	—
De Bilt		160·6	354	i 20 2a	[+ 1]	i 38 5	PPS	i 20 53	PKP_3	e 63·7
Ogyalla		160·6	326	e 19 53	[− 8]	—	—	e 25 12	PP	—
Kalossa		161·1	323	e 20 17	[+15]	—	—	e 20 50	PKP_3	—
Cheb		161·1	340	e 20 31	PKP_3	—	—	e 24 23	PP	—
Belgrade		161·3	315	e 20 2k	[0]	e 31 17	{− 3}	—	—	e 84·8
Kew		161·3	4	i 20 1	[− 1]	e 26 54	[−12]	i 20 45	PKP_3	e 74·7
Uccle		161·9	357	i 20 3	[0]	—	—	i 24 33	PP	—
Stuttgart		163·1	344	i 20 3a	[− 1]	e 31 31	{+ 3}	i 24 39	PP	e 78·7
Zagreb		163·1	324	e 20 4a	[0]	e 31 28	{ 0}	e 20 10	PKP	e 83·7
Jersey	E.	163·4	9	e 20 31	PKP_3	e 45 11	SS	e 29 46	?	56·7
Strasbourg		163·6	346	i 20 4	[0]	e 31 28	{− 3}	e 21 5	PKP_3	76·7

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		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Paris		164·0	359	e 20 3	[− 2]	i 31 49	{+16}	i 24 41	PP		e 77·7
Triest		164·2	329	e 20 9	[+ 4]	i 31 31	{− 3}	i 21 4	PKP_3		e 63·7
Zürich		164·6	344	e 20 4	[− 1]	—	—	e 21 2	PKP_3		—
Basle		164·7	346	e 20 5	[− 1]	—	—	e 21 16	PKP_3		—
Chur		164·8	341	e 20 4	[− 2]	—	—	e 21 4	PKP_3		—
Besançon		165·2	349	i 20 13a?	[+ 7]	—	—	i 21 13?	PKP_3		—
Neuchatel		165·3	346	e 20 6	[0]	—	—	e 24 50	PP		—
Taranto		165·5	306	e 20 3	[− 3]	e 31 43	{+ 3}	e 42 43	?		—
Salo		165·6	334	20 5a	[− 1]	—	—	i 21 9	PKP_3		—
Padova		166·0	330	21 18	PKP_3	—	—	e 25 19	PP		—
Bologna	z.	166·2	331	e 20 7a	[0]	e 31 59	{+15}	i 21 12	PKP_3		—
Pavia	z.	166·4	338	e 20 6	[− 1]	—	—	—	—		—
Prato		166·8	330	e 21 16	PKP_2	—	—	i 25 20	PP		—
Clermont-Ferrand		167·0	356	i 20 8	[+ 1]	i 27 14	[+ 4]	i 21 13	PKP_3		78·7
Rome		167·6	321	i 20 7a	[− 1]	i 31 38	{−13}	i 25 1	PP		e 75·0
Messina		167·7	301	e 20 13	[+ 5]	—	—	e 25 23	PP		—
Catania		168·2	297	e 20 11	[+ 3]	e 29 40	?	e 25 13	PP		—
Lisbon		169·2	53	i 20 11a	[+ 2]	32 15	{+16}	21 36	PKP_3		79·5
Tamanrasset	z.	169·5	194	i 20 10a	[+ 1]	i 27 11	[0]	i 21 23k	PKP_3		—
Barcelona		171·4	—	—	—	e 36 9	?	e 46 36	SS		—
Toledo		171·5	—	i 20 10	[0]	i 46 59	SS	i 21 34	PKP_3		79·0
Tortosa		171·9	—	i 20 23	[+12]	32 8	{− 4}	21 17	PKP_3		e 83·7
Tunis		172·2	—	e 20 13	[+ 3]	e 27 9	[− 3]	e 21 38	PKP_3		—
Malaga	z.	173·5	—	i 20 11	[0]	27 15	[+ 2]	i 25 37	PP		82·6
Granada		173·7	—	i 20 11k	[0]	27 6	[− 7]	20 28	pPKP		i 82·0
Alicante		174·1	—	20 15	[+ 4]	27 13	[0]	20 42	pPKP		e 81·6
Almeria		174·6	—	i 20 14	[+ 3]	27 16	[+ 3]	i 21 56	PKP_2		84·5
Algiers		175·9	—	i 20 13	[+ 1]	e 32 55	{+23}	i 21 54	PKP_2		—

Additional readings :—
Apia e =5m.14s.
Brisbane ePE =5m.36s., iZ =7m.14s., iSZ =10m.2s., iZ =10m.20s., iSSE =10m.36s.
Riverview iPPN =6m.15s., iE =6m.25s., iNZ =6m.33s., iN =9m.0s., iZ =10m.10s., isSE =10m.19s., isSN =10m.22s., iN =10m.32s., iSSN =11m.18s.
Santa Lucia E =36m.35s.
Pasadena iPPE =16m.22s., eSSN =28m.31s., ePKP,PKPZ =38m.24s.
Santa Clara isSE =23m.58s.
Berkeley iN =12m.55s., iZ =13m.3s., iE =13m.15s., iZ =13m.18s., 13m.29s., and 14m.38s., iE =22m.11s., iN =22m.17s., iE =23m.39s., eE =35m.55s., eN =39m.25s.
Vladivostok iPS =24m.49s., eSS =29m.25s.
Arcata iZ =13m.11s. and 13m.35s.
Copiapo N =12m.46s. and 22m.43s.
Tinemaha iZ =13m.25s.
Reno iN =13m.15s., iE =13m.23s., iN =13m.27s., iE =14m.1s., eSKKSN =23m.59s., eN =43m.1s., eE =45m.55s., eZ =46m.55s.
Tucson iPP? =16m.41s., esPP =17m.38s., eSP =25m.14s., iPS? =25m.34s., eSS? =30m.32s., eSSS? =33m.43s.
La Plata P_cPN =13m.49s., PP?N =14m.55s., PPPN =17m.0s., P_cSN =18m.19s., SS?N =25m.25s., SS?E =25m.31s., Q?N =33m.48s., N =37m.31s.
Huancayo eSKS =23m.33s., ipS =24m.51s., ePS =25m.56s., eSS? =31m.3s., eSSS =34m.40s.
Salt Lake City esPP =18m.17s., eSKKS =24m.8s., eS =24m.51s., iSP =26m.5s.
Logan ePPP? =19m.18s., eS =24m.26s., iPS? =26m.21s., eSS? =30m.34s., eSSS =34m.50s.
La Paz iN =14m.35s., iEN =17m.57s., iSEN =24m.35s., iPSE =26m.16s., iEN =26m.39s., iSSEN =30m.31s., iEN =35m.27s.
Butte esPPN =18m.38s.
Bozeman ePS =26m.57s., eSS =32m.6s., eSSS? =35m.34s.
College eSP? =26m.37s.
Calcutta ePPPE =20m.2s., iPPSE =27m.53s., iSSSE =47m.27s.
Kodaikanal PSE =28m.26s., SSE =34m.31s.
St. Louis ipPP =19m.7s., iS? =26m.22s., ePS? =28m.24s.
Irkutsk PS =28m.16s., SSS =38m.49s.
Chicago eSPP =29m.58s., eSS =34m.33s.
Tananarive PS =28m.54s., SS =35m.0s.
Poona PPEN =20m.5s., SKSEN =25m.43s., SKKSEN =26m.27s., PSEN =29m.30s., PPSEN =30m.22s.
Cleveland ePPE =19m.45s., eE =34m.29s., 34m.51s., and 43m.49s.
Bombay eN =20m.13s., ePSE =29m.27s., iN =31m.34s., eE =31m.43s., eN =35m.47s., eSSE =37m.11s.
Philadelphia eS? =27m.29s., eSS =36m.48s.

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Fordham i=19m.7s., iSS=37m.12s.
Ottawa i=19m.6s. and 19m.17s., e=30m.52s., and 36m.59s.
Harvard i=19m.6s.
Weston eSS=37m.33s.
Seven Falls eE=37m.55s.
Bermuda e=32m.1s. and 32m.53s.
Tashkent iSKKS=27m.55s., ePS=31m.8s.
Sverdlovsk iPS=31m.47s., eSS=39m.31s.
Ivigtut 35m.31s.
Scoresby Sund 23m.8s., 29m.41s., and 40m.52s.
Helsinki ePKP$_3$=20m.20s., epPKP$_3$=20m.37s., ePPS=35m.48s., eSS=42m.7s.
Upsala PKPN=20m.2s., iPKP$_2$E=20m.20s., iPKS?=23m.7s., eE=32m.18s., eN=33m.13s. and 37m.43s., eE=38m.43s.?, eSS=42m.43s., SSSN=48m.33s., eQ?=52·7m.
Helwan eZ=20m.45s., PKP$_2$Z=21m.22s., eZ=22m.19s., eNZ=24m.22s., eE=28m.58s. and 34m.10s.
Copenhagen 20m.20s. and 20m.39s., sPKP$_3$=21m.8s., ePP=24m.7s., pPP=24m.18s., 34m.20s. and 39m.7s., SS=43m.43s., SSS=49m.43s.
Bucharest eN=20m.50s. and 26m.19s.
Potsdam iPKP$_2$Z=20m.38s.k, iPPPE=28m.5s., iPPPZ=28m.11s., iPPSZ=37m.37s., and many other readings without phase.
Raciborzu eE=20m.10s., eZ=20m.39s., eN=20m.49s., eE=21m.25s., eN=21m.29s. and 25m.13s.
Collmberg Z=20m.13s., eE=20m.42s. and 31m.27s., eSKS?E=37m.50s., eSSE=45m.27s., eSSS?E=51m.24s.?
Budapest eE=30m.32s. and 31m.32s.
Jena ePKP?N=20m.5s., eZ=21m.8s., ePP?NZ=24m.15s., ePP?E=24m.19s., eE=25m.7s.
De Bilt iPP=24m.27s., eZ=30m.8s., eSS=44m.43s.?, eSSS=50m.13s.
Kalossa eN=26m.13s., eE=26m.18s.
Belgrade i=21m.5s., eSS=37m.19s.
Kew eE=21m.36s., iPPZ=24m.28s., ePPSZ=38m.3s., eSSN=45m.37s., eSSSE=50m.49s., eN=52m.40s. and 54m.57s., eE=61m.1s.
Stuttgart iPKPZ=20m.18s. and 20m.22s.k, iPKP$_2$?Z=20m.36s., iSKP?=23m.31s., iPPZ=24m.49s., ePSKS=35m.1s., ePPS=38m.18s., eSS=44m.55s., eSSS=51m.13s., and other readings without phase.
Strasbourg iPKP$_2$=21m.12s., iSKP=23m.11s., eSKP=23m.26s., ePP=24m.41s., eSKS?=27m.12s., ePKKP=28m.5s. and 28m.8s., ePPP=28m.39s., ePP$_2$?=32m.37s., eSKKS$_2$=34m.5s. and 34m.14s., iPPS=38m.19s., eSS=45m.5s. and 45m.10s., eSSS=51m.28s., Q=67m.43s.?, and many other readings without phase.
Paris iPKP$_3$=20m.45s., i=25m.13s., 29m.57s., and 30m.53s., iSKKS$_3$=34m.37s., iPPS=38m.33s., eSS=45m.14s., eSS?=45m.27s., eSSP=46m.31s., eSSS=51m.31s.
Triest iPKS=24m.32s., iPP=24m.58s., iSKKKS=32m.21s., iPSKS=35m.31s., iPPS=37m.27s., eSS=46m.31s.
Zürich ePP=24m.44s.
Basle ePP=24m.39s.
Chur eL?=28m.1s.
Besançon e=21m.28s.?, 21m.38s.?, 21m.56s.?, 22m.12s.?, 22m.28s.?, and 24m.24s.?, ePP=24m.59s.? and 25m.4s.?, e=25m.22s.? and 27m.52s.?, ePPP=28m.50s.? and 29m.9s.?
Salo eZ=20m.37s., i=21m.31s., iE=25m.13s. and 25m.39s.
Padova iN=21m.37s.
Bologna ePPZ=24m.58s., ePPPZ=29m.2s.
Clermont-Ferrand iPP=25m.1s., i=25m.46s., iSKKS=31m.44s., iSS=45m.49s., iSSS=52m.19s., Q=60m.43s.?
Rome iE=21m.33s., iPPPZ=28m.45s., iPSKS=35m.29s.?, iSSN=46m.28s.
Lisbon iZ=20m.25s., Z=20m.37s., PPZ=25m.14s.a, iPPE=25m.26s.k, SKS?NZ=26m.57s., E=33m.47s., SSEN=46m.26s.
Tamanrasset eZ=22m.7s., ePPZ=25m.10s., iPPPZ=29m.26s.a.
Toledo iPPZ=25m.24s., ePPPZ=29m.23s., iN=39m.43s.
Tortosa PPN=25m.22s., PPPN=29m.22s., iN=33m.16s., SKKSN=34m.11s., PPSN=38m.53s., iN=41m.30s., SSN=46m.30s., SSPN=47m.40s., SSN=50m.16s.
Tunis ePP=25m.34s. and 26m.43s., eSKKS=32m.28s., eSKKS$_2$=33m.29s., ePPS=39m.26s., eSS=46m.21s., eSSS=52m.34s.
Malaga iPKP$_2$Z=21m.55s., PPPZ=30m.1s., SSZ=47m.35s., QZ=71m.47s.
Granada sPKP=20m.58s., PKP$_2$=22m.29s., pPKP$_2$=22m.37s., iPP=25m.43s., pPP=26m.22s., sSKS=27m.57s., PPP=29m.55s., SKKS=32m.16s., sSKKS=33m.28s., SKSP=35m.37s., PPS=39m.28s., iSS=46m.45s., SSP=48m.52s., SSS=52m.1s.
Alicante pPKP$_2$=21m.47s., PKS=23m.49s., PP=25m.38s., PPP=29m.47s., SKKS=32m.27s., SKSP=36m.21s., PPS=39m.53s., SS=46m.50s., SSP=48m.11s., SSS=54m.5s., Q=70m.59s.
Almeria iPKS=23m.46s., iPP=25m.25s., PPP=30m.0s., SKKS=32m.30s., PPS=39m.56s., SS=47m.0s., SSS=54m.0s.
Algiers i=20m.48s. and 20m.54s., ePP$_2$=26m.28s., eP$_c$P,PKP?=29m.10s., ePPP=29m.57s., e=36m.43s.?, eSS=46m.43s.?

Feb. 13d. 20h. 43m. 16s. Epicentre 20°·8S. 69°·0W. Depth of focus 0·010.
(as on 1948, Sept. 3d.).

Intensity IV between 20° and 21° S. Lat.

F. Greve.
Boletin del año 1948, primer semestre, Instituto Sismologico, Santiago, p. 7. Depth of focus 100km.

$A = +·3353$, $B = -·8735$, $C = -·3531$; $\delta = +11$; $h = +4$;
$D = -·934$, $E = -·358$; $G = -·127$, $H = +·330$, $K = -·936$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		4·4	11	i 1 5a	− 1	i 1 41	−15	—	—	—
Copiapo	N.	6·6	190	1 35	− 1	2 46	− 4	—	—	—
Huancayo		10·6	325	e 2 30	0	e 4 37	+ 9	—	—	i 5·0
Santa Lucia		12·7	186	i 3 8	+10	—	—	—	—	6·1
Bogota		25·7	348	i 5 25	+ 2	e 9 53	+11	i 6 3	PPP	11·7
Fort de France		36·1	14	e 6 49	− 5	—	—	—	—	—
Harvard		63·0	358	i 10 16	− 3	—	—	—	—	—
Ottawa	Z.	66·2	354	i 10 36a	− 4	—	—	e 11 5	pP	—
Tucson		66·2	322	i 10 40	0	—	—	i 11 7	pP	—
Pierce Ferry		70·8	323	i 11 9	+ 1	—	—	—	—	—
Boulder City		71·2	322	i 11 11	+ 1	—	—	i 11 40	pP	—
Pasadena		71·9	319	i 11 16k	+ 2	—	—	i 11 33	pP	—
Tinemaha		74·0	321	i 11 27k	0	—	—	i 11 42	pP	—
Mineral	Z.	78·1	321	i 11 50	0	—	—	—	—	—
Shasta Dam		78·8	321	i 11 25	−29	—	—	i 11 47	P	—
Hungry Horse		79·7	331	i 11 59	0	—	—	—	—	—
Malaga		83·6	47	i 12 18	− 1	—	—	—	—	—
Tamanrasset	Z.	84·6	63	i 12 24a	0	—	—	i 12 55k	pP	—
Auckland	N.	96·9	226	—	—	e 23 26	[−22]	—	—	—
Stuttgart	Z.	97·9	41	e 13 24	− 2	—	—	—	—	—

Additional readings :—
La Paz iPZ = 1m.14s., iS = 2m.11s.
Copiapo N = 54s., 1m.47s., 2m.9s., and 2m.38s.
Huancayo i = 2m.58s. and 4m.44s.
Santa Lucia iN = 3m.15s., E = 3m.27s. and 4m.4s., N = 5m.46s. and 5m.53s.
Bogota $ePcP$ = 9m.39s., $eScP$ = 13m.18s.
Harvard iS = 10m.45s.; readings given as for local shock.
Tucson isP = 11m.21s.
Pasadena i = 11m.44s. and 11m.58s.
Tinemaha iZ = 11m.56s. and 12m.11s.
Tamanrasset eZ = 13m.21s.

Feb. 13d. Readings also at 1h. (Ashkabad), 5h. (Clermont-Ferrand, near Barcelona, and Tortosa), 7h. (Ashkabad), 8h. (College, Strasbourg, Stuttgart, Poona, Ashkabad, Sverdlovsk, Almata, Samarkand, near Andijan, Frunse, Kulyab, Murgab, Obigarm, Stalinabad, Tashkent, and Tchimkent), 12h. (Pasadena and Tinemaha), 13h. (Huancayo and near La Paz), 14h. (Besançon, Frunse, Samarkand, near Andijan, Kulyab, Stalinabad, Tashkent, and near Klyuchi), 17h. (near Tacubaya), 18h. (Stuttgart, Bermuda, Logan, Tucson, Boulder City, Pierce Ferry, Hungry Horse, and Shasta Dam), 19h. (Ashkabad), 20h. (College, near Ashkabad, and near Klyuchi), 21h. (Boulder City and Pierce Ferry).

Feb. 14d. 16h. 24m. 29s. Epicentre 16°·1S. 168°·3E. (as on 1948, May 23d.).

$A = -·9413$, $B = +·1949$, $C = -·2756$; $\delta = -1$; $h = +6$;
$D = +·203$, $E = +·979$; $G = +·270$, $H = -·056$, $K = -·961$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	18·1	229	i 4 12	− 2	i 7 35	0	i 4 24	PP	—
Apia		19·4	86	4 34	+ 4	—	—	—	—	—
Auckland	N.	21·5	166	i 4 56	+ 4	i 9 3	+16	—	—	—
Riverview		23·5	217	i 5 8a	− 4	i 9 17	− 6	i 5 49	PPP	e 10·8
Wellington		25·7	170	i 5 32	− 1	—	—	—	—	10·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick	z.	84·6	49	i 12 29	− 7	—	—	i 15 45	PP	—
Fresno	z.	85·7	50	i 12 33	− 9	—	—	i 15 55	PP	—
Mineral	z.	85·9	46	i 12 34	− 9	—	—	—	—	—
Pasadena		85·9	53	i 12 35a	− 8	—	—	i 13 5	pP	—
Reno	z.	86·8	48	i 12 40a	− 7	—	—	—	—	—
Tinemaha		86·9	50	i 12 41a	− 7	—	—	i 13 19	pP	—
Calcutta	E.	87·1	295	—	—	i 23 5	[−10]	—	—	—
College		87·3	17	i 12 37	−13	—	—	—	—	—
Boulder City		89·1	52	e 12 42	−16	—	—	—	—	—
Pierce Ferry		89·8	52	e 12 54	− 8	—	—	—	—	—
Tucson		91·0	57	e 12 58	− 9	—	—	e 16 37	PP	—
Hungry Horse		93·9	41	i 13 11	−10	—	—	—	—	—
Ottawa	z.	118·8	46	e 18 42	[− 9]	—	—	—	—	—
Ksara		133·8	301	(e 21 56)	PP	(e 32 15)	PS	—	—	—
Helwan	z.	138·3	297	19 17	[−10]	e 22 41	PP	—	—	—
Jena	E.	140·5	336	e 18 22	[−69]	—	—	—	—	—
Zagreb		142·4	328	e 19 26	[− 9]	—	—	e 22 50	PP	—
Stuttgart	z.	143·2	337	e 19 23	[−13]	—	—	e 22 53	PP	—
Strasbourg		143·9	339	e 19 25	[−12]	—	—	—	—	—
Chur		144·6	335	e 19 27	[−11]	—	—	e 22 56	PP	—
Zürich		144·6	336	i 19 26k	[−12]	—	—	e 30 57	{+69}	—
Basle		144·8	337	e 19 27	[−12]	—	—	—	—	—
Salo	z.	145·2	333	i 19 28a	[−12]	—	—	—	—	—
Padova		145·4	331	19 31	[− 9]	—	—	e 23 5	PP	—
Paris		145·4	334	i 19 29	[−11]	—	—	e 22 46	PP	—
Bologna		145·6	330	i 19 31a	[− 9]	—	—	e 23 21	PP	—
Besançon		145·7	338	e 19 32?	[− 8]	—	—	—	—	—
Pavia	z.	146·1	334	i 19 31	[−10]	—	—	—	—	—
Prato		146·2	330	e 19 31	[−10]	—	—	—	—	—
Florence		146·2	329	19 34	[− 7]	—	—	—	—	—
Rome	z.	146·9	325	i 19 34a	[− 8]	—	—	—	—	—
Clermont-Ferrand		147·9	341	i 19 35	[− 9]	—	—	—	—	—
Toledo		155·4	346	e 19 53	[− 2]	—	—	—	—	—
Tamanrasset	z.	162·5	296	i 19 56a	[− 7]	—	—	i 24 36k	PP	—

Additional readings and note :—
Brisbane iE =4m.48s., iZ =5m.45s., iE =7m.55s. and 8m.35s.
Riverview iN =9m.22s., iNZ =10m.11s., iE =10m.15s.
Wellington e =6m.1s. and 6m.36s.
Pasadena $iP_cP?Z$ =12m.42s., iPPZ =15m.57s.
Tinemaha $iP_cP?Z$ =12m.48s., iPPZ =16m.6s.
Boulder City e =12m.47s.
Tucson i =13m.32s. and 13m.45s.
Ksara readings have been increased by 20 minutes.
Helwan eZ =13m.1s.
Stuttgart iPKPZ =19m.26s.k.
Strasbourg iPKP =19m.29s., e? =19m.49s., e =20m.23s., 20m.53s., and 21m.11s.
Salo ! =20m.10s.
Besançon e =19m.55s.?
Florence e =20m.12s.
Rome iZ =20m.3s., iE =20m.21s.
Clermont-Ferrand i =19m.59s.
Toledo e =20m.11s.
Tamanrasset e =20m.13s.
Long waves were also recorded at Arapuni.

Feb. 14d. 18h. 7m. 30s. Epicentre 17°·8N. 105°·5W.

$A = -·2546$, $B = -·9181$, $C = +·3038$; $\delta = +2$; $h = +5$;
$D = -·964$, $E = +·267$; $G = -·081$, $H = -·293$, $K = -·953$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manzanillo	1·7	42	0 20	−11	—	—	—	—	0·6
Guadalajara	3·5	35	0 43	−14	—	—	—	—	1·4
Tacubaya	6·2	74	i 1 35k	0	2 54	+ 6	—	—	3·1
Puebla	7·0	77	1 46	0	—	—	—	—	3·6
Tucson	15·2	342	i 3 37	− 1	—	—	—	—	e 6·8

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		15·3	76	3 51	+12	7 3	SSS	—	—	—
Riverside		19·3	329	e 4 34	+ 5	—	—	—	—	—
Pierce Ferry		19·7	340	i 4 32	− 2	e 8 24	+14	—	—	—
Pasadena		19·8	329	i 4 33	− 2	i 8 24	+11	—	—	—
Boulder City		19·9	338	i 4 34	− 2	—	—	—	—	—
Mobile		20·3	47	4 52	PP	8 34	+11	—	—	—
Tinemaha		22·2	333	i 4 59	− 1	—	—	—	—	—
Fresno	Z.	22·7	330	i 5 4	0	—	—	—	—	—
Salt Lake City		23·5	348	e 5 3	− 9	i 9 26	+ 3	e 5 49	PP	e 9·5
Lick		24·1	328	i 5 17	− 1	—	—	—	—	e 14·9
Lincoln	E.	24·2	16	e 5 18	− 1	e 9 43	+ 8	—	—	e 12·6
Santa Clara		24·3	328	i 5 21	+ 1	i 9 48	+11	i 5 39	pP	e 12·6
Logan		24·5	349	e 5 19	− 3	e 9 36	− 4	i 5 46	PP	e 12·7
St. Louis		24·7	29	i 5 24	0	i 9 48	+ 4	i 5 55	PP	—
Berkeley		24·8	328	i 5 25k	0	i 9 56	+10	—	—	e 13·3
Reno		25·0	334	i 5 27k	0	e 10 9	+20	i 5 46k	PP	—
Rapid City	E.	26·3	4	e 5 42	+ 3	e 10 17	+ 6	e 7 0	PP	i 10·5
Mineral	Z.	26·4	332	i 5 38	− 2	—	—	—	—	—
Columbia		27·2	48	e 5 46	− 1	e 10 28	+ 3	—	—	e 14·8
Ferndale	E.	27·9	329	—	—	e 10 40	+ 3	—	—	—
Arcata	N.	28·0	330	e 6 47	PP	e 12 32	SSS	—	—	e 18·0
Bozeman		28·2	353	e 5 55	− 1	e 10 50	+ 9	e 6 49	PP	e 13·1
Chicago		28·4	27	e 5 59	+ 1	e 10 45	0	—	—	e 12·0
Butte	N.	28·7	350	e 6 0	− 1	i 10 51	+ 1	i 7 2	PP	e 12·2
Cleveland		31·3	36	i 6 23	− 1	i 11 31	0	i 7 16	PP	—
Hungry Horse		31·3	350	i 6 21	− 3	—	—	—	—	—
New Kensington	E.	31·8	39	e 6 16	−12	e 11 41	+ 3	—	—	e 13·5
Seattle		32·8	340	i 8 15	PPP	e 11 42	−12	—	—	e 12·8
Pennsylvania	E.	33·0	40	i 6 41	+ 2	i 12 2	+ 5	e 7 54	PP	14·0
Bogota		33·4	109	e 6 49	+ 7	i 12 14	+11	i 7 45	PP	17·5
Victoria		33·9	339	e 7 30	PP	i 12 18	+ 7	—	—	17·0
Philadelphia		34·3	44	e 6 48	− 2	e 12 16	− 1	e 7 48	PP	e 13·5
Saskatoon		34·3	359	7 25	+35	12 58	+41	15 42	SSS	19·0
Fordham		35·6	43	7 1	0	12 41	+ 3	—	—	18·2
Ottawa		37·0	35	7 13k	0	13 0	+ 1	8 35	PP	20·3
San Juan		37·4	82	e 8 44	PP	—	—	—	—	e 22·0
Harvard		37·9	42	i 7 20	0	e 13 15	+ 2	—	—	e 20·5
Weston		38·0	42	i 7 21	0	i 13 17	+ 3	—	—	—
Bermuda		39·5	60	e 7 30	− 4	e 13 12	−25	e 9 10	PP	e 16·8
Seven Falls	E.	40·8	36	7 45	0	13 53	− 3	9 33	PP	18·9
Huancayo		42·0	133	e 7 51	− 3	e 14 20	+ 6	e 10 10	PPP	e 17·6
Halifax		44·0	44	e 15 58	?	e 18 18	SS	—	—	24·5
Honolulu		49·3	284	—	—	e 18 24	SS	—	—	e 21·7
La Paz		50·2	130	i 8 59k	− 1	i 16 13	+ 2	11 2	PP	22·8
College		54·9	340	e 9 30	− 5	e 17 34	+18	—	—	e 30·3
Ivigtut		59·0	29	—	—	e 17 50	−20	—	—	29·5
Kew		85·4	37	—	—	e 23 16?	+ 5	—	—	e 42·5
Paris		88·1	39	i 12 42	−12	—	—	—	—	e 44·5
Strasbourg		91·3	38	—	—	e 24 16	+10	e 30 17	SS	41·5
Rome	E.	97·6	42	—	—	e 31 41	SS	—	—	—

Additional readings :—
Tucson i =4m.11s. and 4m.34s.
Salt Lake City i =5m.31s.
Santa Clara isSE =10m.24s.
Logan i =10m.42s.
St. Louis iZ =5m.34s., iPPPZ =6m.11s., iN =10m.25s.
Berkeley iPN =5m.28s., iZ =5m.42s.k, iE =6m.28s., iZ =6m.32s., iN =10m.16s., iE = 10m.24s., eZ =10m.55s., eN =12m.24s., eE =12m.48s.
Reno iN =6m.8s.
Cleveland iE =8m.28s., iSE =11m.35s., iE =13m.40s., iN =14m.27s.
Pennsylvania eP_cP?E =9m.12s.
Bogota eS_cP =13m.12s., eSSEN =14m.15s.
Ottawa SS =16m.6s.
Bermuda e =13m.35s.
Seven Falls SSE =17m.3s.
La Paz iEN =21m.6s.

Continued on next page.

Kew eE =35m.44s., eQEN =38·5m.
Strasbourg e? =26m.11s., Q =38·5m.
Long waves were also recorded at Shawinigan Falls, Ukiah, Sitka, Alicante, Almeria, Granada, Malaga, De Bilt, Clermont-Ferrand, Scoresby Sund, and Tananarive.

Feb. 14d. 18h. 42m. 6s. Epicentre 13°·5N. 121°·2E. (as on 1939, May 6d.).

Felt at Manila—no damage.
Suggested epicentres : 14°N. 121°E. (U.S.C.G.S.).
12°N. 122°·5E. (Strasbourg).

Seismo. Notes. Bulletin of the Seismo. Soc. of America, Vol. 39, No. 2, April, 1949, p. 153.

$A = -·5039$, $B = +·8320$, $C = +·2320$; $\delta = -4$; $h = +6$;
$D = +·855$, $E = +·518$; $G = -·120$, $H = +·198$, $K = -·973$.

		Δ	Az.	P.	O−C.	S.	O−C.		Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Batavia		24·2	216	i 5 0	−19	i 9 28	− 7	—	—	—
Vladivostok		30·9	16	e 6 19	− 1	—	—	e 7 39	PPP	—
Calcutta	E.	32·5	291	e 6 39	+ 5	i 11 45	− 4	7 45	PP	14·4
Irkutsk		41·0	343	7 52	+ 6	13 54	− 5	e 9 17	PP	—
Columbo	E.	41·2	264	7 43	− 5	13 45	−17	—	—	22·8
Hyderabad	N.	41·3	281	e 7 58	+ 9	13 48	−16	16 59	SS	19·3
Kodaikanal	E.	42·9	272	i 8 4	+ 2	14 34	+ 7	9 52	PP	—
Poona		45·7	283	8 17	− 7	14 58	−10	10 12	PP	—
Bombay		46·7	284	e 8 27	− 5	i 15 9	−13	10 17	PP	22·2
Almata		48·1	317	e 8 46	+ 3	—	—	—	—	—
Murgab		48·5	310	8 42	− 4	15 40	− 8	—	—	—
Frunse		49·6	315	e 8 54	− 1	—	—	—	—	—
Andijan		50·4	312	e 9 0	− 1	e 16 21	PS	e 18 45	S_eS	—
Brisbane	Z.	51·1	143	i 9 8	+ 2	—	—	i 10 17	P_eP	—
Obi-garm		51·8	309	i 8 29?	−43	i 15 47?	−46	—	—	—
Stalinabad		52·5	309	i 9 14	− 3	i 16 34	− 9	—	—	—
Tashkent		52·8	312	i 9 17?	− 2	e 16 35?	−12	i 10 28	P_eP	—
Tchimkent		52·9	314	i 9 19	− 1	—	—	—	—	—
Samarkand		54·1	309	e 9 26	− 3	—	—	—	—	—
Riverview		55·0	149	i 9 37a	+ 2	i 17 25	+ 8	e 17 38	PS	e 23·5
Ashkabad		60·6	306	e 10 5	−10	—	—	—	—	—
Sverdlovsk		62·8	328	i 10 34	+ 4	i 18 50	− 8	—	—	—
Grozny		70·3	312	11 21	+ 4	—	—	—	—	—
Erevan		71·3	308	e 11 39	+16	—	—	—	—	—
Leninakan		71·8	309	11 43	+17	—	—	—	—	—
Piatigorsk		72·2	313	11 20?	− 9	—	—	—	—	—
Moscow		75·4	325	e 11 48	+ 1	e 21 16	−11	—	—	—
College		78·3	26	i 12 2	− 1	—	—	—	—	—
Ksara		78·8	301	i 12 10	+ 4	22 16?	+12	—	—	—
Istanbul		82·8	311	e 12 27	0	—	—	—	—	—
Helwan		83·2	299	i 12 33a	+ 4	22 41	− 8	15 40	PP	—
Upsala		85·1	331	—	—	e 21 54?	?	—	—	e 45·9
Potsdam		90·1	325	e 13 54?	+51	e 21 42	?	—	—	e 51·9
Zagreb		90·7	318	e 16 52	PP	e 23 31	[− 6]	—	—	—
Jena		91·5	323	e 13 8	− 2	—	—	—	—	—
Stuttgart	Z.	93·9	322	e 13 16	− 5	—	—	—	—	—
Salo		94·4	320	e 13 8	−15	—	—	e 12 21	?	—
Strasbourg		94·8	322	e 13 21	− 4	—	—	—	—	e 47·9
Zürich	Z.	94·8	322	e 13 20	− 5	—	—	—	—	—
Aberdeen	E.	95·5	333	i 19 38	PPP	—	—	—	—	47·4
Paris		97·7	324	i 13 36	− 2	—	—	—	—	e 53·9
Hungry Horse		101·4	35	e 14 7	+12	—	—	i 30 0	PKKP	—
Tinemaha	Z.	104·9	47	e 18 30	PP	—	—	—	—	—
Mount Wilson	Z.	106·4	49	e 18 54	PP	—	—	—	—	—
Tamanrasset	Z.	107·4	300	e 18 20	[− 8]	—	—	e 18 40	PP	—
Boulder City		107·8	46	—	—	e 29 44	PPS	—	—	—
Pierce Ferry		108·3	46	e 17 56	?	—	—	i 18 54	PP	—
Tucson		112·6	46	e 19 18	PP	—	—	—	—	—
Huancayo		163·8	84	e 19 19	[−46]	e 26 33	[−35]	e 46 41	SSP	e 82·7
La Paz		170·5	110	i 20 10	[0]	i 32 2	{− 3}	i 25 18	PP	83·4

For Notes see next page.

NOTES TO FEBRUARY 14d. 18h. 42m. 6s.

Additional readings :—
Calcutta PPPE =8m.11s., QE =12m.57s., SSSE =13m.14s.
Irkutsk SS =16m.48s.
Poona iE =8m.26s., PSEN =15m.5s.
Tashkent ePPP =12m.18s.
Riverview eE =18m.0s., eSSE =21m.8s.
Helwan eZ =16m.24s., iN =23m.8s.
Stuttgart eZ =13m.37s.
Salo e =14m.56s.
Hungry Horse iP =14m.12s.
Huancayo e =30m.41s., ePPS =39m.15s.
Long waves were also recorded at Auckland, Wellington, Tacubaya, and numerous other American and European stations.

Feb. 14d. 22h. North Atlantic Ocean.

Alicante eP =32m.2s.
Zurich eZ =32m.51s.
Paris iP =33m.55s.?, eL =41m.
Clermont-Ferrand eP =34m.11s., L =39m.
Strasbourg eP? =34m.38s., e =34m.51s., ePP =35m.4s., e =35m.40s., eL =39m.
Stuttgart ePZ =34m.38s., eQ =42·8m.
Jena eN =34m.47s.
Ottawa eZ =35m.38s.
Tamanrasset ePZ =36m.41s.
Hungry Horse iP =38m.32s.
College iP =38m.57s.
Pierce Ferry iP =39m.29s.
Boulder City iP =39m.32s.
Tucson eP =39m.33s., e =39m.49s.
Shasta Dam iP =39m.37s.
Mineral iZ =39m.38s. and 39m.43s.
Tinemaha ePZ =39m.42s.
Pasadena ePZ =39m.53s.
La Paz ePE =41m.11s.
Long waves also recorded at Kew and Weston.

Feb. 14d. Readings also at 0h. (Hungry Horse), 1h. (Hungry Horse and near Ashkabad), 2h. (Tacubaya), 3h. (Shasta Dam, Hungry Horse, and Tacubaya), 5h. (near Tacubaya), 6h. (Ashkabad (2)), 8h. (near Fort de France), 10h. (Paris, Samarkand, Tashkent, Tchimkent, near Andijan, Frunse, Kulyab, Murgab, Obi-garm, Stalinabad, and near Ashkabad), 13h. (near Ashkabad), 15h. (Hungry Horse, Shasta Dam, and near Mizusawa), 19h. (Hungry Horse, Butte, Lincoln, Philadelphia, Rapid City, Boulder City, Pasadena, Salt Lake City, Tinemaha, Tucson, Batavia, and near Manzanillo), 20h. (Mount Wilson, Tinemaha, Tucson (2), Boulder City, Pierce Ferry, Hungry Horse, College, Lincoln, near Manzanillo, and near Messina), 22h. (Ashkabad).

Feb. 15d. 3h. 52m. 19s. Epicentre 17°·8N. 105°·5W. (as on 14d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manzanillo		1·7	42	0 40	+ 9	—	—	—	—	1·0
Tacubaya		6·2	74	1 34	− 1	(2 48)	0	—	—	2·8
Puebla		7·0	77	e 1 17	−29	e 2 7	−61	—	—	—
Tucson		15·2	342	i 3 37	− 1	e 6 17	−11	—	—	e 7·2
Pierce Ferry		19·7	340	e 4 31	− 3	—	—	—	—	—
Pasadena		19·8	329	e 4 32	− 3	—	—	—	—	e 10·5
Boulder City		19·9	338	i 4 34	− 2	—	—	—	—	—
Tinemaha		22·2	333	e 4 59	− 1	—	—	—	—	—
Fresno	Z.	22·7	330	i 5 3	− 1	—	—	—	—	—
Salt Lake City		23·5	348	e 5 34	+22	e 9 59	+36	—	—	e 10·1
Lincoln	E.	24·2	16	—	—	e 9 47	+12	—	—	e 12·4
Logan		24·5	349	e 5 24	+ 2	(e 9 52)	+12	—	—	e 9·9
St. Louis		24·7	29	i 5 22	− 2	i 9 48	+ 4	—	—	—
Reno	Z.	25·0	334	e 5 27	0	—	—	—	—	—
Chicago		28·4	27	—	—	e 10 59	+14	—	—	e 14·9

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Hungry Horse		31·3	350	e 6 11	−13	—	—	—	—	—
Philadelphia		34·3	44	—	—	e 12 17	0	—	—	e 16·2
Ottawa		37·0	35	e 6 57	−16	—	—	—	—	19·7
La Paz	N.	50·2	130	e 9 13	+13	—	—	—	—	—
College		54·9	340	i 9 31	− 4	—	—	i 10 22	PcP	—
Paris		88·1	39	i 12 44	−10	—	—	—	—	—

Additional readings :—
Tucson i = 4m.28s.
Pasadena iNZ = 6m.16s.
Tinemaha eZ = 6m.26s.
Reno iZ = 5m.35s., iE = 5m.43s., eN = 6m.6s.
Hungry Horse e = 6m.21s.
Long waves were also recorded at Butte, Rapid City, Berkeley, Weston, and Sitka.

Feb. 15d. 14h. 9m. 13s. Epicentre 20°·5N. 71°·5W. (as on 1946, Sept. 20d.).
A = +·2974, B = −·8890, C = +·3481 ; δ = −6 ; h = +5 ;
D = −·948, E = −·317 ; G = +·110, H = −·330, K = −·937.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
San Juan		5·5	112	(i 1 19)	− 6	i 1 19	P	—	—	i 1·6
Bermuda		13·3	26	—	—	e 5 25	−17	—	—	—
Bogota		16·0	189	e 3 25 ?	−23	e 6 31	−15	e 7 54	PcP	—
Mobile		18·1	307	i 4 20	+ 6	e 8 10	+35	—	—	e 10·5
Philadelphia		19·7	353	e 4 32	− 2	e 8 10	0	e 4 52	PP	e 9·1
Fordham		20·4	357	e 4 41	0	i 8 23	− 2	—	—	—
Weston		21·8	2	i 4 59	+ 3	i 8 52	0	—	—	—
Harvard		22·0	2	i 4 54	− 4	e 8 58	+ 2	—	—	—
St. Louis		24·3	323	e 5 23	+ 3	e 10 5	+28	—	—	—
Ottawa	z.	25·1	353	e 5 25	− 3	e 10 18	+27	—	—	—
Huancayo		32·6	187	e 6 14	−21	—	—	—	—	—
La Paz		36·9	174	7 11	− 1	12 27	−31	—	—	20·8
Tucson		36·9	298	i 7 15	+ 3	—	—	—	—	—
Logan		40·0	312	e 7 36	− 2	—	—	—	—	—
Pierce Ferry		40·2	303	e 7 41	+ 1	—	—	—	—	—
Boulder City		40·8	302	i 7 47	+ 2	—	—	—	—	—
Pasadena		43·3	299	i 8 6a	+ 1	—	—	i 8 14	pP	—
Tinemaha		43·7	303	i 8 11a	+ 3	—	—	i 8 18	pP	—
Hungry Horse		43·9	320	i 8 9	− 1	—	—	—	—	—
Fresno	z.	44·9	303	i 8 18	0	—	—	—	—	—
Almeria		61·5	59	e 10 19	− 2	18 39	− 3	12 35	PP	31·8
Alicante		62·9	57	e 10 34	+ 4	18 58	− 2	12 50	PP	e 31·2
College		65·8	334	e 10 44	− 5	—	—	—	—	—
Stuttgart	z.	68·8	44	e 10 50	−18	—	—	—	—	—

Additional readings :—
San Juan eP = 44s.
Philadelphia i = 8m.33s.
Boulder City i = 8m.47s.
Fresno eE = 8m.21s.
Almeria PcP = 11m.1s., PPP = 14m.5s., PPS = 19m.11s., SS = 22m.35s., SSS = 25m.11s.
Alicante PPP = 14m.10s., PS = 19m.2s., PPS = 19m.12s., SS = 23m.0s., SSS = 25m.36s.
Long waves were also recorded at Berkeley and Sitka.

Feb. 15d. Readings also at 1h. (Alicante, Ashkabad, Obi-garm, Stalinabad, near Almata, Andijan, Frunse, Kulyab, Murgab, Tashkent, and Tchimkent), 2h. (Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse), 3h. (Tacubaya), 5h. (Tacubaya (2), near Obi-garm and near Mizusawa), 6h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Logan, Ottawa, Hungry Horse, College, Bogota, near Tacubaya (2), Manzanillo, and near Puebla), 7h. (Merida, Puebla, Tacubaya, Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Logan, Butte (2), Hungry Horse, Seattle (2), Sitka, College, Ottawa, and Philadelphia), 8h. (Sitka and near Obi-garm), 9h. (near Obi-garm), 10h. (Lick), 11h. (College, Hungry Horse, and Shasta Dam), 12h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Samarkand, Stalinabad, near Andijan, and Obi-garm), 13h. (Lick), 14h. (Nanking), 15h., 16h., 17h. (2) (Ashkabad), 18h. (Santa Lucia and near Ashkabad), 20h. (Huancayo and near Tucson), 22h. (Istanbul, Paris, Strasbourg, Stuttgart, Clermont-Ferrand, Basle, Zürich, and Tamanrasset).

Feb. 16d. 11h. 37m. 16s. Epicentre 15°·0S. 168°·0E.

$A = -·9453$, $B = +·2009$, $C = -·2572$; $\delta = +10$; $h = +6$;
$D = +·208$, $E = +·978$: $G = +·252$, $H = -·053$, $K = -·966$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		18·7	226	i 4 22	0	i 7 58	+10	i 4 56	sP	9·5
Apia		19·7	90	e 4 34	0	—	—	—	—	—
Auckland	N.	22·6	166	5 4	+ 1	9 21	+14	10 11	SSS	11·7
Riverview		24·2	216	i 5 15a	− 4	i 10 36	+61	i 5 24	pP	e 11·6
Wellington		26·7	169	i 6 36	PP	i 10 34	+17	—	—	—
Perth		50·2	241	—	—	i 19 49	SS	—	—	27·1
Batavia		60·6	272	e 9 12	−63	16 48	?	—	—	—
Vladivostok		66·6	332	i 10 53	− 1	19 45	0	24 8	SS	—
Berkeley		83·8	49	i 12 32a	0	23 8	+13	i 12 35	pP	—
Lick	Z.	84·1	49	i 12 33	− 1	—	—	—	—	—
Shasta Dam		84·9	46	i 13 7	+29	—	—	—	—	—
Fresno		85·2	50	e 12 38	− 1	—	—	—	—	—
Mineral		85·3	47	i 12 39	− 1	—	—	—	—	—
Pasadena		85·4	53	i 12 40a	0	—	—	—	—	—
Riverside	E.	86·0	53	e 12 43	0	—	—	—	—	—
Reno	Z.	86·3	49	i 12 45	0	—	—	—	—	—
Calcutta	E.	86·4	295	e 13 1	+16	e 23 23	+ 2	—	—	—
College		86·4	18	i 12 42	− 3	—	—	—	—	—
Irkutsk		86·5	327	e 12 52	+ 6	—	—	—	—	—
Tinemaha		86·5	51	i 12 45a	− 1	—	—	—	—	—
Boulder City		88·6	53	e 12 54	− 2	—	—	—	—	—
Pierce Ferry		89·3	53	i 13 0	+ 1	—	—	—	—	—
Tucson		90·6	57	i 13 6	+ 1	e 23 46	−14	—	—	e 41·9
Logan		92·7	48	i 13 12	− 3	—	—	e 16 55	PP	—
Kodaikanal	E.	93·1	280	—	—	e 22 24	?	—	—	—
Hungry Horse		93·3	40	i 13 16	− 2	—	—	—	—	—
Bombay		99·5	287	e 16 59	?	e 24 25	[0]	e 17 9	PP	—
Ksara		133·0	302	e 21 15	PP	—	—	—	—	—
Stuttgart	Z.	142·1	337	e 19 29	[− 5]	—	—	—	—	—
Triest		142·5	330	e 19 41	[+ 6]	—	—	i 20 17	PKP_2	—
Strasbourg		142·8	338	e 19 31	[− 4]	—	—	—	—	e 53·7
Paris		144·2	343	i 19 35	[− 3]	—	—	e 22 27	PP	—
Padova		144·3	331	19 40	[+ 2]	e 23 21	PKS	e 21 33	?	—
Besançon		144·5	338	e 19 46?	[+ 8]	—	—	—	—	—
Bologna	z.	144·6	330	e 19 38	[0]	—	—	—	—	—
Pavia		145·0	334	i 19 39	[0]	—	—	—	—	—
Prato		145·1	330	i 19 40	[+ 1]	e 28 54	{−57}	—	—	—
Florence		145·1	330	i 19 38a	[− 1]	—	—	e 19 52	pPKP	—
Rome		145·9	326	19 40a	[− 1]	21 39	?	20 8	PKP_2	—
Clermont-Ferrand		146·8	340	i 19 44	[+ 2]	—	—	23 4	?	60·7
Tamanrasset	z.	161·7	299	i 19 3a	[−60]	e 31 32	{+10}	e 19 48	pPKP	—

Additional readings :—
Brisbane iE = 5m.12s., and 5m.41s., iEN = 5m.56s., iZ = 6m.1s., iE = 6m.57s.
Auckland iN = 6m.20s. and 7m.54s.
Riverview iZ = 5m.34s. and 5m.42s., iPP = 5m.53s., iZ = 6m.0s., iN = 9m.56s., iEN = 10m.7s.
Wellington iZ = 7m.0s.
Fresno iZ = 12m.45s.
Reno iN = 13m.3s.
Triest i = 22m.42s.
Paris e = 20m.19s.
Tamanrasset eZ = 23m.33s. and iZ = 24m.18s.
Long waves were recorded at Arapuni.

Feb. 16d. 15h. Asia Minor ?

Istanbul P =13m.48s., S_gE =14m.46s.
Bucharest eN =15m.12s., 15m.24s., and 15m.48s.
Salo eZ =15m.30s.?
Helwan iN =15m.34s.
Ksara e =15m.36s. and 17m.43s.
Stuttgart eZ =16m.33s.
Strasbourg iP =16m.42s., i =16m.45s.
Besançon eP? =16m.58s., e =17m.4s.
Clermont-Ferrand iP =17m.20s.
Paris eP =17m.15s., i =17m.20s. and 17m.43s.
Belgrade e =17m.17s., 17m.54s., 18m.16s., 18m.40s., and 20m.8s.
Tamanrasset eP =17m.42s., e =18m.59s.
College iP =24m.24s.
Hungry Horse iP =25m.14s.
Huancayo e =40m.3s., eS? =42m.49s., eL =43m.5s.
Long waves were also recorded at Sofia and Alicante.

Feb. 16d. Readings also at 0h. (Klyuchi and near Ashkabad), 1h. (Pierce Ferry), 2h. (Istanbul and La Paz), 3h. and 4h. (Pierce Ferry), 8h. (Ashkabad and near Mizusawa), 10h. (Stuttgart, College, Hungry Horse, Pierce Ferry, and near Klyuchi), 11h. (Pierce Ferry and Shasta Dam), 12h. (Mount Wilson, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Berkeley, Reno, Mineral, Hungry Horse, and near Obi-garm), 15h. (near Ashkabad (3)), 16h. (Collmberg, Boulder City, Pierce Ferry, and Shasta Dam), 17h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Lick, Shasta Dam, Logan, Hungry Horse, La Paz (2), and near Copiapo), 18h. (Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse), 22h. (Ashkabad, La Paz, and near Bogota), 23h. (Ashkabad, Frunse, Samarkand, near Andijan, Kulyab, Murgab, and Obi-garm).

Feb. 17d. 4h. 37m. 32s. Epicentre 44°·6N. 6°·8E. (as on 1939, March 20d.).
Intensity V at Barcelonnette and Fours, also at Isola, Maritime Alps.

J. P. Rothé and N. Dechevoy.
La Séismicité de la France de 1940-1950. Annales de l'Institut de Physique du Globe de Strasbourg. 3e partie Géophysique, Nouvelle Série T. VII. Le Puy, 1954, pp. 53-54, with Macroseismic Chart. Epicentre 44°20'N. 6°55'E.

$A = +·7094$, $B = +·0846$, $C = +·6998$; $\delta = +13$; $h = -3$;
$D = +·118$, $E = -·993$; $G = +·695$, $H = +·083$, $K = -·714$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Pavia	1·8	71	e 0 37	+ 5	—	—	—	—
Besançon	2·7	348	e 0 47?	+ 2	e 1 19?	0	e 1 28?	S_g
Salo	2·8	69	e 0 49	+ 2	e 1 35	S_g	—	—
Clermont-Ferrand	2·9	293	e 0 36	−12	i 1 14	−10	i 1 27	S*
Basle	3·0	10	0 48	− 2	e 1 31	+ 4	e 1 36	S_g
Zürich	3·0	24	e 0 49	− 1	e 1 32	S*	—	—
Strasbourg	4·1	10	e 1 12	P*	e 2 10	S*	—	—
Stuttgart	4·5	21	e 1 17	+ 6	e 2 20	S*	—	—
Paris	5·1	326	e 1 22	+ 2	e 2 14	− 6	e 1 30	P*

Additional readings :—
Besançon e =1m.34s.?, 1m.49s.?, and 1m.54s.?
Strasbourg e =2m.31s. and 2m.48s.
Paris eS? =2m.28s., eS_g? =2m.48s., e =3m.9s.

Feb. 17d. 21h. 0m. 49s. Epicentre 36°·5N. 5°·2E.

Damage at Kerrara and Oued-Marsa.
Epicentre 36°30′N. 5°15′E. (Strasbourg). Macroseismic radius 60km.

J. P. Rothé.
Les Séismes de Kerrata et la Séismicité de l'Algérie. Annales de l'Institut de Physique du Globe de Strasbourg. 3e partie, Géophysique T. VI, 1950, pp. 3-9. 5 figures and Macroseismic Chart.

$A = +\cdot8025$, $B = +\cdot0730$, $C = +\cdot5922$; $\delta = +4$; $h = 0$;
$D = +\cdot091$, $E = -\cdot996$; $G = +\cdot590$, $H = +\cdot054$, $K = -\cdot806$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Algiers		1·8	280	0 32	0	i 0 53	− 3	0 36	P_g	—
Tunis		4·0	84	i 1 5	+ 1	i 1 50	− 2	i 1 26	P_g	—
Alicante		4·9	294	1 19	+ 2	2 22	+ 7	1 39	P_g	3·1
Barcelona		5·5	335	1 1	−24	e 2 11	−19	—	—	—
Tortosa		5·7	321	1 27	− 1	(2 35)	0	1 56	P_g	2·6
Almeria		6·2	276	1 39	+ 4	2 47	− 1	2 6	P_g	4·8
Marseilles		6·8	1	—	—	e 2 46	−17	—	—	4·2
Granada		7·1	278	i 1 46a	− 2	i 3 27	S*	i 2 6a	P*	—
Malaga	Z.	7·7	275	e 1 55	− 1	i 4 3	S_g	7 43	P_cP	4·4
Rome	N.	7·8	44	—	—	e 3 21	− 7	—	—	—
Toledo		8·0	298	i 2 0	0	i 3 46	+13	i 2 29	P*	4·0
Florence		8·6	31	—	—	e 3 45?	− 3	—	—	e 5·2
Pavia		9·2	18	—	—	e 3 43	−20	—	—	—
Clermont-Ferrand		9·4	351	e 2 16	− 2	—	—	i 4 28	SS	4·7
Salo	E.	9·9	22	e 2 47	+22	—	—	—	—	e 5·3
Besançon		10·8	3	e 2 39?	0	—	—	i 2 49?	PP	—
Zürich		11·1	12	e 2 55	+12	e 5 25	L	—	—	(e 5·4)
Basle		11·2	8	e 2 43	− 1	—	—	—	—	—
Lisbon		11·6	285	e 2 47	− 3	5 47	Q	2 52a	PP	6·3
Strasbourg		12·2	8	e 2 59	+ 1	(e 5 41)	+25	—	—	e 5·7
Paris		12·5	352	e 3 0	− 2	—	—	i 3 13	PP	e 6·7
Stuttgart		12·6	12	e 3 1	− 2	—	—	e 3 15	PP	e 7·0
Tamanrasset	Z.	13·6	179	e 3 14	− 3	i 5 48	− 2	i 3 23k	PP	i 7·1
Jena		15·1	16	e 3 37	+ 1	—	—	—	—	—
Helwan		22·8	99	e 5 6	+ 1	9 26	+15	5 30	PP	—
Hungry Horse		79·7	324	i 10 9	−122	—	—	—	—	—

Additional readings :—
Algiers i = 44s. and 51s., S_g = 1m.2s.
Tunis iS? = 2m.1s., iS_g = 2m.14s.
Alicante P = 1m.29s., S_g = 2m.32s.
Tortosa P_gEN = 1m.46s., P_gN = 1m.49s., P_gS_gN = 2m.32s., S_gEN = 2m.58s.
Almeria P_g = 2m.12s., S_g = 3m.32s., 3m.38s., and 3m.43s.
Marseilles eS? = 2m.51s.
Malaga S_cPZ = 11m.5s.
Toledo iZ = 3m.4s. and 3m.29s.
Clermont-Ferrand iP = 2m.22s.
Besançon iPPP? = 2m.55s.?
Strasbourg e = 3m.46s. and 4m.37s.
Paris iP = 3m.4s., i = 3m.58s.
Tamanrasset iPPPZ = 3m.28s.k, iZ = 6m.0s., eZ = 6m.14s.
Helwan PPPZ = 5m.56s.
Long waves were also recorded at De Bilt and Kew.

Feb. 17d. 22h. 5m. 33s. Epicentre 46°·3N. 7°·4E. (as on 1945, Nov. 10d.).

Intensity V at Montana; IV at Leuterbad. Epicentre 46°20′E., 7°30′E. Macroseismic radius 20km.

E. Wanner.
Jähresbericht des Erdbebendienstes der Schweiz, im Jähre, 1949, Zürich, 1950, p.2. Macroseismic Chart, p. 5.

$A = +·6875$, $B = +·0893$, $C = +·7206$; $\delta = -10$; $h = -4$;
$D = +·129$, $E = -·992$; $G = +·715$, $H = +·093$, $K = -·693$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Besançon		1·3	314	e 0 31	+ 6	i 0 47?	+ 3	i 0 51?	S_g	0·9
Basle		1·3	6	e 0 20	− 5	e 0 36	− 8	—	—	—
Zürich		1·3	37	e 0 21	− 4	e 0 39	− 5	—	—	—
Chur		1·6	69	e 0 26	− 4	e 0 49	− 2	—	—	—
Ravenburg		2·1	45	e 0 37?	0	e 1 6	+ 2	—	—	—
Salo		2·3	108	e 0 53	P_g	e 1 10	+ 1	—	—	—
Strasbourg		2·3	6	e 0 41	+ 1	e 1 6	− 3	e 0 45	P_g	—
Stuttgart		2·7	26	e 0 46	+ 1	i 1 26	S_g	e 0 51	P*	—
Clermont-Ferrand		3·0	260	e 0 58	P_g	e 1 39	S_g	—	—	—
Paris		4·2	309	e 1 2	− 5	e 1 44	−13	—	—	—
Jena		5·4	30	—	—	e 2 47	S*	e 2 55	S_g	—
Collmberg	E.	6·2	34	—	—	e 3 15?	S*	—	—	—

Additional readings :—
Salo i = 1m.13s.
Stuttgart e = 1m.23s., i = 1m.31s.
Clermont-Ferrand iS_g = 1m.46s.
Jena eE = 2m.50s.

Feb. 17d. Readings also at 0h., 1h., and 2h. (2) (near Ashkabad), 3h. (Mount Wilson, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, College, and near Apia), 4h. (Ashkabad and near Obi-garm), 5h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, near San Juan, Andijan, Ashkabad, Baku, Piatigorsk, Sotchi, near Erevan, Grozny, and Leninakan), 7h. (near College), 8h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 9h. (Pasadena, Tinemaha, Tucson, Pierce Ferry, and Shasta Dam), 10h. (Tucson, Pierce Ferry, Hungry Horse, and near Theodosia), 11h. (Hungry Horse), 12h. (Ashkabad), 13h. and 14h. (La Paz), 15h. (Ashkabad), 16h. (Frunse, near Andijan, Murgab, and Obi-garm), 17h. (Samarkand), 19h. (Andijan, Samarkand, near Kulyab, Murgab, Obi-garm, Stalinabad, near College, and near Ottawa), 20h. (Apia, Vladivostok, Stuttgart, Logan, Berkeley, Fresno, Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and College (2)), 21h. (Ottawa, Philadelphia, and Paris), 22h. and 23h. (2) (Ashkabad).

Feb. 18d. 5h. 11m. 38s. Epicentre 17°·8N. 105·5W. (as on 15d.).

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Manzanillo		1·7	42	0 33	+ 2	—	—	—	—	1·0
Tacubaya		6·2	74	1 41	+ 6	3 5	S*	—	—	—
Vera Cruz		9·0	80	2 16	+ 3	—	—	—	—	4·6
Tucson		15·2	342	e 3 35	− 3	e 6 1	−27	e 4 5	PP	e 7·7
Pierce Ferry		19·7	340	i 4 32	− 2	—	—	i 5 6	PP	—
Pasadena		19·8	329	i 4 35k	0	—	—	—	—	e 9·8
Boulder City		19·9	338	e 4 34	− 2	—	—	—	—	—
Tinemaha		22·2	333	i 4 59	− 1	—	—	—	—	—
Salt Lake City		23·5	348	—	—	e 9 39	+16	—	—	e 12·4
Lincoln	E.	24·2	16	e 7 52	?	—	—	—	—	e 12·5
Logan		24·5	349	e 5 24	+ 2	e 9 47	+ 7	e 5 46	PP	e 12·8
Reno	Z.	25·0	334	e 5 28	+ 1	—	—	—	—	—
Shasta Dam		27·1	332	i 4 40	−66	—	—	—	—	—
Hungry Horse		31·3	350	e 4 21	?	—	—	—	—	—

Reno also gives eE = 5m.33s., eN = 5m.44s.
Long waves were also recorded at Berkeley, Bozeman, Butte, Chicago, and Philadelphia.

Feb. 18d. 9h. 1m. 38s. Epicentre 19°·4N. 70°·4W. (as on 1947, Oct. 1d.).

$A = +·3166$, $B = -·8892$, $C = +·3302$; $\delta = -6$; $h = +5$;
$D = -·942$, $E = -·335$; $G = +·111$, $H = -·311$, $K = -·944$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		4·2	103	e 0 56	−11	i 1 29	P_g	—	—	i 1·6
Fort de France		10·0	116	e 2 32	+ 5	—	—	—	—	—
Bermuda		13·9	21	—	—	e 5 44	−13	e 5 52	S	—
Bogota		15·1	194	i 3 39	+ 3	i 6 20	− 5	i 3 48	PP	—
Fordham		21·6	353	e 4 56	+ 2	e 8 36	−13	—	—	—
Weston		22·9	359	i 5 11	+ 5	i 9 0	−13	—	—	—
Harvard		23·1	359	e 5 13	+ 5	e 9 10	− 6	—	—	—
Cleveland		24·0	339	i 5 15	− 2	e 9 47	+15	e 10 14	sS	—
St. Louis		25·8	322	e 5 34	0	e 10 9	+ 7	i 11 22	SS	—
Ottawa	Z.	26·3	352	e 6 1	+22	e 10 29	+18	—	—	—
La Paz	E.	35·8	175	e 7 2	− 1	—	—	—	—	—
Tucson		38·4	298	e 7 25	0	—	—	e 8 31	PP	e 27·6
Logan		41·5	312	e 7 42	− 8	—	—	—	—	—
Boulder City		42·3	303	e 7 57	0	—	—	—	—	—
Riverside	E.	44·0	300	e 8 11	0	—	—	—	—	—
Pasadena		44·7	300	i 8 17	+ 1	—	—	—	—	e 31·5
Tinemaha		45·2	303	i 8 20	0	—	—	—	—	—
Hungry Horse		45·4	320	i 8 20	− 2	—	—	—	—	—
Fresno	Z.	46·3	303	i 8 28	− 1	—	—	—	—	—
Shasta Dam		49·0	308	i 7 46	−64	—	—	—	—	—
Almeria		61·2	58	e 9 55	−24	18 11	−27	12 11	PP	32·4
Alicante		62·7	56	10 1	−28	18 3	−54	12 11	PP	e 28·8
College		67·3	334	e 10 54	− 5	—	—	—	—	—

Additional readings :—
Bogota iSS = 6m.45s.
Cleveland iPP?N = 5m.28s., eSN = 9m.51s.
Hungry Horse e = 9m.0s., i = 9m.5s.
Almeria PPP = 13m.39s., SSS = 24m.39s.
Long waves were also recorded at Columbia, Salt Lake City, Berkeley, and Sitka.

Feb. 18d. Readings also at 1h. (Ashkabad), 2h. (near Copiapo (2)), 3h. (Hungry Horse and near Pierce Ferry), 5h. (Ashkabad (2), Ottawa, and Hungry Horse), 6h., 7h., 8h., and 9h. (near Ashkabad), 12h. (Santa Lucia, Fort de France, and near San Juan), 13h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse), 14h. (Strasbourg), 15h. (Mizusawa and near Andijan), 19h. (Piatigorsk, Sotchi, near Erevan, Grozny, and Leninakan), 20h. (Bucharest, near Belgrade and Sofia), 22h. (Copiapo, La Paz, near Boulder City and Pierce Ferry).

Feb. 19d. 0h. 55m. 36s. Epicentre 11°·1S. 165°·3E.

$A = -·9494$, $B = +·2491$, $C = -·1913$; $\delta = +1$; $h = +6$;
$D = +·254$, $E = +·967$; $G = +·185$, $H = -·049$, $K = -·982$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		20·0	214	i 4 44	+ 7	i 8 32	+15	i 5 0	PP	i 10·1
Apia		22·5	100	4 59	− 3	e 9 24	+19	e 5 30	PP	—
Riverview		26·1	207	i 5 43$_a$	+ 6	i 10 18	+11	i 11 32	SSS	e 12·5
Arapuni	E.	28·4	163	—	—	e 11 24?	+39	—	—	—
Kaimata		31·8	172	6 29	+ 1	—	—	—	—	—
Honolulu		48·5	49	e 8 53	+ 7	e 16 2	+14	e 10 13	P_cP	e 22·4
Perth		50·0	237	—	—	i 16 39	+30	i 23 29	Q	—
Batavia		57·9	270	i 9 38	−18	17 22	−33	—	—	—
Vladivostok		62·0	333	i 10 30	+ 6	i 18 56	+ 8	12 48	PP	—
Berkeley		83·3	51	i 12 30$_a$	0	e 24 0	PPS	i 12 44	pP	e 38·3
Santa Clara		83·3	51	e 12 44	+14	—	—	—	—	e 38·6
College		83·5	19	i 12 32	+ 1	—	—	—	—	—
Lick	Z.	83·5	51	i 12 31	0	—	—	i 14 41	?	—
Shasta Dam		84·1	47	i 12 34	0	—	—	i 15 47	PP	—
Mineral	Z.	84·6	48	i 12 35	− 1	—	—	e 15 50	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno	Z.	84·8	51	i 12 36	− 1	—	—	i 12 50	pP	—
Pasadena		85·3	54	i 12 39a	− 1	—	—	i 12 52	pP	e 35·6
Reno		85·6	50	i 12 42a	+ 1	—	—	i 12 55a	pP	—
Riverside	E.	85·8	54	e 12 42	0	—	—	e 12 56	pP	—
Tinemaha		86·0	52	i 12 43a	0	—	—	i 12 59	pP	—
Boulder City		88·4	53	i 12 55	0	—	—	e 16 33	PP	—
Pierce Ferry		89·1	53	i 12 58	0	—	—	e 16 35	PP	—
Tucson		90·7	58	i 13 6	0	e 23 30	[− 7]	e 16 28	PP	e 40·8
Hungry Horse		92·1	41	i 13 12	0	—	—	e 16 50	PP	—
Logan		92·1	48	e 13 10	− 2	—	—	e 16 26	PP	—
Bombay	N.	95·8	288	e 19 24	PPP	e 24 59	+14	—	—	—
La Paz	N.	120·5	117	e 18 46	[− 8]	—	—	—	—	—
Helwan	Z.	133·4	300	e 19 22	[+ 4]	—	—	i 21 57	PP	—
Stuttgart	Z.	137·5	336	e 19 29	[+ 3]	e 23 10	SKP	e 22 14	PP	—
Kew		138·1	346	—	—	e 47 24?	?	e 71 24?	Q	e 77·4
Strasbourg		138·2	337	e 19 34	[+ 7]	—	—	e 20 32	PKP_2	e 65·4
Salo		139·4	332	e 20 14	PKP_2	—	—	e 23 14	SKP	—
Paris		139·8	342	e 19 34	[+ 4]	—	—	e 23 9	SKP	e 75·4
Rome		141·2	327	e 19 47	[+14]	e 41 46	SSP	e 35 16	PPS	e 69·4
Tortosa	N.	147·9	337	20 1	[+17]	48 47	SSS	—	—	—
Toledo	Z.	149·8	343	i 19 57	[+10]	—	—	e 23 28	PP	89·9
Almeria		152·1	339	19 57	[+ 6]	43 57	SS	24 1	PP	60·2
Granada		152·2	341	i 20 2k	[+11]	44 21	SSP	20 30a	pPKP	75·7
Tamanrasset	Z.	157·5	305	i 20 2a	[+ 4]	—	—	e 20 39	PKP_2	—

Additional readings :—
Brisbane iZ = 5m.8s., isP?N = 5m.31s., iZ = 8m.35s. and 8m.41s., iSSE = 8m.52s.
Apia i = 5m.11s.
Riverview i = 6m.0s., iPP = 6m.29s., iZ = 6m.38s., iE = 10m.28s., iN = 10m.32s., eQE = 11m.18s.
Honolulu iP = 8m.56s., ePP = 11m.1s.
Berkeley iZ = 12m.42s., eE = 12m.58s., eZ = 15m.52s., iPPZ = 15m.53s., eE = 37m.48s.
Vladivostok eP_cP = 10m.57s., ePPP = 14m.26s., iPS = 19m.25s., eSS = 23m.6s.
Shasta Dam i = 16m.0s.
Mineral eZ = 15m.58s.
Fresno iPPZ = 16m.5s.
Pasadena ePPZ = 16m.8s.
Reno ePPZ = 16m.14s., eE = 16m.22s., iN = 16m.29s. and 17m.0s.
Tucson i = 13m.18s.
Logan i = 13m.25s.
Stuttgart eZ = 20m.0s.
Toledo iZ = 20m.17s., ePPZ = 24m.2s.
Almeria PKP_2 = 20m.29s., PPP = 27m.37s., SKSP = 34m.17s., PPS = 36m.3s.
Granada $pPKP_2$ = 20m.54s., iPP = 23m.57s., pPP = 24m.21s., PPP = 27m.33s., SKSP = 33m.51s.
Tamanrasset iZ = 20m.15s. and 20m.50s., eZ = 21m.17s.
Long waves were also recorded at Auckland, Wellington, Kodaikanal, and other American and European stations.

Feb. 19d. 20h. Caribbean.

Balboa Heights eP = 24m.14s., iS = 25m.18s.
Bogota iP = 24m.33s., iS = 25m.27s., i = 25m.45s., iS* = 26m.0s., iS_E = 26m.25s.
La Paz PE = 28m.43s., iEN = 36m.0s.
Tucson iP = 30m.18s., e = 30m.32s.
Pierce Ferry iP = 30m.49s., i = 31m.3s.
Boulder City eP = 30m.54s., i = 31m.6s.
Tinemaha iPZ = 31m.16s., iZ = 31m.33s.
Hungry Horse iP = 31m.36s., i = 32m.45s.
Shasta Dam iP = 31m.45s.
Stuttgart eZ = 34m.20s. and 34m.30s.
Long waves were recorded at Bermuda.

Feb. 19d. Readings also at 0h. (Auckland, Wellington, Clermont-Ferrand, and near Mizusawa), 1h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, near College, near Andijan, Frunse, Kulyab, Murgab, Obi-garm, Samarkand, and Stalinabad), 2h. (Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Berkeley, Mineral, Hungry Horse, College, Logan, Paris, Strasbourg, Stuttgart, Tamanrasset, and near Apia), 3h. and 4h. (Hungry Horse), 6h. (Tucson, Boulder City, Pierce Ferry, Hungry Horse, Logan, and near Ashkabad (3)), 7h. (near Zürich), 12h. (near Hungry Horse), 14h. (Strasbourg, Stuttgart, College, Murgab, near Kulyab, and Stalinabad), 16h. (near Ashkabad), 17h. (near Zürich), 18h. (Boulder City, Pierce Ferry, Shasta Dam, and near Tucson (2)), 19h. (Ashkabad and near Malaga), 20h. (near Murgab, Obi-garm, and near Ashkabad), 21h. (near Ashkabad), 22h. (Boulder City, Pierce Ferry (2), Shasta Dam (2), Hungry Horse (2), Stuttgart (2), Ashkabad, Almata, near Andijan (3), Frunse, Kulyab, Murgab, Obi-garm (2), Samarkand, Stalinabad, Tashkent, Tchimkent, and near Tacubaya).

Feb. 20d. 11h. Explosion near Nordhausen, Germany.

Location 51°33′N. 10°47′E. The time at origin is approximately 11h. 59m. 10s., the direction cosines (geocentric) of the position are +·6134, +·1168, +·7811.

Seven stations record near earthquake phases generated by this explosion :

Jena (△ =0°·8) iP_gEN =59m.26s., iN =59m.32s., iS_gN? =59m.37s.
Collmberg (△ =1°·4) eP_gZ =59m.36s., iE =59m.40s., iS_g =59m.54s., iZ =59m.58s.
Stuttgart (△ =2°·9) eP =60m.6s., eP_g =60m.10s., eS =60m.44s., i =60m.46s., iS_g = 60m.51s., e =60m.56s.
Strasbourg (△ =3°·5) eP_g =60m.19s., eS_g =61m.10s., e =61m.19s.
Ravensburg (△ =3°·8) eZ =60m.24s.?
Zürich (△ =4°·4) eP? =60m.29s., eS =61m.30s.
Basle (△ =4°·5) e =60m.35s.

Feb. 20d. Readings also at 1h. (Copiapo, Hungry Horse, and Shasta Dam), 4h. (Strasbourg, Hungry Horse, and near Tacubaya), 5h. (Pierce Ferry, Shasta Dam, and near Mizusawa), 6h. (Boulder City, Pierce Ferry, Hungry Horse, Andijan, Tchimkent, near Kulyab, Murgab, Obi-garm, Stalinabad, and near Balboa Heights), 7h. (near Ashkabad), 10h. (Tinemaha, Pasadena, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Logan, Hungry Horse, College, Ottawa, Collmberg, Stuttgart, and near Alicante (2)), 11h. (near Klyuchi), 12h. (near Istanbul), 15h. (Tucson and near Batavia), 16h. (Pierce Ferry and Shasta Dam), 17h. (near Ashkabad), 18h. (Pierce Ferry, Shasta Dam, and Hungry Horse), 21h. (near College), 23h. (Ashkabad).

Feb. 21d. 11h. 39m. 35s. Epicentre 8°·9N. 39°·8W.

A = +·7592, B = −·6325, C = +·1537 ; δ = +6 ; h = +7 ;
D = −·640, E = −·768 ; G = +·118, H = −·098, K = −·988.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		27·2	294	—	—	(e 10 41)	+16	—	—	e 10·7
Bermuda		32·8	319	e 7 33	PP	—	—	—	—	e 14·2
Bogota		34·3	266	e 6 48	− 2	e 12 19	+ 2	e 14 55	SSS	18·4
La Paz		37·7	228	i 7 19a	0	i 13 15	+ 5	i 8 53	PP	19·1
Huancayo		41·0	240	e 7 45	− 1	e 13 47	−12	—	—	e 20·1
Philadelphia		44·1	321	e 9 4	+52	e 14 53	+ 8	—	—	e 20·6
La Plata	N.	46·8	200	17 13	?	22 25	Q	—	—	25·3
Ottawa	Z.	47·7	327	e 8 44	+ 4	—	—	—	—	—
Cleveland		49·0	319	i 8 52	+ 2	e 15 57	+ 2	i 9 1	pP	—
Clermont-Ferrand		51·9	38	i 9 14	+ 2	—	—	—	—	25·4
Paris		53·2	34	i 9 23	+ 1	e 16 27	−25	—	—	e 25·4
Kew		53·3	30	—	—	—	—	e 22 25?	SSS	—
St. Louis		54·0	312	e 9 26	− 2	e 17 7	+ 4	—	—	—
Strasbourg		56·1	37	e 9 43	0	—	—	—	—	—
Stuttgart	z.	57·0	37	e 9 50	0	—	—	—	—	—
Tucson		69·3	302	e 11 11	0	—	—	—	—	e 39·0
Logan		70·7	312	e 11 18	− 2	—	—	—	—	—
Pierce Ferry		72·1	305	e 11 28	0	—	—	—	—	—
Boulder City		72·7	305	e 11 33	+ 1	—	—	—	—	—
Hungry Horse		72·9	318	e 11 31	− 2	—	—	—	—	—

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pasadena		75·5	303	e 11 48	0	—	—	—	—	—
Tinemaha	z.	75·5	306	e 11 41	− 7	—	—	—	—	—
Reno	z.	76·7	309	e 12 3	+ 8	—	—	—	—	—
Mineral	z.	78·1	310	e 12 4	+ 2	—	—	—	—	—
Shasta Dam		78·7	310	e 11 17	−49	—	—	—	—	—
College		89·5	337	i 13 1	+ 1	—	—	—	—	—

Additional readings :—
La Paz iZ = 8m.35s.
Cleveland eSN = 16m.1s.
Shasta Dam i = 12m.5s.

Feb. 21d. 16h. 38m. 32s. Epicentre 41°·2N. 84°·5E. Given by U.S.S.R.

A = +·0723, B = +·7512, C = +·6561 ; δ = 0 ; h = −2 ;
D = +·995, E = −·096 ; G = +·063, H = +·653, K = −·755.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Almata		6·0	293	e 1 32	0	i 2 40	− 3
Frunse		7·6	286	e 1 52	− 3	3 16	− 7
Murgab		8·6	254	2 13	+ 4	3 50	+ 2
Andijan		9·2	271	e 2 17	+ 1	—	—
Tchimkent		11·2	281	e 2 41	− 3	i 4 50	− 2
Tashkent		11·4	276	e 2 46?	− 1	—	—
Obi-garm		11·6	263	i 2 48	− 2	—	—
Kulyab		11·8	259	—	—	5 20	+14
Stalinabad		12·4	263	e 2 59	− 2	5 23	+ 2
Samarkand		13·4	269	e 3 13	− 1	—	—
Irkutsk		17·5	43	e 4 12	+ 5	e 7 10?	−11
Copenhagen		47·7	313	8 40	0	—	—
Collmberg		48·6	306	e 8 45	− 2	—	—
Stuttgart	z.	51·8	305	e 9 10	− 2	—	—
College		66·7	22	i 10 56	+ 1	—	—
Hungry Horse		89·3	12	i 13 1	+ 2	—	—

Additional readings :—
Copenhagen 8m.45s.
Collmberg eEN = 8m.56s.
Long waves were recorded at Bombay and Calcutta.

Feb. 21d. Readings also at 0h. (Logan), 2h. (Tamanrasset, Helwan, and Shasta Dam), 6h. (Kulyab and near Obi-garm), 7h. (Santa Lucia and near Bogota), 8h. (Kulyab, Stalinabad, near Obi-garm, and near Ashkabad), 9h. (near Copiapo), 10h. (Boulder City and Hungry Horse), 11h. (Ashkabad and near Pierce Ferry), 12h. (Ashkabad), 14h. (near Triest), 17h. (Copiapo, Hungry Horse, near College, near Ottawa, near Obi-garm and near Tchimkent), 18h. (Andijan and near Obi-garm), 19h. (Kaimata, near Wellington, New Plymouth, Auckland and Tuai), 20h. (near Tucson (2)), 21h. (near College), 22h. (Hungry Horse and Kew), 23h. (Pierce Ferry and near College).

Feb. 22d. Readings at 0h. (Helwan and near College), 4h. (near Ashkabad), 7h. (near Klyuchi), 8h. (near Istanbul), 9h. (Hungry Horse and near College), 10h. (Apia, Brisbane, Mount Wilson, Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Hungry Horse, College, Shasta Dam, Kulyab, near Obi-garm and Stalinabad), 11h. (near Boulder City, Pierce Ferry, and near Ashkabad) 12h. (Hungry Horse), 13h. (near Ashkabad and near Klyuchi), 14h. (near Ottawa and near Ashkabad), 16h. (Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse (2)), 17h. (Rome, Zagreb, near Messina and Taranto), 18h. (near Mizusawa), 19h. (near Tucson), 20h. (Hungry Horse and near Tucson (2)), 21h. (near Tucson), 23h. (Stuttgart, Kaimata, near New Plymouth, Wellington, and Tuai).

Feb. 23d. 15h. 28m. 27s. Epicentre 34°·5N. 26°·5E. Given by Strasbourg.

$A = +·7391$, $B = +·3685$, $C = +·5638$; $\delta = -7$; $h = 0$;
$D = +·446$, $E = -·895$; $G = +·505$, $H = +·252$, $K = -·826$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Helwan		6·2	137	e 1 33	− 2	2 44	− 1	e 2 9	P_g
Messina		9·6	296	e 4 3a	?	e 4 9	− 3	—	—
Chur		17·8	320	e 4 13	+ 2	—	—	—	—
Zürich		18·6	320	e 4 20a	− 1	e 8 7	+21	—	—
Stuttgart	z.	19·2	325	e 4 29	+ 1	—	—	—	—
Basle		19·3	320	e 4 29	0	—	—	—	—
Neuchatel		19·3	318	e 4 27	− 2	—	—	—	—
Jena		19·7	333	e 4 36	+ 2	—	—	—	—
Strasbourg		19·8	323	i 4 37	+ 2	—	—	e 4 56	PP
Besançon		20·0	317	e 5 0?	+23	—	—	—	—
Clermont-Ferrand		21·1	310	e 4 48	0	i 6 52	?	—	—
Tamanrasset	z.	21·8	244	i 4 54a	− 2	—	—	e 5 15	PP
Paris		22·8	317	i 5 6	+ 1	—	—	i 5 40	PP
Granada		24·5	286	i 6 48a	?	—	—	—	—
Ottawa	z.	73·9	314	e 11 41	+ 2	—	—	—	—
College		80·9	357	i 12 19	+ 2	—	—	—	—
Hungry Horse		90·3	335	i 13 6	+ 2	—	—	—	—

Additional readings :—
Helwan eZ = 1m.42s. and 1m. 54s., S_gN = 3m.21s.
Stuttgart eZ = 4m.46s. and 5m.2s.
Strasbourg e = 4m.53s., ePP = 4m.59s.
Besançon e = 5m.12s.?, 5m. 39s.,? and 6m.3s.?

Feb. 23d. 16h. 8m. 7s. Epicentre 42°·2N. 84°·1E.

$A = +·0764$, $B = +·7391$, $C = +·6692$; $\delta = -7$; $h = -2$;
$D = +·995$, $E = -·103$; $G = +·069$, $H = +·666$, $K = -·743$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata		5·3	284	i 1 24	+ 2	i 2 36	S*	—	—	—
Frunse		7·1	279	e 1 47	− 1	3 17	+ 7	—	—	—
Murgab		8·6	247	2 8	− 1	—	—	—	—	—
Andijan		8·9	264	i 2 12	0	—	—	—	—	—
Tchimkent		10·7	275	i 2 36	− 2	i 4 48	+ 9	—	—	—
Tashkent		11·1	270	i 2 39	− 4	i 4 48	− 1	—	—	—
Kulyab		11·8	253	i 2 48	− 5	—	—	—	—	—
Stalinabad		12·2	258	i 2 55	− 3	—	—	—	—	—
Dehra Dun	N.	12·8	204	i 2 38a	−28	e 4 14	−76	—	—	e 6·0
Samarkand		13·2	265	i 3 8	− 3	—	—	—	—	—
Irkutsk		17·0	47	i 4 5	+ 4	—	—	—	—	—
Calcutta	E.	19·9	168	i 4 32a	− 4	i 8 14	− 1	i 4 54	PP	—
Ashkabad		20·2	266	i 4 37?	− 2	—	—	—	—	—
Sverdlovsk		21·0	323	i 4 49	+ 2	i 8 39	+ 2	—	—	—
Bombay		25·1	206	5 28	0	i 9 52	+ 1	i 6 12	PP	12·0
Poona		25·2	203	i 5 27	− 2	i 9 27	−25	6 0	PP	11·8
Hyderabad	N.	25·2	192	5 25	− 4	9 47	− 5	9 0	P_cP	—
Baku		25·7	278	i 6 1?	+28	—	—	—	—	—
Grozny		28·0	286	i 5 57?	+ 2	—	—	—	—	—
Nanking		29·3	99	e 4 31	−95	9 25	−94	—	—	—
Erevan		29·7	280	e 6 13	+ 3	11 12	+ 6	—	—	—
Piatigorsk		29·8	288	e 6 10	− 1	—	—	—	—	—
Leninakan		30·0	282	i 6 11	− 1	—	—	—	—	—
Sotchi		32·3	288	i 6 34	+ 1	—	—	—	—	—
Kodaikanal	E.	32·4	192	e 6 52	+18	11 48	0	—	—	—
Moscow		32·7	311	6 41	+ 5	11 55	+ 3	—	—	—
Vladivostok		34·8	73	i 6 56?	+ 2	i 12 23?	− 2	—	—	—
Theodosia		35·0	292	e 6 54	− 2	—	—	—	—	—
Colombo	E.	35·4	187	7 12	+12	12 35	+ 1	—	—	19·2
Yalta		35·9	291	i 7 4	0	i 12 46	+ 4	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Simferopol		35·9	292	e 7 5	+ 1	—	—	—	—	—
Ksara		38·5	273	e 7 30	+ 4	13 28	+ 6	—	—	—
Helsinki		39·6	319	i 7 36a	+ 1	e 13 41	+ 3	e 9 8	PP	e 18·9
Osaka		40·5	83	e 7 42	0	14 3	+11	—	—	—
Istanbul		40·5	288	7 38	− 4	13 52	0	—	—	—
Cernauti		40·6	300	7 52	+ 9	—	—	9 20	PP	—
Owase		41·1	83	e 7 50	+ 3	14 3	+ 2	—	—	—
Yuzno-Sakhlinsk		41·2	63	7 53	+ 5	e 14 3	+ 1	—	—	—
Sapporo		41·4	68	7 48	− 2	14 17	+12	—	—	—
Bucharest		41·5	294	e 7 57	+ 7	i 14 18	+11	i 9 37	PP	19·9
Campulung		42·0	295	e 8 1	+ 7	i 17 35	SS	e 9 39	PP	—
Mizusawa		42·7	74	8 4	+ 4	e 14 3	−21	—	—	15·8
Tokyo		43·1	80	8 10	+ 6	14 49	+19	—	—	—
Kakioka		43·2	79	8 5	+ 1	14 25	− 7	—	—	—
Upsala		43·3	318	i 8 6a	+ 1	i 14 36	+ 3	9 43	PP	e 20·9
Helwan		43·8	271	i 8 8a	− 1	i 14 37	− 3	9 51	PP	—
Skalnate Pleso		44·0	303	e 8 25	+14	—	—	e 10 14	PP	—
Sofia		44·0	292	i 8 15	+ 4	14 55	+12	i 9 58	PP	24·3
Raciborzu		45·0	304	e 8 21	+ 2	e 15 1?	+ 3	e 10 11	PP	e 19·9
Belgrade		45·2	296	i 8 19k	− 1	i 18 35	SS	e 10 11	PP	—
Budapest		45·2	300	8 24	+ 4	15 2	+ 1	10 13	PP	24·4
Kalossa		45·6	300	8 28	+ 4	e 18 57	SS	10 19	PP	e 24·4
Ogyalla		45·7	301	e 8 30	+ 6	e 15 18	+10	—	—	—
Lund		46·4	313	8 32	+ 2	15 18	0	—	—	—
Copenhagen		46·8	313	i 8 34	+ 1	i 15 25	+ 1	10 28	PP	23·9
Prague		47·3	305	i 8 33	− 4	e 15 29	− 2	—	—	—
Potsdam		47·4	308	e 8 31	− 7	i 15 30	− 2	i 10 35k	PP	21·2
Zagreb		47·8	299	e 8 39	− 2	e 19 21	SS	i 10 34	PP	—
Collmberg		47·8	307	e 8 40	− 1	e 15 36	− 2	e 10 34	PP	e 21·4
Cheb		48·5	305	8 51	+ 5	e 15 54	+ 6	—	—	—
Jena		48·7	306	e 8 48	0	e 15 53	+ 3	e 10 43	PP	e 21·6
Taranto		49·0	292	8 52	+ 2	16 1	+ 6	—	—	e 25·2
Bergen	N.	49·3	321	—	—	e 15 37	−22	—	—	19·7
Triest		49·3	299	i 8 52a	− 1	i 15 58	− 1	i 10 52	PP	—
Padova		51·0	298	9 6	0	16 33	+11	11 18	PP	27·9
Stuttgart		51·0	305	e 9 5	− 1	i 16 22	0	i 11 9	PP	e 23·9
Messina		51·2	291	e 9 12	+ 5	16 37	+12	e 11 7	PP	—
Bologna		51·3	299	e 9 9a	+ 1	e 16 29	+ 3	i 11 13	PP	e 23·3
Salo		51·4	301	9 13a	+ 4	i 16 49	+21	i 11 11	PP	—
Chur		51·5	302	e 9 9	0	e 20 32	SS	—	—	—
Florence		51·7	298	i 9 11a	0	i 16 33	+ 1	i 11 12	PP	e 23·9
Rome		51·7	295	i 9 10a	− 1	16 18	−14	i 11 11	PP	25·8
Prato		51·7	296	i 9 11	0	i 16 21	−11	—	—	—
Catania		51·9	290	e 9 12	0	e 16 46	+11	—	—	e 23·9
Strasbourg		51·9	305	i 9 13a	+ 1	i 16 38	+ 3	i 11 11	PP	25·9
Zürich		51·9	303	e 9 11a	− 1	e 16 45	+10	e 20 13	SS	—
De Bilt		52·1	311	i 9 15a	+ 1	i 16 40	+ 2	e 11 12	PP	e 23·9
Basle		52·4	303	e 9 17a	+ 1	e 16 7	−35	—	—	—
Batavia		52·4	151	e 8 53	−23	i 16 16	−26	—	—	28·9
Pavia	Z.	52·4	301	i 9 16	0	—	—	—	—	—
Neuchatel		53·1	303	i 9 27	+ 6	—	—	—	—	e 21·1
Besançon		53·5	304	i 9 49?	+25	e 17 3?	+ 6	i 11 24	PP	24·0
Aberdeen	E.	54·0	318	i 8 44	−44	i 17 12	+ 9	i 11 10	PP	28·7
Durham	N.	54·7	315	i 9 35	+ 2	i 17 17	+ 4	i 11 43	PP	—
Edinburgh	E.	55·0	317	9 27	− 8	17 18	+ 1	11 31	PP	25·4
Paris		55·0	307	i 9 35	0	i 17 20	+ 3	i 11 41	PP	e 25·9
Kew		55·4	311	i 9 40	+ 2	i 17 15	− 7	i 11 44	PP	e 29·9
Marseilles		55·7	300	e 9 40	0	e 17 23	− 3	e 11 54	PP	25·4
Tunis		55·7	291	e 9 43	+ 3	e 17 24	− 2	e 11 47	PP	24·9
Scoresby Sund		55·9	338	9 44a	+ 2	17 37	+ 8	11 52	PP	—
Clermont-Ferrand		56·0	303	i 9 43	0	i 17 42	+12	i 11 50	PP	25·4
Jersey	E.	57·5	310	i 9 56	+ 3	i 17 59	+ 9	21 52	SS	25·9
Barcelona		58·7	300	10 5	+ 3	18 9	+ 3	13 35	PPP	—
Reykjavik		59·2	331	e 9 53	−12	e 24 17	SSS	—	—	e 29·9
Bagneres		59·2	302	e 10 7	+ 2	e 18 17	+ 5	e 21 43	SS	27·9

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tortosa		60·1	299	i 10 11	0	i 18 26	+ 2	12 28	PP	27·8
Algiers		60·5	294	i 10 14	0	18 29	0	i 12 27	PP	25·5
Alicante		62·1	298	10 22	− 3	18 56	+ 7	10 42	pP	e 30·2
Toledo	z.	63·5	300	i 10 35	+ 1	i 19 13	+ 6	11 11	PcP	30·7
Almeria		64·2	297	i 10 35	− 4	i 19 34	PS	13 14	PP	36·2
Granada		64·7	298	i 10 41k	− 1	i 19 44	PS	13 27k	PP	33·0
Malaga	N.	65·5	298	i 10 53	+ 6	i 19 43	+11	e 13 33	PP	35·7
College		65·8	22	e 10 49	0	i 19 47	+12	e 13 14	PP	e 27·8
Tamanrasset	z.	66·8	282	e 10 54	− 2	e 19 51	+ 3	e 13 28	PP	—
Lisbon		67·4	302	i 11 0a	+ 1	19 50	− 5	13 31	PP	32·0
Tananarive		69·5	218	e 11 15	+ 3	e 20 21	+ 1	13 50	PP	e 33·3
Ivigtut	z.	69·9	338	i 11 14	− 1	—	—	13 55	PP	33·9
Sitka		75·3	21	i 11 52	+ 5	i 21 42	+16	e 16 40	PPP	e 36·1
Saskatoon		85·6	7	12 43	+ 2	23 19	+ 6	24 19	PS	44·9
Victoria		86·5	18	12 55	+ 9	23 23	+ 1	29 53	SSP	53·9
Seattle		87·5	18	e 12 59	+ 8	e 23 47	+16	e 29 13	SS	e 36·1
Seven Falls	E.	88·3	344	12 56	+ 1	23 35	− 4	24 51	PS	40·9
Hungry Horse		88·4	12	i 12 55	0	—	—	i 13 17	PcP	—
Shawinigan Falls	N.	89·3	344	e 13 0	+ 1	—	—	—	—	—
Ottawa		90·9	345	13 8a	+ 1	24 15	+12	23 49	SKS	42·9
Butte	N.	90·9	11	i 13 9	+ 2	e 23 51	{+ 2}	e 16 32	PP	e 38·0
Bozeman		91·5	10	e 13 9	− 1	e 24 12	+ 4	e 17 18	PP	e 38·1
Harvard		92·9	341	i 13 16	0	e 25 29	PS	e 33 53?	SSS	e 44·3
Weston		92·9	341	i 13 15	− 1	i 24 3	{− 1}	e 17 7	PP	—
Rapid City	E.	93·9	5	i 13 24	+ 3	e 25 38	PS	i 18 32	PPP	e 38·2
Brisbane		94·0	124	i 13 22	+ 1	i 23 58	[+ 2]	i 17 8	PP	—
Shasta Dam		94·1	20	i 13 23	+ 1	—	—	i 17 11	PP	—
Mineral	z.	94·6	19	i 13 26	+ 2	—	—	i 17 17	PP	e 63·9
Fordham		94·9	342	i 13 28	+ 3	e 24 16	{− 2}	i 17 20	PP	44·9
Logan		95·2	12	i 13 26	− 1	e 24 14	{− 5}	e 17 20	PP	e 39·2
Cleveland		95·7	349	i 13 30	+ 1	e 23 58	[− 7]	i 17 22	PP	—
Pennsylvania	E.	95·8	346	—	—	e 24 4	[− 1]	e 31 35	SSP	—
Reno		95·8	18	e 13 33a	+ 4	e 24 9	[+ 4]	e 24 21	SKKS	e 56·0
Philadelphia		96·1	343	e 13 33	+ 2	e 24 3	[− 4]	e 26 21	SP	e 43·8
Chicago		96·1	354	e 13 33	+ 2	e 24 5	[− 2]	e 17 27	PP	e 38·6
Salt Lake City		96·2	12	e 13 31	0	e 31 33	SS	e 17 29	PP	e 41·6
Berkeley	z.	96·8	20	i 13 37a	+ 3	—	—	—	—	—
Lincoln	E.	97·3	0	e 13 45	+ 9	e 24 13	[0]	e 35 1	SSS	e 43·4
Santa Clara		97·3	20	i 27 11	PPS	—	—	e 49 30	Q	e 56·6
Lick	z.	97·4	20	i 13 39	+ 2	—	—	i 17 40	PP	—
Riverview		97·5	130	e 13 36	− 1	e 24 15	[+ 1]	e 17 46	PP	e 48·2
Fresno	z.	98·5	19	e 13 37	− 5	—	—	i 17 48	PP	—
Tinemaha	z.	98·5	17	i 13 45	+ 3	—	—	—	—	—
Florissant		99·2	355	e 13 47	+ 2	e 24 20	[− 3]	e 17 47	PP	—
St. Louis		99·4	355	i 13 42	− 4	i 24 21	[− 3]	i 17 42	PP	—
Boulder City		100·3	15	i 13 52	+ 2	—	—	i 20 40	PPP	—
Pierce Ferry		100·3	14	i 13 52	+ 2	—	—	i 17 58	PP	—
Bermuda		100·4	333	e 14 3	+13	e 24 43	[+14]	e 18 6	PP	e 41·9
Pasadena		101·3	18	i 13 57	+ 3	e 24 43	[+10]	i 18 8	PP	e 36·9
Riverside	z.	101·7	18	e 13 57	+ 1	—	—	e 30 6	PKKP	—
Palomar	z.	102·4	17	e 13 58	− 1	—	—	—	—	—
Columbia		103·0	347	e 18 16	PP	e 24 42	[+ 1]	—	—	e 45·2
Tucson		104·7	12	e 14 12	+ 3	e 24 59	[+10]	i 18 34	PP	e 49·6
Mobile		107·1	353	13 45	P	e 24 53	[− 7]	e 18 52	PP	e 42·9
San Juan		113·7	328	e 19 50	PP	i 29 16	PS	e 22 12	PPP	e 45·0
Auckland	N.	114·0	118	23 38	?	42 29	?	—	—	57·9
Fort de France		114·9	321	—	—	e 28 40	PS	—	—	—
Tacubaya		118·6	3	e 20 2	PP	e 26 18	[+33]	—	—	e 70·0
Bogota		129·3	330	i 19 15	[+ 5]	e 22 23	PKS	e 21 20	PP	e 81·9
Huancayo		145·0	322	i 19 43	[+ 4]	e 30 7	{+17}	i 22 57	PP	e 58·9
La Paz		145·0	307	i 19 42a	[+ 3]	i 26 53	[+ 6]	i 19 47	pPKP	67·1
La Plata	E.	149·4	271	19 47	[+ 1]	31 59	?	23 17	PP	88·4
	N.	149·4	271	19 51	[+ 5]	26 59	[+ 6]	23 35	PP	81·3
Santa Lucia	N.	158·3	285	20 25	[+26]	44 13	SS	24 18	PP	74·9

For Notes see next page,

NOTES TO FEBRUARY 23d. 16h. 8m. 7s.

Additional readings :—
Bombay iSSEN =10m.52s.
Poona QN =10m.37s., SSSN =11m.8s., S_cSN =16m.7s.
Hyderabad PPN =5m.51s., SSN =10m.38s.
Helsinki eSS =15m.46s., eSSS =16m.46s.
Bucharest iEN =8m.0s., iP_cP?EN =10m.11s., iSN =14m.21s., iN =15m.33s., iSS?E =17m.24s., iSS?N =17m.29s., iS_cSE =17m.59s.
Campulung eE =8m.23s.
Upsala iE =8m.58s., eN =16m.53s., eE =17m.24s., iN =17m.32s., SSE =17m.52s.?
Helwan eN =8m.51s. and 9m.13s., PPN =9m.51s., P_cPN =9m.56s., PPPN =10m.25s., iN =12m.51s., eN =13m.41s. and 14m.20s., iN =17m.59s.
Sofia SS =18m.10s., S_cS =19m.26s., SSS =23m.13s.
Raciborzu eN =8m.28s., eZ =9m.29s., eP_cP?Z =10m.1s.?, eZ =10m.55s., ePPP?EN =10m.58s., eZ =11m.39s., e =18m.18s., eN =19m.41s., eE =19m.57s., iN =20m.14s., iSS?N =20m.39s.
Budapest eN =10m.25s., PPPE =10m.41s., PSE =15m.19s., eN =15m.35s. and 17m.12s., SSE =17m.15s., SSN =18m.34s., SSSE =19m.37s., eSSSN =19m.43s.
Kalossa eN =10m.23s., eE =11m.10s., eN =11m.23s., iN =11m.40s.
Copenhagen 18m.58s., SSS =19m.56s., 23m.19s.
Potsdam iPZ =8m.38s.a, iPPPN =11m.37s., iPSZ =15m.58s., iSSE =19m.18s., iSSZ =19m.22s.; many other readings given without phase.
Zagreb i =8m.46s., iZ =8m.49s., iEZ =9m.33s., i =10m.47s., i =12m.21s., e =14m.9s., i =19m.33s., eE =19m.44s., eZ =20m.44s., i =21m.40s., e =22m.33s., i =23m.22s., eE =26m.49s., i =26m.55s., eZ =27m.42s., iE =27m.53s.
Collmberg iEZ =8m.43s., iPZ =8m.54s., iZ =10m.38s., iE =15m.56s., eS$_c$S?N =18m.36s., eSSE =19m.7s., eN =19m.36s.
Jena eE =14m.42s., eSZ =16m.3s., eSSN =19m.27s., eSSE =19m.37s.
Triest iP_cP =10m.9s., iS_cS =18m.42s., iSS =19m.44s.
Padova i =16m.51s.
Stuttgart iP =9m.10s., iZ =9m.13s. and 9m.17s.a, i =11m.43s. and 12m.58s., iSS =19m.53s., i =20m.59s.
Bologna eZ =9m.43s., e =20m.53s.
Salo iE =10m.14s. and 10m.38s.
Florence iZ =10m.10s., eSSE =20m.23s.
Rome iPPP =12m.5s., PS? =16m.48s.
Strasbourg iP_cP =10m.28s., eP_cP =10m.33s., iPPP =12m.17s., iP_cS =14m.27s., iS =16m.43s., iPS =16m.51s., iS_cS =19m.3s., iSS =20m.15s., iSSS =21m.57s. and 22m.11s.; many other readings given without phase.
De Bilt iP_cP =10m.34s., eSS =20m.30s.
Besançon i =10m.11s.?, 10m.17s.?, and 10m.26s., iP_cP =10m.53s.?, i =11m.41s., iPP =11m.48s.?, i =11m.57s.? and 12m.39s.?, iPPP? =12m.57s.?, e =13m.27s.?
Aberdeen iSSE =21m.24s., iSSSE =23m.58s., iE =25m.23s. and 27m.17s.
Durham iP_cPN =10m.52s., iPPPN =12m.55s., iP_cSN =14m.42s., iPSN =17m.33s., iPPSN =17m.39s., iS_cSN =19m.38s.
Edinburgh P_cPE =10m.16s., PPP?E =12m.59s., PPSE =17m.43s., S_cSE =19m.0s.
Paris iP_cP =10m.35s. and 10m.42s., iPPP =12m.50s., iP_cS =14m.46s., iS =17m.14s., iPS =17m.31s., eS_cS =19m.20s., iPKP,PKP? =39m.43s.; many other readings given without phase.
Kew iP_cPZ =11m.57s., eS =17m.35s., ePSNZ =18m.17s., eSSN =19m.37s., eNZ =21m.19s., e =21m.51s., eE =23m.51s., eQEN =24·9m.
Marseilles i =10m.4s., eP_cP =10m.55s., e =11m.24s., ePP =12m.7s., ePPP =12m.57s., e =13m.55s., eS =17m.29s., e =18m.33s. and 19m.1s., eS_cS =19m.19s., e =20m.22s., eSS =20m.59s., eSSS =22m.55s., e =23m.51s. and 24m.13s.
Tunis iP_cP =10m.41s., ePPP =12m.56s., iP_cS =14m.40s., ePS =17m.36s., ePPS? =17m.40s. and 17m.45s., eSS =20m.45s. and 21m.0s., eSSS =22m.55s. and 23m.9s.; many other readings given without phase.
Scoresby Sund 12m.56s., 17m.16s., 18m.5s., and 21m.5s.
Clermont-Ferrand iPPP =13m.17s., iPS? =17m.56s., iSS =21m.26s., iSSS =23m.47s.
Jersey eE =22m.43s.
Barcelona SS =22m.17s.
Reykjavik eE =25m.41s., eN =26m.47s.
Bagneres eP_cS =14m.43s., eS_cS? =19m.37s.
Tortosa P_cP?N =11m.10s., PPPEN =13m.48s., P_cS?E =15m.7s., PPSEN =18m.38s., SSN =22m.14s., SSSEN =24m.53s.
Algiers i =10m.18s., 10m.41s., and 12m.35s., iPPP =13m.42s.
Alicante P_cP =10m.50s., PP =12m.46s., PPP =14m.16s., S_cS =19m.56s., SS =23m.0s., SSS =25m.46s., Q =26m.18s.
Toledo z. ePP? =13m.11s., ePPP =14m.42s., eSKS =20m.23s., eSS =23m.31s., eSSS =26m.23s.
Almeria P_cP =11m.2s., PPP =14m.50s., P_cS =15m.12s., PS =20m.12s., S_cS =20m.34s., SS =23m.50s., SSS =26m.50s.
Granada P_cP =11m.47s., PPP =14m.44s.a, S_cS =20m.41s., SS =23m.56s.
Malaga iP_cPN =11m.15s., iPPPN =15m.19s.
College iP_cP =11m.29s., i =12m.12s., eS =19m.22s., iS_cS =20m.35s., eSS =24m.4s., ePKP,PKP? =39m.18s.
Tamanrasset iZ =11m.11s.a, iP_cPZ =11m.17s.a, iZ =11m.48s.k, ePPPZ =15m.7s.

Continued on next page.

Lisbon iPZ = 11m.3s.a, iPcPZ = 11m.31s., N = 14m.38s., PSEN = 20m.11s., eN = 21m.17s., E = 22m.43s., SSN = 24m.14s., SSEN = 24m.28s., SSSEN = 27m.17s.
Tananarive PS = 20m.37s., SS = 24m.52s., SSS = 28m.11s.
Ivigtut iZ = 11m.19s., Z = 15m.20s.
Saskatoon SS = 29m.17s., Q = 36·9m.
Victoria SS = 42m.53s.?
Seattle eSKS? = 24m.1s.
Seven Falls SSE = 30m.29s.
Ottawa e = 14m.27s., PPS = 25m.23s., SSS = 30m.23s.
Butte ePSN = 25m.16s., eSS?N = 30m.14s., iSSSN = 33m.48s.
Bozeman ePPP? = 19m.16s., iSKS? = 23m.57s., ePS? = 25m.33s., ePSPS = 31m.2s.
Weston iPS = 25m.48s.
Brisbane iZ = 13m.50s., eS?N = 23m.55s., eSS?E = 29m.3s.
Fordham iPS = 26m.10s., eSS = 31m.30s.
Logan ePPP? = 19m.19s., ePS = 26m.26s., eSS? = 31m.33s., eSSS? = 35m.44s.
Cleveland eN = 16m.42s., iPPN = 17m.28s., iSKSN = 24m.12s., iPSN = 26m.4s., eSSN = 31m.28s., eSSSN = 35m.11s.
Pennsylvania eE = 26m.32s. and 34m.5s.
Reno iE = 13m.39s., iN = 14m.3s. and 16m.33s., ePKPZ = 17m.25s.
Philadelphia ePP = 17m.24s., eSP = 26m.5s., eSS = 31m.9s.
Chicago e = 17m.56s., ePS = 26m.17s., ePSPS = 31m.59s.
Salt Lake City e = 23m.14s., eSS? = 30m.55s.
Santa Clara iSE = 37m.48s., eZ = 39m.57s.
Lick eN = 13m.50s.
Riverview eSE = 25m.5s., ePS = 26m.26s., eZ = 39m.39s.
Fresno eN = 13m.45s.
Florissant e = 19m.59s., iPS = 26m.45s., i = 27m.36s., iSS = 32m.39s.
St. Louis i = 14m.48s., iPS = 26m.42s., iSS = 32m.36s.
Pierce Ferry i = 15m.11s.
Bermuda e = 17m.2s. and 23m.8s., ePS = 27m.12s., i = 28m.53s.
Pasadena iZ = 14m.51s., eZ = 17m.29s., iPSEN = 27m.13s., ePKKPZ = 30m.1s., eSS = 32m.17s.
Tucson ePPP = 20m.51s., eS? = 25m.36s., ePS = 27m.47s., ePPS = 28m.48s., ePSPS = 33m.53s., eSSS? = 37m.53s.
Mobile ePS = 28m.11s.
San Juan eSS = 34m.46s., eSSS = 40m.11s.
Tacubaya i = 20m.57s., e = 24m.47s.
Huancayo e = 33m.20s., eSS = 42m.3s., e = 43m.0s., eSSS? = 48m.3s.
La Paz iE = 20m.13s., iPPZ = 23m.5s., iPKSZ = 23m.18s., iEN = 23m.37s., iSKKSN = 30m.7s., iPSZ = 33m.23s., iPPSE = 35m.17s., iSS = 41m.53s.
La Plata N = 20m.47s., E = 20m.53s., PPN = 21m.43s., SKKS?E = 27m.35s., SSSN = 42m.42s., N = 55m.41s., Q?N = 64m.41s., QN = 69m.17s.
Long waves were also recorded at Wellington, Chihuahua, and Honolulu.

Feb. 23d. Readings also at 0h. (Tacubaya), 1h. (Boulder City, Pierce Ferry, Mineral, Shasta Dam, Berkeley, near Fresno, Lick, and Reno), 2h. (near Hungry Horse), 3h. (near Ashkabad), 4h. (Palomar, near Pasadena, Riverside, Tucson, Boulder City, Pierce Ferry, near Kulyab, Obi-garm, and Stalinabad), 5h. (Mount Wilson, Palomar, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and near Zürich), 6h (Upsala, Santa Lucia, Hungry Horse, and near College (2)), 8h. (Boulder City and Pierce Ferry and near Tucson), 9h. (Upsala, Granada, Alicante, Bombay, Obi-garm, Philadelphia, Cleveland, Seven Falls, Riverside, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Sitka, and near College (2)), 10h. (near Apia), 11h. (Hungry Horse and near Mizusawa), 12h. (near Ashkabad), 14h. (Pierce Ferry and near College), 15h. (Collmberg, and Stuttgart), 16h. (Collmberg, Stuttgart, Granada, Tamanrasset, Almata, Samarkand, Tashkent, and near Huancayo), 17h. (Ottawa, Pierce Ferry, Hungry Horse, Shasta Dam, College (2), Stuttgart, Almata (3), Andijan, Murgab, Tashkent (2), Tchimkent, and near Klyuchi (2)), 18h. (Almata), 19h. (Almata (2), Andijan, Murgab, Obi-garm, Samarkand, Stalinabad, Tashkent, Stuttgart, and College), 20h. (Apia, Almata, Andijan, Stalinabad, Tashkent, Ottawa, Pasadena, Palomar, Riverside, Tinemaha, Berkeley, Boulder City, Pierce Ferry (2), Shasta Dam, Hungry Horse, near Tucson (2), and near College), 21h. (Auckland, Wellington, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City (2), Pierce Ferry (2), Shasta Dam, Hungry Horse, College (2), Stuttgart, and near Ashkabad), 23h. (Almata and Andijan).

Feb. 24d. 5h. 27m. 53s. Epicentre 41°·2N. 84°·5E. (as on 1949, Feb. 21d.).

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata	6·0	293	i 1 29	− 3	i 2 42	− 1	—	—	—
Frunse	7·6	286	e 1 53	− 2	—	—	—	—	—
Murgab	8·6	254	2 13	+ 4	3 58	+10	—	—	—
Andijan	9·2	271	e 2 17	+ 1	—	—	—	—	—
Tchimkent	11·2	281	i 2 38	− 6	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		11·4	276	e 2 45	− 2	i 4 55	− 1	—	—	—
Obi-garm		11·6	263	i 2 42?	− 8	—	—	—	—	—
Stalinabad		12·4	263	i 2 58	− 3	—	—	—	—	—
Samarkand		13·4	269	i 3 10	− 4	—	—	—	—	—
Irkutsk		17·5	43	e 4 13	+ 6	7 35	+14	—	—	—
Ashkabad		20·4	268	e 4 41	0	e 8 28	+ 3	—	—	—
Sverdlovsk		22·0	323	i 4 52?	− 6	i 8 50?	− 6	e 9 25?	SS	—
Hyderabad	N.	24·2	194	—	—	9 55	+20	—	—	—
Bombay		24·4	207	e 5 33	+12	e 9 58	+19	—	—	12·6
Grozny		28·6	287	e 6 8	+ 8	—	—	—	—	—
Piatigorsk		30·4	290	e 6 15	− 1	—	—	e 12 59	SS	—
Leninakan		30·5	283	e 6 27	+10	—	—	—	—	—
Moscow		33·6	312	6 42	− 2	—	—	—	—	—
Vladivostok		34·8	71	—	—	e 12 43	+18	e 15 13	SSS	—
Raciborzu	N.	45·8	305	—	—	—	—	e 20 48	Q	e 24·4
Collmberg		48·6	306	e 8 45	− 2	—	—	—	—	—
Jena	E.	49·6	307	8 53	− 2	—	—	—	—	—
Stuttgart		51·8	305	e 9 10a	− 2	—	—	—	—	e 28·1
Besançon		54·4	304	e 9 56?	+25	—	—	—	—	—
Paris		55·8	307	i 9 40	− 1	—	—	e 11 36	PP	e 34·4
Kew		56·3	311	—	—	e 22 7?	SS	—	—	e 29·1
Clermont-Ferrand		56·8	304	e 9 47	− 1	—	—	—	—	—
College		66·7	22	i 10 56	+ 1	—	—	—	—	—
Tamanrasset	Z.	67·3	281	i 11 0a	+ 1	—	—	i 11 32	P_cP	—
Hungry Horse		89·3	12	i 13 2	+ 3	—	—	—	—	—
Ottawa	Z.	92·0	346	e 13 19	+ 7	—	—	—	—	—
Shasta Dam		94·9	20	i 13 28	+ 3	—	—	—	—	—
Boulder City		101·2	16	e 14 4	+10	—	—	—	—	—
Pierce Ferry		101·2	15	i 14 3	+ 9	—	—	—	—	—
La Paz	N.	145·9	308	19 55	[+14]	—	—	—	—	—
Huancayo		146·0	323	e 19 47	[+ 6]	—	—	—	—	—

Additional readings :—
Murgab i = 3m.41s.
Collmberg eE = 8m.49s., and 8m.54s.
Stuttgart eZ = 9m.20s.
Paris i = 9m.51s.
Tamanrasset i = 11m.5s.k.
Long waves were also recorded at De Bilt, Rome, and Upsala.

Feb. 24d. 10h. Undetermined shock. Coast of Ecuador.
Bogota iP = 28m.44s., eN = 30m.41s., iS = 31m.6s., iSS = 31m.33s.
Huancayo eP = 28m.47s., eS = 30m.30s., eL = 30m.48s.
La Paz ePZ = 30m.24s., iPP = 30m.38s., iS = 33m.46s., L = 35m.18s.
Tucson iP = 34m.38s., ipP = 34m.54s.
Ottawa eZ = 34m.53s.
Palomar ePZ = 35m.12s., ipPZ = 35m.29s.
Pierce Ferry iP = 35m.13s., i = 35m.30s.
Boulder City eP = 35m.16s., i = 35m.24s.
Riverside iPZ = 35m.18s., ipPZ = 35m.35s.
Mount Wilson iPZ = 35m.21s., ipPZ = 35m.38s.
Tinemaha iP = 35m.38s., ipPZ = 35m.55s.
Hungry Horse iP = 36m.15s.
College iP = 38m.42s.

Feb. 24d. 11h. 35m. 2s. Epicentre 11°·4S. 75°·4W. (as on 1948, May 21d.).

$A = +\cdot2472$, $B = -\cdot9489$, $C = -\cdot1964$; $\delta = +9$; $h = +7$;
$D = -\cdot968$, $E = -\cdot252$; $G = -\cdot050$, $H = +\cdot190$, $K = -\cdot981$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		0·7	174	i 0 19	+ 2	i 0 26	− 2	—	—	e 0·6
La Paz		8·7	126	2 32	P*	i 4 26	S*	—	—	i 5·5
Bogota		16·0	5	i 3 44	− 4	i 8 16	?	e 7 35	SSS	12·0
Tucson		55·1	323	e 9 36	0	—	—	—	—	—
Pierce Ferry		59·6	324	i 10 8	0	—	—	—	—	—
Riverside	Z.	60·2	320	e 10 13	+ 1	—	—	—	—	—
Mount Wilson	Z.	60·8	320	e 10 19	+ 3	—	—	—	—	—
Tinemaha	Z.	62·8	322	e 10 30	0	—	—	—	—	—
Hungry Horse		68·6	333	e 11 5	− 2	—	—	—	—	—
College		92·9	336	i 13 14	− 2	—	—	—	—	—

Feb. 24d. 11h. 49m. 33s. Epicentre 40°·4N. 126°·0W. (as on 1941, May 16d.).

$A = -·4489$, $B = -·6178$, $C = +·6456$; $\delta = -1$; $h = -2$;
$D = -·809$, $E = +·588$; $G = -·379$, $H = -·522$, $K = -·764$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale		1·3	83	i 0 25	0	i 0 43	− 1	—	—	e 1·0
Arcata		1·5	72	−0 33?	−61	—	—	—	—	—
Shasta Dam		2·8	84	i 0 45	− 2	i 1 22	0	—	—	—
Mineral		3·4	90	i 0 54	− 1	—	—	—	—	—
Berkeley		3·8	130	i 1 0a	− 1	i 1 48	+ 1	i 1 17	P_g	—
San Francisco		3·8	132	i 1 0	− 1	i 1 42	− 5	—	—	—
Branner		4·2	133	i 1 5	− 2	i 1 55	− 2	—	—	—
Santa Clara		4·4	133	e 0 55	−15	i 2 27	S_g	—	—	—
Lick	z.	4·6	130	1 1 10	− 2	—	—	—	—	—
Reno		4·8	98	e 1 15	0	i 2 12	0	i 1 37	P_g	—
Fresno		6·1	123	i 1 34	0	i 2 45	0	—	—	—
Tinemaha		6·9	114	i 1 49	+ 4	i 3 19	+14	—	—	—
Pasadena		8·8	132	i 2 11	0	i 3 48	− 5	—	—	—
Riverside	z.	9·4	130	e 2 18	0	—	—	—	—	—
Boulder City		9·8	113	i 2 28	+ 4	—	—	—	—	—
Pierce Ferry		10·4	111	i 2 35	+ 1	—	—	—	—	—
Logan		10·8	78	e 2 36	− 3	—	—	—	—	e 6·0
Hungry Horse		11·7	43	i 2 48	− 3	i 4 13	−51	—	—	—
Tucson		14·7	119	i 3 33	+ 2	—	—	e 3 57	PPP	e 9·6

Additional readings :—
Berkeley iZ = 1m.8s. and 2m.8s., eE = 2m.14s., and 2m.49s., iE = 4m.21s., eE = 4m.50s.
Reno iPZ = 1m.20s.a, iN = 1m.29s. and 1m.51s., iSEN = 2m.0s.
Long waves were also recorded at Bozeman, Butte, and Salt Lake City.

Feb. 24d. 23h. 2m. 19s. Epicentre 30°·1N. 68°·8E.

$A = +·3134$, $B = +·8080$, $C = +·4990$; $\delta = +8$; $h = +2$;
$D = +·932$, $E = -·362$; $G = +·180$, $H = +·465$, $K = -·867$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Dehra Dun	N.	8·0	86	(e 2 45?)	P_g	(3 29)	− 4	—	—	(i 4·0)
Stalinabad		8·2	0	i 2 5	+ 2	i 3 59	S*	—	—	—
Obi-garm		8·3	5	i 2 10?	+ 6	e 4 1	S*	—	—	—
Murgab		9·3	26	2 19?	+ 2	4 0?	− 5	—	—	—
Samarkand		9·7	352	i 2 23?	+ 1	i 4 27	+12	—	—	—
Andijan		11·0	14	e 2 41	− 1	i 4 57?	+10	—	—	—
Tashkent		11·2	2	i 2 43	− 1	i 5 2	+10	—	—	—
Bombay	N.	11·7	161	e 2 49	− 2	i 4 49	−15	—	—	6·4
Tchimkent		12·2	3	e 2 55	− 3	e 5 16	0	—	—	—
Poona	N.	12·4	157	2 56	− 5	5 21	0	—	—	—
Frunse		13·6	18	i 3 15	− 2	—	—	—	—	—
Almata		14·7	24	i 3 28	− 3	—	—	—	—	—
Hyderabad	N.	15·4	143	3 37	− 3	6 36	+ 4	—	—	—
Baku		18·5	309	e 7 27?	S	(e 7 27?)	−17	—	—	(e 11·0)
Calcutta	E.	19·0	108	i 4 24a	− 2	i 7 54	− 1	i 8 19	SS	—
Kodaikanal	E.	21·4	156	i 4 54	+ 3	i 8 51	+ 6	—	—	—
Erevan		22·2	303	e 4 59	− 1	—	—	—	—	—
Grozny		22·6	311	e 5 12	+ 9	i 9 18	+11	—	—	—
Leninakan		22·9	304	e 5 0	− 6	9 4	− 9	e 5 41	PPP	—
Piatigorsk		24·7	311	5 30	+ 6	9 49	+ 5	—	—	—
Colombo	E.	25·3	154	e 5 32	+ 2	—	—	—	—	e 13·9
Sotchi		26·7	308	e 5 47	+ 4	—	—	—	—	—
Sverdlovsk		27·3	350	i 5 49	+ 1	i 10 27	0	—	—	—
Ksara		28·1	285	e 6 7	+12	e 12 3	SS	—	—	—
Yalta		30·8	307	e 6 20	0	11 24	+ 1	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		32·4	279	e 6 34	0	e 12 29	+41	e 13 56	SSS	—
Istanbul		33·8	300	6 44k	− 2	—	—	e 8 31	?	—
Moscow		33·8	328	e 6 50	+ 4	e 12 18	+ 8	e 14 33	SSS	—
Irkutsk		34·2	39	e 6 51?	+ 2	—	—	—	—	—
Belgrade		40·5	304	e 7 53	+11	e 16 55	SS	e 9 56	P_cP	e 33·1
Triest		45·3	306	e 8 23	+ 2	e 15 7	+ 5	—	—	—
Upsala		46·0	326	—	—	e 18 41?	SS	—	—	e 25·7
Potsdam	z.	46·1	316	e 8 30	+ 2	—	—	—	—	31·4
Rome		46·3	301	i 8 29k	0	i 15 13	− 3	e 18 46	SS	22·1
Padova		46·6	306	e 9 52	+80	e 16 27	+66	—	—	—
Jena	N.	46·9	313	e 8 32	− 2	—	—	e 8 36	P	—
Bologna		47·0	304	e 8 40	+ 5	e 17 6	?	—	—	—
Florence	z.	47·1	304	e 8 37	+ 2	—	—	—	—	—
Prato		47·2	304	e 8 41	+ 5	—	—	—	—	—
Salo		47·5	306	e 8 39	+ 1	e 15 34	0	—	—	—
Stuttgart		48·4	310	e 8 44	− 2	—	—	e 10 13	P_cP	28·7
Zürich		48·8	308	e 8 41k	− 8	—	—	—	—	—
Strasbourg		49·3	310	e 8 49	− 4	e 18 56	S_cS	e 10 20	P_cP	—
Basle		49·5	309	e 8 33	−21	—	—	—	—	—
Vladivostok		51·2	57	i 9 7	0	e 16 26	+ 1	e 19 6	S_cS	—
Clermont-Ferrand		52·7	306	e 9 16	− 2	—	—	e 10 29	P_cP	32·7
Paris		52·8	310	i 9 17	− 2	—	—	e 12 0	PP	e 33·7
Kew		54·4	314	—	—	e 18 43	?	e 25 41?	Q	e 34·7
Tamanrasset	z.	56·5	279	e 9 35	−11	—	—	—	—	—
Toledo	z.	59·0	300	e 9 59	− 5	—	—	—	—	—
Hungry Horse		101·9	2	e 17 4	PP	—	—	i 18 2	PKP	—
Shasta Dam		108·8	9	e 17 46	?	—	—	—	—	—
Pierce Ferry		114·1	2	e 18 42	[+ 1]	—	—	—	—	—
Boulder City		114·2	3	i 18 45	[+ 4]	—	—	—	—	—
La Paz	N.	138·4	279	i 20 4	PKP_3	—	—	—	—	—

Additional readings and note :—
Dehra Dun readings have been decreased by 2m.
Baku readings are recorded as P and S respectively.
Helwan eZ = 7m.41s., PPZ = 8m.11s., eZ = 9m.35s.
Upsala eN = 22m.21s., eE = 23m.41s.?
Rome iZ = 9m.11s., e = 11m.12s., eN = 15m.17s., iN = 15m.41s.
Stuttgart eZ = 9m.3s.
Strasbourg e = 9m.10s., ePPP = 11m.52s., e = 20m.2s. and 20m.36s.
Vladivostok iSS = 19m.48s.
Clermont-Ferrand e = 9m.32s.
Paris i = 9m.21s., 9m.45s., and 10m.0s.
Tamanrasset eZ = 8m.45s., i = 8m.49s., eZ = 9m.17s.
Long waves were recorded at College and other European stations.

Feb. 24d. Readings also at 0h. (Branner, near Berkeley, Lick, and San Francisco), 2h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse (2), College, Bombay, Andijan (2), Almata (2), Obi-garm, Samarkand, Stalinabad, Tashkent, and Sverdlovsk), 3h. (Strasbourg, Stuttgart, Ottawa, and near College), 4h. (Bombay, Almata, Frunse, Murgab, Obi-garm, Stalinabad, Tchimkent, Leninakan, Sverdlovsk, Collmberg, Stuttgart, Shasta Dam, Hungry Horse, and near College (2)), 5h. (Bombay, Tucson, Boulder City, Pierce Ferry, and Huancayo), 7h. (Bombay, Almata, Andijan, Frunse, Murgab, Obi-garm, Stalinabad, Tashkent, Sverdlovsk, Stuttgart, College, near Boulder City and Pierce Ferry), 8h. (near Ashkabad), 9h. (Tinemaha, Tucson, Pierce Ferry, Shasta Dam, and Hungry Horse), 10h. (Copiapo, Almata, Murgab, Obi-garm, Tashkent, and Sverdlovsk), 11h. (near Almata (2) and near Messina), 12h. (Andijan and near Almata), 13h. (Bombay), 14h. (Almata, Frunse, and Murgab), 15h. (Stalinabad, Tashkent, and Sverdlovsk), 16h. (near Bogota), 17h. (near Alicante and near Ashkabad), 18h. (near College), 19h. (Almata and Andijan), 22h. (near Tucson).

Feb. 25d. 2h. 28m. 0s. Epicentre 36°·9N. 120°·7W.

A = −·4093, B = −·6893, C = +·5978 ; δ = +3 ; h = −1 ;
D = −·860, E = +·511 ; G = −·305, H = −·514, K = −·802.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno		0·8	103	i 0 16	− 2	i 0 26	− 5	—	—	—
Lick		0·9	300	i 0 18	− 2	i 0 33	− 1	—	—	—
Santa Clara		1·1	294	e 0 38	S	i 0 46	?	—	—	—
Branner		1·3	294	i 0 26	+ 1	i 0 44	0	—	—	—
Berkeley		1·6	308	i 0 30k	0	i 0 57	S_g	e 0 35	P_g	—
San Francisco		1·6	302	i 0 34	+ 4	i 0 50	− 1	i 0 57	S_g	—
Tinemaha		2·0	86	i 0 37a	+ 2	i 1 3	+ 1	—	—	—
Haiwee	z.	2·3	109	i 0 40	0	—	—	—	—	—
Santa Barbara		2·6	162	i 0 41	− 3	i 1 17	0	—	—	—
Reno		2·7	15	i 0 49	+ 4	i 1 19	0	i 1 25	S*	—
Pasadena		3·4	142	i 0 52	− 3	i 1 31	− 6	i 1 1	P*	—
Mineral		3·5	349	i 0 58	+ 1	i 1 55	S_g	1 8	P_g	—
Riverside		4·0	136	e 0 59	− 5	—	—	i 1 9	P*	—
Shasta Dam		4·0	342	e 1 6	+ 2	—	—	—	—	—
Boulder City		4·8	99	i 1 29	P*	—	—	i 1 34	P_g	—
Pierce Ferry		5·5	96	e 1 23	− 2	—	—	—	—	i 3·0
Logan		8·4	52	e 2 11	+ 5	—	—	—	—	—
Tucson		9·4	117	e 2 16	− 2	—	—	—	—	e 4·9

Additional readings :—
Fresno iN = 1m.58s., iE = 2m.5s.
Berkeley iZ = 1m.0s.
Reno iPZ = 53s., iEN = 56s., iE = 1m.1s.
Mineral iZ = 1m.5s.
Long waves were also recorded at Philadelphia.

Feb. 25d. Readings also at 1h. (Rome, Frunse, Tashkent, Tchimkent, near Almata, Andijan (2), Kulyab, Murgab, Obi-garm, Samarkand, Stalinabad, and near College), 4h. (Paris, Strasbourg, Stuttgart, Kew, Hungry Horse, Shasta Dam, and College), 5h. (De Bilt, Rome, Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse), 6h. (Punta Arenas, Santa Lucia, Boulder City (2), Pierce Ferry (2), Shasta Dam, Hungry Horse (2), College (2), near Kulyab, Obi-garm, and Stalinabad), 10h. (Santa Lucia, Pierce Ferry, Hungry Horse, and near College). 11h. (Santa Lucia), 14h. (College, Almata, Andijan, Frunse, Murgab, and Tashkent), 15h. (La Paz and Stalinabad), 16h. (College), 20h. (Clermont-Ferrand, Paris, and near Messina), 21h. (Istanbul and near College), 22h. (Almata, Andijan, Frunse, Murgab, Obi-garm, Stalinabad, Tashkent, and Sverdlovsk), 23h. (Pierce Ferry (2)).

Feb. 26d. 4h. 1m. 42s. Epicentre 35°·8N. 142°·0E. (as on 1948, Aug. 17d.).

A = −·6406, B = +·5005, C = +·5823 ; δ = −6 ; h = 0 ;
D = +·616, E = +·788 ; G = −·459, H = +·358, K = −·813.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		3·4	348	e 1 0	P*	1 38	+ 1	—	—	—
Vladivostok		10·7	316	i 2 36	− 2	e 5 14	SSS	i 2 50	PP	—
Irkutsk		31·3	314	e 6 22	− 2	11 37	+ 6	e 7 32	PP	—
Calcutta	E.	48·1	270	e 8 42	− 1	e 15 42	0	—	—	—
College		49·9	32	i 8 58	+ 1	—	—	—	—	—
Frunse		51·4	300	e 9 30?	+21	—	—	—	—	—
Andijan		53·6	298	e 9 25	0	e 17 3	+ 5	—	—	—
Tashkent		55·6	299	e 9 37	− 3	—	—	—	—	—
Obi-garm		56·2	297	i 9 35?	− 9	i 17 28	− 5	—	—	—
Sverdlovsk		56·4	320	9 44	− 1	17 37	+ 1	19 28	S_eS	—
Stalinabad		56·9	298	e 9 46	− 3	i 17 42	0	—	—	—
Samarkand		57·8	298	e 10 8	+13	—	—	—	—	—
Moscow		68·5	324	e 11 10	+ 4	e 20 13	+ 5	—	—	—
Baku		69·3	305	—	—	e 20 18	+ 1	—	—	—
Shasta Dam		71·5	53	e 11 22	− 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hungry Horse		72·4	43	e 11 27	− 3	—	—	—	—	—
Leninakan		73·1	309	12 8?	PcP	—	—	—	—	—
Tinemaha		76·1	55	e 12 1	+10	—	—	—	—	—
Yalta		76·8	316	e 16 41	PPP	—	—	—	—	—
Logan		77·5	48	e 11 57	− 2	—	—	—	—	—
Mount Wilson	z.	77·9	58	e 12 11	+10	—	—	—	—	—
Boulder City		79·0	54	e 12 6	− 1	—	—	—	—	—
Palomar	z.	79·2	57	e 12 14	+ 6	—	—	—	—	—
Pierce Ferry		79·5	53	e 12 8	− 2	—	—	—	—	—
Istanbul		81·9	316	12 18	− 5	—	—	e 15 34	PP	—
Belgrade		83·9	322	e 12 41k	+ 8	e 22 56	0	e 15 36	PP	e 52·1
Tucson		83·9	54	e 12 32	− 1	—	—	—	—	e 55·3
Stuttgart		85·9	331	e 12 44	+ 1	e 23 18	+ 2	—	—	e 46·3
Triest		86·4	327	e 12 45	0	e 23 29	+ 8	—	—	e 47·0
Strasbourg		86·6	332	e 17 25	?	e 26 11	?	e 39 56	Q	44·3
Kew		87·0	338	—	—	e 32 38	SSS	e 46 18?	Q	e 54·3
Helwan		87·7	306	e 16 18	PP	e 23 32	− 1	—	—	—
Paris		88·4	335	e 17 18?	PP	—	—	—	—	e 50·3
Rome		89·9	325	e 12 42	−20	e 23 31	[− 1]	e 16 33	PP	—
La Paz	z.	147·0	62	i 19 50	[+ 7]	—	—	i 19 56	PKP_2	—

Additional readings :—
Vladivostok iSSS = 5m.28s.
Irkutsk eSS = 13m.24s.
Sverdlovsk SS = 21m.36s.
Tucson i = 12m.41s.
Rome eSS? = 33m.33s.
Long waves were also recorded at Weston and other European stations.

Feb. 26d. 8h. 30m. 4s. Epicentre 37°·2N. 118°·7W. (as on 1948, June 7d.).

A = −·3834, B = −·7004, C = +·6020 ; δ = −4 ; h = −1 ;
D = −·877, E = +·480 ; G = −·289, H = −·528, K = −·799.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Fresno		1·0	244	i 0 21	0	i 0 36	0	—	—
Lick		2·3	270	i 0 39	− 1	i 1 9	0	i 1 26	S_g
Reno		2·5	340	i 0 42a	− 1	i 1 12	− 2	i 0 51	P_g
Branner		2·8	276	i 0 44	− 3	i 1 19	− 3	i 0 52	P*
Berkeley	z.	2·9	285	i 0 47a	− 1	e 1 21	− 3	e 0 50	P*
Boulder City		3·3	110	e 1 0	P*	i 1 50	S_g	i 1 7	P_g
Pierce Ferry		3·9	104	i 1 4	+ 2	i 1 50	0	i 1 16	P_g
Mineral		3·9	325	i 1 3	+ 1	i 1 54	+ 4	i 2 0	S*
Shasta Dam		4·5	322	e 1 12	+ 1	i 2 10	+ 5	—	—

Additional readings :—
Reno iSZ = 1m.15s., iZ = 1m.36s.
Boulder City i = 1m.14s.
Pierce Ferry i = 1m.12s.
Mineral iZ = 2m.4s.
Shasta Dam i = 1m.16s.

Feb. 26d. 16h. 56m. 27s. Epicentre 5°·5N. 126°·0E. (as on 1946, Nov. 2d.).

Rough.

A = −·5851, B = +·8054, C = +·0952 ; δ = +7 ; h = +7 ;
D = +·809, E = +·588 ; G = −·056, H = +·077, K = −·996.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		22·4	240	i 5 3k	+ 1	i 8 56	− 8	—	—	—
Vladivostok		37·8	7	e 7 12	− 8	i 13 1	−10	—	—	—
Calcutta	E.	40·1	299	—	—	e 13 53	+ 7	—	—	—
Riverview		45·8	150	i 12 47a	?	i 18 2	SS	—	—	e 23·4
Irkutsk		49·9	342	e 9 9	+12	—	—	—	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata	57·2	320	e 9 54	+ 3	—	—	—	—	—
Andijan	59·3	315	e 10 5	− 1	—	—	—	—	—
Obi-garm	60·6	312	i 10 11	− 4	—	—	—	—	—
Stalinabad	61·2	312	e 10 18	− 1	—	—	—	—	—
Tashkent	61·7	315	e 10 16?	− 6	—	—	—	—	—
Samarkand	62·9	312	e 10 27	− 3	—	—	—	—	—
Ashkabad	69·1	308	e 11 8	− 2	—	—	—	—	—
Sverdlovsk	72·1	329	i 11 25	− 3	i 20 45	− 5	—	—	—
Baku	75·9	311	—	—	e 21 31	− 1	—	—	—
Grozny	79·2	313	e 12 8	0	22 8	0	—	—	—
College	83·4	25	e 12 16	−14	—	—	—	—	—
Moscow	84·6	325	e 12 42	+ 6	—	—	—	—	—
Shasta Dam	102·5	47	i 12 15	?	—	—	—	—	—
Hungry Horse	105·1	37	e 13 52	−19	—	—	—	—	—

Long waves were also recorded at Santa Lucia.

Feb. 26d. 21h. 37m. 20s. Epicentre 42°·3N. 142°·4E. Depth of focus 0·005.
(as on 1937, Nov. 26d.).

Intensity V at Urakawa; IV at Muroran, Hatinohe; II-III at Kusiro, Sapporo, Mori, and Aomori. Macroseismic radius =200-300km. Depth: 30km.
" Seismological Bulletin Cent. Met. Obs., Japan, for the year 1949, Tokyo, 1950, p.7, with macroseismic chart.

A = −·5878, B = +·4527, C = +·6706; δ = +15; h = −3;
D = +·610, E = +·792; G = −·531, H = +·409, K = −·742.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Urakawa		0·3	118	0 10	− 2	0 18	− 2	—	—	—
Sapporo		1·1	315	0 20a	0	0 37	+ 1	—	—	—
Mori		1·4	262	0 26	+ 2	0 45	+ 2	—	—	—
Kusiro		1·6	65	−0 6	−33	0 13	−34	—	—	—
Aomori		1·9	219	0 34a	+ 3	1 0	+ 6	—	—	—
Hatinohe		1·9	200	0 33	+ 2	0 44	−10	—	—	—
Nemuro		2·6	66	0 41	0	1 4	− 8	—	—	—
Miyako		2·7	187	0 41	− 1	1 11	− 3	—	—	—
Morioka		2·8	200	0 45	+ 1	1 16	− 1	—	—	—
Mizusawa	E.	3·3	197	0 57	+ 6	1 31	+ 2	—	—	—
Sendai		4·2	198	1 3	0	1 53	+ 1	—	—	—
Yuzno-Sakhlinsk		4·6	3	1 8	− 1	2 1	− 1	—	—	—
Hukusima		4·8	200	1 13	+ 1	2 12	+ 5	—	—	—
Aikawa		5·3	218	1 12	− 7	—	—	—	—	—
Onahama		5·5	193	1 38	+17	—	—	—	—	—
Mito		6·1	196	1 34	+ 4	—	—	—	—	—
Kakioka		6·3	198	1 31	− 1	2 35	− 9	—	—	—
Maebasi		6·4	205	1 45	+11	2 52	+ 6	—	—	—
Nagano		6·5	212	1 40	+ 5	—	—	—	—	—
Wazima		6·5	223	1 39	+ 4	—	—	—	—	—
Kumagaya		6·6	202	1 57	+20	—	—	—	—	—
Tokyo		6·9	198	1 40	− 1	2 56	− 3	—	—	—
Hunatu		7·3	204	1 45	− 1	—	—	—	—	—
Vladivostok		7·8	280	i 1 54	+ 1	i 3 28	+ 7	—	—	—
Hungry Horse		67·5	45	i 10 48	− 3	—	—	—	—	—
Upsala	N.	68·6	334	e 6 40	?	e 13 20	SS	e 17 40?	?	e 21·7
Boulder City		75·0	55	e 11 34	− 2	—	—	—	—	—
Pierce Ferry		75·4	55	i 11 37	− 1	—	—	—	—	—
Stuttgart	Z.	80·4	331	e 12 4	− 2	—	—	—	—	—

Feb. 26d. Readings also at 0h. (Bombay, Helwan, Ksara, Tamanrasset, Andijan, Frunse, Obi-garm, Samarkand, Tashkent, near Almata (2), and Murgab (2)), 1h. (Almata, Andijan, Murgab, Samarkand, Stalinabad, Tashkent, Stuttgart, Pierce Ferry, Shasta Dam, and Hungry Horse), 6h. (near Obi-garm and near Alicante), 8h. (Klyuchi and near Ashkabad), 9h. (Brisbane and Riverview), 10h. (Almata, Stalinabad, near Obi-garm and Murgab), 12h. (Almata, Andijan, and Santa Lucia), 13h. (near Andijan, Kulyab, Murgab, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 14h. (near Mizusawa), 15h. (Nanking, Vladivostok, Irkutsk, Sverdlovsk, Boulder City, Shasta Dam, Hungry Horse, College, Granada, and near Obi-garm), 16h. (Columbia, Calcutta, De Bilt, Strasbourg, near Obi-garm (2) and Stalinabad), 17h. (Andijan, near Almata, Pierce Ferry, and near Tucson), 18h. (Mizusawa, Palomar, Tinemaha, Pasadena, Riverside, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Mineral, Hungry Horse, College, Bozeman, Butte, Salt Lake City, Seattle, Lincoln, Cleveland, Ottawa, and Philadelphia), 19h. (Jena, near Collmberg and near Tucson), 20h. (Hungry Horse and near Ottawa), 21h. (Almata), 22h. (near Tucson), 23h. (near Honolulu).

Feb. 27d. 9h.-10h. Atlantic.

Fort de France eP =59m.47s.
San Juan iP =60m.26s., i =60m.44s., eS? =64m.27s., eL =67m.2s.
Bermuda eP =60m.45s., eL =65m.20s.
Bogota ePEN =62m.47s., eEN =70m.3s.
La Paz iPZ =63m.59s., iSN =70m.32s., iSSE =73m.55s.
Tamanrasset iPZ =64m.37s.a, eZ =64m.44s.
Tucson eP =66m.0s.
Hungry Horse e =66m.8s., ePcP? =67m.7s.
Pierce Ferry eP =66m.12s., iP =66m.15s.
Huancayo e =66m.27s., eS =70m.45s., eSS =73m.46s., eL =80m.15s.
Boulder City eP =66m.29s.
College iP =67m.52s.
Long waves were recorded at Granada.

Feb. 27d. 10h. Probably same origin as above.

San Juan iP =39m.54s., eS? =43m.45s., eL =44m.42s.
Bermuda e =41m.20s., eL =45m.20s.
La Paz iPZ =43m.27s., iSN =50m.0s., iE =53m.13s.
Tamanrasset ePZ =44m.6s., iZ =44m.14s.a and 46m.12s.k.
Paris eP =44m.8s., i = 44m.14s.
Tucson e =45m.28s., eL? =58m.0s.
Hungry Horse eP =45m.41s.
Pierce Ferry iP =45m.45s.
Boulder City eP =45m.48s.
College eP =47m.19s.
Huancayo eS =50m.13s., eL =53m.18s.
Long waves were recorded at Bogota and Granada.

Feb. 27d. 13h. 35m. 46s. Epicentre 41°·2N. 125°·2W.

A = −·4350, B = −·6166, C = +·6561 ; δ = −11 ; h = −2 ;
D = −·817, E = +·576 ; G = −·378, H = −·536, K = −·755.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale		1·0	132	i 0 21	0	i 0 35	− 1	—	—	—
Shasta Dam		2·2	103	i 0 38	0	—	—	—	—	—
Mineral		2·9	107	i 0 47	− 1	i 1 23	− 1	—	—	—
Berkeley		4·0	145	i 1 3a	− 1	e 1 47	− 5	i 1 9	P*	—
San Francisco		4·0	147	i 1 4	0	i 1 49	− 3	—	—	—
Branner		4·4	147	i 1 8	− 2	i 1 59	− 3	—	—	—
Reno		4·4	110	i 1 10a	0	i 1 59	− 3	i 1 28	Pg	—
Lick	z.	4·7	143	i 1 13	− 1	i 2 4	− 6	i 1 19	P*	—
Fresno	z.	6·1	135	i 1 34	0	—	—	—	—	—
Tinemaha		6·8	125	i 1 55	P*	e 3 16	+13	—	—	—
Santa Barbara	z.	8·0	145	e 2 4	+ 4	—	—	—	—	—
Pasadena		9·0	139	i 2 13k	0	1 3 53	− 5	—	—	—
Riverside		9·5	137	i 2 20k	0	—	—	—	—	—
Boulder City		9·7	119	e 2 23	+ 1	—	—	—	—	—
Logan		10·1	82	e 2 26	− 2	—	—	—	—	e 5·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pierce Ferry		10·1	116	i 2 28	0	—	—	—	—	—
Palomar		10·3	137	i 2 30	− 2	—	—	—	—	—
Hungry Horse		10·7	44	i 2 25	−13	—	—	—	—	—
Tucson		14·6	123	i 3 30	0	—	—	—	—	e 9·4
College		27·0	339	e 5 44	− 1	—	—	—	—	—

Additional readings :—
Berkeley iZ = 1m.6s.k.
Reno iZ = 1m.14s., iE = 1m.24s. and 1m.34s., iN = 1m.45s., iEZ = 1m.52s., iE = 2m.14s.
Lick iN = 2m.8s.
Tinemaha eEN = 1m.58s.
Pasadena i = 2m.20s.
Riverside i = 2m.27s.
Pierce Ferry i = 2m.32s.
Palomar iN = 2m.34s.
Tucson i = 3m.38s.
Long waves were also recorded at Bozeman, Butte, and Ukiah.

Feb. 27d. Readings also at 0h. (Boulder City, Pierce Ferry, Hungry Horse, Stuttgart, Andijan, and near Almata), 1h. (Strasbourg and near Almata), 2h. (Boulder City, Pierce Ferry, Hungry Horse, Ashkabad, near Almata, near Algiers, near Copiapo and Santa Lucia), 4h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Almata, Andijan, Frunse, Kulyab, Murgab, Obi-garm, Stalinabad, Tashkent, and Tchimkent), 5h. (near Bogota and near Ashkabad), 6h. (Pierce Ferry, Tucson, near San Juan, near Basle, Neuchatel, and Zürich), 7h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and near La Paz), 9h. (Santa Lucia and near Murgab), 10h. (near Kulyab, Obi-garm, Stalinabad, and near Alicante), 12h. (Almata, Andijan, Murgab, College, and near Alicante (2)), 13h. (Arcata, College, Almata, Kulyab, Murgab, near Obi-garm, and Stalinabad), 15h. (Strasbourg), 17h. (Santa Lucia and Tacubaya), 18h. (near Granada and near Hungry Horse), 20h. (near Tucson, near Tacubaya, and near Mizusawa), 21h. (Palomar, Pasadena, Riverside, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, College, Almata, and near Mizusawa), 22h. (Palomar, Riverside, Boulder City, Pierce Ferry, Shasta Dam (2), Hungry Horse, Almata, Andijan (2), near Kulyab, Obi-garm, Samarkand, and Stalinabad), 23h. (Kulyab, near Obi-garm and Stalinabad).

Feb. 28d. 0h. 13m. 7s. Epicentre 55°·5S. 29°·0W. (as on 1947, July 24d.).

A = +·4977, B = −·2759, C = −·8223 ; δ = 0 ; h = −7 ;
D = −·485, E = −·875 ; G = −·719, H = +·399, K = −·569.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Punta Arenas	N.	24·3	258	5 24	+ 4	9 53	+16	6 12	PP	11·5
La Plata		28·6	304	5 53	− 7	10 43	− 5	6 17	PP	14·5
Santa Lucia	E.	36·3	290	7 2	− 5	e 12 47	− 1	i 8 17	PP	18·2
	N.	36·3	290	e 7 0	− 7	e 12 41	− 7	i 8 17	PP	18·5
Copiapo	N.	40·9	296	i 7 11	−35	13 51	− 7	18 22	Q	—
La Paz		49·0	308	i 8 51 a	+ 1	i 15 53	− 2	i 10 13	PcP	23·7
Huancayo		56·4	302	i 9 40	− 5	i 17 36	0	i 10 56	PcP	i 23·6
Tananarive		67·0	90	11 13	+16	e 19 52	+ 2	13 31	PP	e 28·8
Bogota		70·4	312	e 11 21	+ 3	e 20 31	+ 1	e 13 52	PP	e 34·9
Fort de France		75·0	328	e 11 13	−32	e 21 33	+10	—	—	—
San Juan		80·0	325	e 12 22	+ 9	i 22 39	+22	e 15 41	PP	e 38·2
Wellington		81·5	198	12 17	− 4	22 29	− 3	23 51	PPS	35·9
Tamanrasset	Z.	83·3	32	i 12 33 k	+ 3	—	—	—	—	—
Auckland	N.	85·8	199	—	—	29 9	SS	—	—	39·9
Riverview	E.	91·0	180	—	—	e 26 14	PPS	—	—	e 37·8
Bermuda		92·7	330	e 17 23	PP	e 24 20	+ 2	e 23 53	SKS	e 37·1
Malaga	Z.	94·1	20	i 13 27 k	+ 5	e 24 52	+21	e 17 30	PP	44·2
Almeria		94·7	21	i 13 29	+ 5	24 39	+ 3	17 19	PP	45·8
Granada		94·8	20	i 13 27 k	+ 2	i 24 47	+11	13 49 a	pP	i 44·9
Tacubaya		95·1	296	e 17 46	PP	e 24 0	[− 2]	—	—	—
Lisbon		95·4	15	13 32 a	+ 4	26 5	PS	31 29	SS	43·9
Algiers		95·9	25	e 17 53	PP	e 25 10?	+24	—	—	e 37·1
Alicante		96·6	22	13 38	+ 5	25 9	+17	17 31	PP	e 47·1
Toledo		97·4	18	e 13 43	+ 6	e 31 45	SS	e 17 32	PP	46·2
Helwan		99·4	50	13 50	+ 4	25 37	+22	17 47	PP	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Columbia		99·6	318	e 18 5	PP	e 24 16	[− 9]	e 27 8	PS	e 40·6
Barcelona		100·1	23	e 18 41	PP	e 25 32	+11	—	—	e 50·6
Philadelphia		102·9	325	e 16 11	?	e 25 41	− 4	e 18 55	PP	e 41·3
Rome		103·2	30	e 18 8	PP	e 24 38	[− 4]	i 27 31	PS	42·6
Fordham		103·3	327	e 17 52	PP	e 24 49	[+ 6]	—	—	54·4
Weston		103·9	329	—	—	e 25 45	− 8	e 33 8	SS	41·9
Clermont-Ferrand		104·5	22	—	—	e 28 11	PS	e 33 26	SS	48·9
Cleveland		106·4	321	e 18 48	PP	i 29 15	PPS	i 33 40	SS	46·6
Triest		107·0	29	e 19 17	PP	e 27 56	PS	e 33 16	SS	e 45·9
Paris		107·2	21	e 17 42	?	e 24 59	[− 1]	e 19 14	PP	e 49·9
St. Louis		107·3	314	e 18 4	PKP	i 25 7	[+ 6]	i 33 41	SS	—
Kodaikanal	E.	107·7	97	—	—	e 28 33	PS	—	—	—
Zagreb		107·8	31	e 18 35	[+ 7]	—	—	—	—	e 54·9
Ottawa		108·0	328	e 18 51	[+22]	e 25 23	[+19]	e 34 5	SS	41·9
Seven Falls	E.	108·1	332	—	—	e 33 53	SS	—	—	44·9
Istanbul		108·1	42	18 52	[+23]	e 26 19	{+27}	—	—	—
Strasbourg		108·2	24	—	—	e 26 46	{+54}	e 28 28	PS	49·9
Belgrade		108·3	35	e 19 4	PP	e 29 33	PPS	e 34 14	SS	e 58·0
Stuttgart		108·7	25	e 18 53	[+23]	e 25 47	{− 9}	e 28 27	PS	e 51·9
Kew		109·3	18	—	—	e 28 41	PS	e 34 48	SS	e 52·9
De Bilt		110·9	21	—	—	e 28 53	PS	e 35 11	SSP	e 49·9
Tucson		111·6	295	e 14 39	P	e 29 0	PS	e 18 38	PKP	e 52·0
Lincoln	E.	111·8	311	—	—	e 27 20	{+62}	—	—	e 49·4
Bombay		112·0	88	e 19 26	PP	i 25 2	[−18]	e 29 2	PS	42·0
Poona	E.	112·3	89	e 19 35	PP	—	—	—	—	—
Potsdam	Z.	113·0	26	—	—	e 29 17	PS	—	—	e 54·4
Yalta		113·0	43	e 19 36	PP	—	—	—	—	—
Leninakan		114·1	52	e 19 14?	PP	—	—	—	—	—
Hyderabad	N.	114·1	93	—	—	29 21	PS	—	—	—
Palomar	Z.	115·6	291	e 18 41	[− 3]	—	—	e 19 46	PP	—
Copenhagen		115·9	24	—	—	26 44	{− 2}	29 41	PS	54·9
Pierce Ferry		116·3	296	e 18 45	[− 1]	—	—	e 19 45	PP	—
Riverside	Z.	116·4	291	i 18 47	[+ 1]	—	—	e 19 58	PP	—
Pasadena		116·9	291	i 18 47	[0]	i 36 23	SSP	i 19 54	PP	e 49·9
Grozny		116·9	52	e 20 5	PP	—	—	—	—	—
Boulder City		117·1	295	i 18 47	[0]	—	—	—	—	—
Bergen	N.	118·7	18	—	—	—	—	(30 13)	PS	30·2
Tinemaha	Z.	119·2	293	i 18 54	[+ 3]	—	—	e 20 22	PP	—
Logan		119·5	301	e 18 53	[+ 1]	—	—	—	—	e 60·0
Upsala		120·8	25	—	—	e 30 20	PS	e 39 53?	?	e 58·4
Lick	Z.	121·2	291	i 18 57	[+ 2]	—	—	—	—	—
Reno	Z.	121·8	294	e 18 59	[+ 3]	—	—	e 20 29	PP	—
Berkeley		121·9	291	i 18 57k	[+ 1]	—	—	—	—	e 65·6
Bozeman		122·1	305	e 20 32	PP	—	—	—	—	e 54·3
Calcutta	E.	123·7	99	e 21 17	?	e 31 15	PPS	—	—	—
Mineral	Z.	123·7	293	i 19 0	[0]	—	—	—	—	—
Shasta Dam		124·0	294	i 19 1	[0]	—	—	—	—	—
Stalinabad		124·8	71	e 19 6	[+ 4]	—	—	—	—	—
Obi-garm		125·4	71	i 19 10	[+ 7]	—	—	—	—	—
Hungry Horse		125·4	305	e 19 0	[− 3]	i 25 56	[−11]	i 28 44	SKKS	—
Scoresby Sund		125·8	2	—	—	28 56	{+63}	—	—	58·9
Tashkent		127·1	68	i 19 11	[+ 5]	e 22 58	PKS	i 21 12	PP	—
Tchimkent		127·9	68	19 10	[+ 2]	—	—	—	—	—
Andijan		128·3	72	e 19 13	[+ 4]	—	—	—	—	—
Frunse		131·0	71	e 22 46	PKS	—	—	—	—	—
Sverdlovsk		133·2	48	i 19 20	[+ 2]	i 22 52	PKS	i 21 46	PP	—
College		149·4	313	i 19 45	[− 1]	30 24	{+ 9}	e 23 57	PP	e 67·3
Vladivostok		162·5	127	e 19 50	[−13]	—	—	—	—	—

Additional readings :—
Punta Arenas N = 8m.6s.
La Plata PPN = 6m.29s., PPPE = 6m.34s., PPPN = 6m.58s., N = 7m.49s., P_cPN = 8m.25s., SSN = 11m.35s., SSE = 12m.0s., QE = 13m.27s.
Santa Lucia E = 7m.19s., N = 7m.53s.?, 9m.14s., and 15m.25s.
Copiapo eN = 13m.41s.

Continued on next page.

La Paz i =9m.9s., iPPZ =10m.53s., iSSN =19m.17s.
Huancayo i =12m.35s., ePPP =13m.3s., eSS =21m.36s.
Tananarive PS =20m.13s., S_cS =21m.15s., SS =24m.16s.
Bogota eS_cS =21m.56s.
San Juan e =22m.11s., eSS? =27m.15s., eSSS =31m.51s.
Wellington i =26m.35s., SS =27m.53s.
Tamanrasset iZ =12m.42s.k, eZ =13m.27s.
Bermuda ePS? =26m.3s., e =26m.43s.
Malaga sSZ =25m.46s., PSZ =26m.32s.
Almeria PPP =19m.31s., SKS =23m.57s., PS =26m.7s., SS =31m.23s., SSS =35m.11s.
Granada PP =17m.10s., PPP =19m.58s., PS =25m.58s., iSS =31m.25s., SSS =35m.58s.
Lisbon EN =26m.41s.
Algiers e =20m.16s.
Alicante PS =26m.38s., SSP =31m.44s.
Helwan PSN =26m.20s., eE =27m.1s.
Columbia eSS =32m.5s.
Philadelphia ePS =27m.32s., eSP =28m.2s., eSS =32m.51s.
Rome iSS?EN =32m.44s., eEN =33m.17s.
Fordham eZ =18m.9s., eN =26m.34s.
Cleveland eN =10m.22s. and 24m.11s., iN =33m.48s.
Triest ePPP =21m.46s., ePPS =29m.2s., eSSS =38m.0s.
Paris ePPS =29m.19s., eSS =34m.4s. and 34m.10s.
St. Louis eZ =18m.30s.
Strasbourg ePPS =29m.23s., e =31m.11s., 34m.33s., 41m.16s., 41m.36s., and 42m.26s.
Belgrade e =20m.26s.
Stuttgart ePPS =29m.25s., eSS =34m.29s.
Kew eZ =29m.33s., e =29m.46s., and 38m.31s., eQEN =49·9m.
Tucson iPP =19m.16s., e =19m.47s., ePSPS =35m.14s.
Potsdam iZ =29m.25s.a.
Copenhagen SS =35m.53s.?
Reno eEN =19m.17s., iZ =19m.23s., eE =20m.10s., ePPN =20m.38s., iE =21m.43s.
Hungry Horse iPKP =19m.15s.
Tashkent eSS =37m.53s.
Sverdlovsk iSS =39m.28s., iSSS =44m.41s.
College e =19m.55s. and 24m.25s., ePPS =36m.44s.
Long waves were also recorded at Arapuni, Chicago, Butte, Salt Lake City, Sitka, Ivigtut, Aberdeen, Basle, and Tortosa.

Feb. 28d. 4h. Near Samoa. Surface reflexions suggest focal depth 0·040.

Apia iP =1m.6s., iSEN =1m.48s., eN =15m.12s. and 20m.6s.
Pasadena iPZ =11m.13s., iZ =12m.14s.
Palomar iPZ =11m.16s.
Riverside ePZ =11m.16s.
Shasta Dam iP =11m.19s., ipP =12m.28s.
Tinemaha iPZ =11m.23s.
Boulder City iP =11m.32s.
Pierce Ferry iP =11m.36s.
Tucson iP =11m.39s., epP =12m.39s.
College iP =12m.4s., ipP =13m.4s.
Hungry Horse iP =12m.8s., esP =13m.44s.
Stuttgart eZ =19m.20s., iZ =19m.23s.a, eZ =20m.28s.
Zürich eZ =19m.22s.
Strasbourg iPKP =19m.24s., e =19m.53s., epPKP =20m.23s.
Paris iPKP =19m.24s., ipPKP =20m.28s., e? =46m.56s., e =59m.
Salo eZ =19m.25s.
Basle eZ =19m.26s.
Clermont-Ferrand iPKP =19m.31s., epPKP =20m.41s.

Feb. 28d. Readings also at 0h. (near Ashkabad (2)), 2h. (near Tacubaya), 3h. (near Santa Lucia and near Andijan), 4h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 5h. (Apia and Santa Lucia), 8h. (Huancayo and near La Paz), 9h. (Tucson, Boulder City, Pierce Ferry, and Hungry Horse), 11h. (Punta Arenas, Tamanrasset, La Paz, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 13h. (near Tacubaya), 14h. (Andijan, Frunse, near Almata, and near Hungry Horse), 15h. (Raciborzu, Stuttgart, and near Andijan), 16h. (near Andijan), 17h. (near Tacubaya (2)).

March 1d. Readings at 0h. (Pierce Ferry), 2h. (Apia, College, Andijan, near Kulyab, Obi-garm, and Stalinabad), 3h. (Andijan, Tucson, Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse), 4h. (near Andijan), 6h. (near College), 7h. (near Obi-garm), 8h. (Paris), 9h. (Andijan, Hungry Horse, and near Ashkabad), 10h. (College), 11h. (Pierce Ferry, Hungry Horse, Kulyab, and near Obi-garm), 12h. (Stuttgart and near Alicante (2)), 14h. (Boulder City, Pierce Ferry, Hungry Horse, La Paz, and near Copiapo), 15h. (Kulyab, near Andijan, Murgab, and Obi-garm), 16h. (Hungry Horse), 19h. (near Ashkabad, Pierce Ferry, Hungry Horse, and near Tucson), 20h. (Calcutta, Poona, Hungry Horse (2), College, Vladivostok, Sverdlovsk, Andijan (2), Frunse, Kulyab, Murgab, Obi-garm (2), Stalinabad (2), Tashkent, near Almata, and near Ashkabad), 21h. and 23h. (near Ashkabad).

March 2d. 0h. Near Apia. Strasbourg suggests an epicentre in the region of 15°S., 171°W.

Apia eP =3m.49s., S =4m.12s., eE =12m.54s.
Tinemaha eZ =14m.49s.
Boulder City eP =15m.0s., i =15m.11s.
Hungry Horse eP =15m.28s., i =15m.48s.
College e =15m.38s. and 15m.50s.
Shasta Dam eP =16m.44s.
Paris e =22m.58s., i =23m.9s.
Strasbourg e =23m.10s., 23m.16s., 23m.25s., and 23m.32s.
Stuttgart eZ =23m.10s.
Clermont-Ferrand e =23m.11s.
Alicante e =25m.26s.
Long waves were recorded at Wellington.

March 2d. 6h. 54m. 30s. Epicentre 72°·0N. 2°·2W.

$A = +\cdot3107$, $B = -\cdot0119$, $C = +\cdot9504$; $\delta = -6$; $h = -12$;
$D = -\cdot038$, $E = -\cdot999$; $G = +\cdot950$, $H = -\cdot036$, $K = -\cdot311$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		6·5	266	1 42	+ 3	2 53	− 2	—	—	—
Reykjavik	N.	10·7	233	e 2 35	− 3	—	—	—	—	e 5·5
Bergen		12·0	162	e 2 59	+ 4	5 12	+ 1	—	—	5·9
Upsala		14·5	137	e 3 30?	+ 2	—	—	—	—	e 6·5
Aberdeen	E.	14·9	180	i 3 48	PP	i 6 14	− 6	—	—	7·2
Copenhagen		17·5	152	e 4 3	− 4	e 7 30	+ 9	—	—	9·5
De Bilt		20·2	166	i 4 38a	− 1	e 8 18	− 3	—	—	e 9·5
Kew		20·6	176	e 4 44	+ 1	e 8 28	− 1	e 5 8	PP	e 9·5
Potsdam		20·8	153	i 4 44a	− 1	i 8 34	+ 1	i 5 7	PP	e 10·0
Jena		22·0	155	e 4 55	− 3	e 9 2	+ 6	e 5 25	PP	e 11·5
Jersey	E.	22·9	181	e 5 10	+ 4	e 9 20	+ 7	—	—	e 11·5
Cheb		23·0	155	e 5 5	− 2	e 9 27	+13	—	—	—
Moscow		23·2	113	5 9	0	e 9 23	+ 5	—	—	—
Prague		23·2	151	e 5 4	− 5	e 9 28	+10	e 5 50	PPP	e 10·8
Paris		23·4	172	i 5 10	− 1	e 9 20	− 1	i 5 43	PP	e 11·5
Raciborzu		23·9	146	e 5 14	− 2	—	—	e 5 17	P	—
Strasbourg		23·9	163	i 5 16a	0	e 9 36	+ 6	e 5 47	PP	e 11·0
Stuttgart		23·9	160	i 5 14a	− 2	e 9 25	− 5	i 5 57k	PPP	e 12·5
Basle		25·0	164	e 5 25	− 2	e 9 45	− 4	—	—	—
Skalnate Pleso		25·1	142	e 5 26	− 2	e 10 2	+11	—	—	—
Zürich		25·2	163	e 5 28a	− 1	e 10 5	+13	e 5 49	PP	e 13·2
Clermont-Ferrand		26·4	171	i 5 41	+ 1	i 10 15	+ 3	i 6 29	PP	13·0
Triest		27·5	155	i 6 1	+11	i 11 29	SS	—	—	—
Belgrade		29·3	145	e 6 0	− 6	e 11 18	+19	e 6 49	PP	e 16·6
Sverdlovsk		29·3	87	i 6 7	+ 1	i 11 5	+ 6	e 7 27	PPP	e 13·4
Rome		31·0	158	—	—	e 11 30	+ 4	i 13 34	SSS	—
Toledo		32·2	182	i 6 28	− 4	e 13 7	SS	—	—	18·0
Yalta		32·6	128	i 6 33	− 2	11 52	+ 1	—	—	—
Lisbon		33·5	189	6 42a	− 1	—	—	12 54	Q	15·0
Alicante		33·7	178	e 6 48	+ 3	i 12 10	+ 2	7 34	pP	e 16·0
Istanbul		34·6	136	6 51	− 2	—	—	e 7 35	?	—
Sotchi		34·8	121	e 8 32	PPP	—	—	—	—	—
Almeria		35·2	181	i 7 6	+ 8	i 12 46	+15	8 32	PPP	18·8
Malaga	Z.	35·4	183	i 7 0k	0	i 12 32	− 2	8 30	PP	17·8
Grozny		36·7	115	e 7 8	− 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tiflis		37·9	117	i 7 21	+ 1	i 13 21	+ 8	i 8 44	PP	—
Leninakan		38·5	119	e 7 4?	−22	—	—	—	—	—
College		41·4	339	e 7 52	+ 2	e 14 2	− 3	e 9 31	PP	e 26·0
Ottawa		42·6	273	e 7 59	0	—	—	—	—	22·5
Ksara		43·1	132	1 30?	?	—	—	—	—	—
Saskatoon		45·5	304	—	—	(16 30?)	?	—	—	16·5
Tashkent		45·6	92	i 8 23	− 1	e 15 7	+ 1	e 10 8	PP	—
Frunse		45·8	86	e 8 27	+ 2	—	—	—	—	—
Helwan		45·9	138	8 36	+10	15 8	− 3	10 15	PP	—
Irkutsk		45·9	56	e 8 26?	0	—	—	—	—	—
Samarkand		46·4	96	e 8 30	− 1	—	—	—	—	—
Andijan		47·1	90	e 8 37	+ 2	—	—	—	—	—
Cleveland		47·9	276	e 8 43	+ 1	e 15 48	+ 9	e 19 37	SS	22·4
Obi-garm		48·1	93	i 8 38?	− 5	i 15 42?	0	—	—	—
Stalinabad		48·1	94	8 43	0	15 46	+ 4	—	—	—
Kulyab		48·9	94	e 8 52	+ 2	e 16 0	+ 7	—	—	—
Murgab		49·8	89	e 8 59	+ 3	16 12	+ 6	—	—	—
Tamanrasset	Z.	50·0	170	e 8 52	− 6	e 15 28	−41	e 10 47	PP	—
Hungry Horse		50·9	307	i 9 4	− 1	—	—	—	—	—
St. Louis		53·2	283	e 8 55	−27	i 16 56	+ 4	—	—	e 28·0
Logan		56·5	303	e 9 44	− 2	e 17 43	+ 6	—	—	e 32·5
Shasta Dam		60·1	311	i 10 10	− 1	—	—	—	—	—
Pierce Ferry		62·3	302	e 10 27	+ 1	—	—	—	—	—
Tinemaha	Z.	62·6	306	i 10 30	+ 2	—	—	—	—	—
Boulder City		62·7	303	i 10 29	0	—	—	—	—	—
Tucson		65·1	298	i 10 46	+ 1	e 19 34	+ 7	e 13 19	PP	e 34·8
Riverside	Z.	65·2	305	e 10 47	+ 2	—	—	e 10 59	?	—
Pasadena	Z.	65·3	305	i 10 46	0	—	—	i 10 55	?	—
Bombay	E.	67·5	98	—	—	e 19 57	+ 1	—	—	—
Bogota		80·1	254	e 12 22	+ 9	e 22 19	+ 1	e 23 12	PS	—
La Paz	N.	98·4	242	e 13 50	+ 9	—	—	—	—	—

Additional readings :—
Copenhagen 4m.44s. and 9m.10s.
Kew ePPPZ = 5m.23s., eSSNZ = 8m.40s.
Potsdam iZ = 4m.47s.k, iE = 4m.55s., iPPPZ = 5m.14s.a, iNZ = 5m.33s.?, iZ = 6m.47s., iSZ = 8m.41s., iN = 8m.51s.
Jena ePZ = 4m.58s., eN = 5m.35s.
Paris i = 5m.17s. and 5m.30s., iPP = 5m.39s., e = 6m.29s. and 8m.7s., eS = 9m.24s., e = 9m.54s., eSS = 10m.5s.
Strasbourg e = 5m.38s., eP_cP? = 8m.48s., eS? = 9m.24s., e = 9m.53s., eSS = 10m.20s.
Stuttgart iZ = 5m.22s.k, i = 9m.40s., eSS = 10m.54s.
Clermont-Ferrand iSS? = 11m.45s., iSSS? = 12m.4s.
Belgrade e = 9m.11s.
Toledo e = 8m.17s. and 17m.3s.
Alicante PP = 8m.11s., PPP = 8m.30s., P_cP = 9m.34s., P_cS = 13m.26s., SS = 14m.8s.
Almeria PPP = 8m.58s., P_cP = 9m.34s., P_cS = 13m.18s., SSS = 15m.38s.
Malaga P_cPZ = 9m.32s., S_cPZ = 13m.12s.
Tiflis eSS = 15m.54s.?
Tashkent eS_cS = 18m.13s., eSSS = 20m.0s.
Helwan iZ = 9m.20s.
Cleveland iPZ = 8m.46s.
Tamanrasset iZ = 9m.0s.k and 9m.10s.k.
Tucson e = 15m.0s.
Bogota e = 13m.47s.
Long waves were also recorded at Ivigtut and at other North American stations.

March 2d. 19h. Mexico.

Puebla P = 10m.44s., L = 11m.44s.
Tacubaya P = 10m.52s., L = 12m.1s.
Tucson iP = 14m.12s., ePP = 15m.0s., e = 17m.42s., eL = 21m.3s.
St. Louis eP = 14m.27s., iS = 18m.49s.
Pasadena iP?Z = 14m.31s.
Tinemaha iPZ = 14m.45s.
Pierce Ferry iP = 14m.56s.
Boulder City iP = 14m.59s.
Hungry Horse iP = 16m.21s.
College e = 19m.24s., eL = 39m.10s.
Long waves were also recorded at Victoria, Seattle, Sitka, Salt Lake City, and Bozeman,

March 2d. Readings also at 0h. (Klyuchi), 2h. (La Paz, Copiapo, Santa Lucia, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Riverside, and Tinemaha), 3h. (Boulder City, Hungry Horse, Pierce Ferry, San Juan, and near Klyuchi), 4h. (Pierce Ferry and Stuttgart), 7h. (Tamanrasset and Ksara), 8h. (Frunse, Tchimkent, near Murgab, Andijan, Kulyab, Stalinabad, Obi-garm, Almata, and Tashkent), 9h. (La Paz), 11h. (Boulder City and Pierce Ferry), 15h. (near Poona), 18h. (near Stalinabad and Samarkand), 20h. (La Paz, Santa Lucia, Boulder City, Hungry Horse, and Pierce Ferry), 21h. (Hungry Horse), 22h. (near Alicante, Granada, Malaga, Lisbon, Almeria, and Toledo), 23h. (near Murgab).

March 3d. 4h. Undetermined shock.

Nanking P =40m.28s., S =42m.6s.
Batavia eP =46m.46s., iSEN =51m.9s.
Poona eE =47m.24s. and 49m.33s., iE =51m.45s. and 56m.15s.
Bombay eEN =47m.30s. and 55m.2s.
College iP? =48m.22s.
Stuttgart eZ =50m.32s. and 51m.16s.
Shasta Dam iP =50m.34s., i =51m.21s.
Hungry Horse iP =50m.36s., i =51m.24s., eS =60m.47s., e =61m.10s.
Reno iPZ =50m.47s.a.
Tinemaha iPZ =50m.59s.
Pasadena iPZ =51m.6s.
Riverside iPZ =51m.8s.
Boulder City iP =51m.11s., e =52m.53s. and 53m.36s.
Pierce Ferry iP =51m.12s.
Palomar ePNZ =51m.12s.
Tucson eP =51m.34s.
Tamanrasset Z =56m.35s., eZ =57m.0s.
Long waves were recorded at De Bilt.

March 3d. 12h. 6m. 57s. Epicentre 46°·5N. 13°·0E. (as on February 3d.).

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Triest	1·0	149	e 0 21	0	i 0 40	+ 4
Padova	1·4	216	0 32	+ 5	0 37	− 9
Salo	2·0	242	e 0 35	0	1 3	+ 1
Zagreb	2·2	108	e 0 47	P_g	e 1 20	S_g
Chur	2·4	279	e 0 52	P_g	e 1 41	?
Florence	3·0	204	e 0 37	−13	i 0 47	P
Zürich	3·1	286	1 7	P_g	2 15	?
Stuttgart	3·5	312	e 1 43?	S	(i 1 43?)	+ 3
Basle	3·8	285	e 1 17	P_g	e 2 35	?

Additional readings :—
Florence i =42s.
Zürich eP_g? =1m.17s.
Stuttgart e =2m.4s. and 2m.38s., eS_g?Z =2m.43s. and 2m.47s., e =2m.57s.

March 3d. Readings also at 0h. (Pierce Ferry, Hungry Horse, and near Andijan), 2h. (Lincoln and near Tacubaya), 3h. (Alicante and De Bilt), 4h. (near Andijan, Kulyab, Murgab, Obi-garm, Stalinabad, and Tashkent), 5h. (Hungry Horse, Tucson, and La Paz), 6h. (Ottawa, Pasadena, Palomar, Riverside, Tucson (2), Boulder City, Pierce Ferry (2), Shasta Dam (2), Hungry Horse (2), College, La Paz, near Huancayo, Stuttgart, Bombay, Almata, Andijan, Ashkabad, Kulyab, Murgab, Obi-garm, Stalinabad, Tashkent, and Sverdlovsk), 7h. (Grozny, Obi-garm, Stalinabad, Andijan, near Ashkabad, Bogota, and near Fort de France), 8h. (Tashkent, Tchimkent, near Obi-garm, Samarkand, Stalinabad, and near Ashkabad), 9h. (Ashkabad, Almata, Andijan, Murgab, Obi-garm, Samarkand, Stalinabad, and Tashkent), 10h. (Ashkabad and Dehra Dun), 11h. (Ashkabad), 12h. (Auckland, Wellington, Boulder City, Pierce Ferry, near Prato, and Florence), 13h. (Almata, Andijan, Murgab, Tchimkent, and near Fort de France), 14h. (Ashkabad, Pierce Ferry, Auckland, and Wellington), 15h. (Auckland, Wellington, near La Paz, and near Ashkabad), 18h. (Ashkabad), 19h. (Almata, Murgab, Sverdlovsk, near Andijan (2), Obi-garm (2), and near Stalinabad), 20h. (Wellington and near Tucson), 22h. (Pierce Ferry).

March 4d. 1h. 16m. 55s. Epicentre 3°·8S. 102°·2E.

Suggested depth 100-150km.

$A = -\cdot2109$, $B = +\cdot9753$, $C = -\cdot0658$; $\delta = +2$; $h = +7$;
$D = +\cdot977$, $E = +\cdot211$; $G = +\cdot014$, $H = -\cdot064$, $K = -\cdot998$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		5·2	117	i 1 24 a	+ 3	i 2 19	− 3	—	—	—
Colombo	E.	24·7	295	5 25	+ 1	9 45	+ 1	—	—	12·9
Kodaikanal	E.	28·3	300	i 6 4	+ 7	i 10 57	+14	i 6 34	PP	13·9
Calcutta	E.	29·5	333	e 6 9	+ 1	i 10 45	−17	11 55	SS	—
Perth		30·8	157	i 8 25	?	i 12 57	SS	—	—	i 14·4
Poona		35·7	310	i 7 1	− 1	i 12 37	− 2	i 8 28	PP	20·9
Bombay		36·7	309	e 7 13	+ 3	i 12 59	+ 5	e 9 38	?	—
Murgab		49·4	331	8 54	+ 1	16 0	0	—	—	—
Obi-garm		51·9	328	i 9 4	− 8	i 16 23	−12	—	—	—
Almata		52·1	337	i 9 16	+ 2	e 16 39	+ 1	—	—	—
Andijan		52·1	331	i 9 15	+ 1	16 42	+ 4	i 9 29	pP	—
Stalinabad		52·3	327	i 9 14	− 1	i 16 35	− 5	i 9 30	pP	—
Frunse		52·8	334	e 9 21	+ 2	e 16 50	+ 3	—	—	—
Brisbane		53·8	122	i 9 25	− 1	i 16 53	− 8	i 9 37	pP	—
Vladivostok		53·9	27	9 29	+ 2	17 5	+ 3	i 12 41	PPP	—
Samarkand		54·0	326	i 9 27	− 1	i 16 56?	− 7	—	—	—
Tashkent		54·0	330	i 9 28	0	i 17 3	0	e 11 19?	PP	—
Riverview		54·4	130	e 9 25	− 6	i 17 6	− 3	i 9 54	pP	e 25·6
Tananarive		55·4	249	—	—	(16 17)	−65	—	—	16·3
Mizusawa	E.	55·8	37	9 43	+ 2	17 34	+ 6	—	—	—
Irkutsk		55·9	1	i 9 45	+ 3	17 35	+ 6	10 41	P_cP	—
Erevan		68·5	316	e 11 9	+ 3	20 15	+ 7	—	—	—
Tiflis		69·0	317	i 11 8	− 1	i 20 8	− 6	—	—	—
Grozny		69·1	319	11 9	− 1	20 11	− 4	i 11 41	P_cP	—
Leninakan		69·2	316	i 11 11?	+ 1	e 20 18?	+ 2	—	—	—
Sverdlovsk		69·2	337	i 11 10	0	i 20 14	− 2	i 11 27	P_cP	—
Piatigorsk		71·1	319	11 22	0	20 34	− 4	—	—	—
Ksara		72·7	306	e 11 34	+ 2	e 20 57	0	—	—	—
Sotchi		73·2	318	e 11 30	− 5	20 55	− 7	e 12 14	P_cP	—
Auckland	N.	73·8	127	—	—	21 9	0	—	—	45·1
Wellington		74·4	132	11 37	− 5	21 3	−13	11 52	pP	38·1
Arapuni	E.	74·6	129	—	—	21 53	PS	—	—	36·1
Helwan		75·4	302	i 11 44	− 3	i 21 25	− 2	14 35	PP	—
Tuai	N.	75·9	130	12 4	+14	e 21 23	− 9	—	—	—
Yalta		77·2	317	i 11 57	0	—	—	i 14 49	PP	—
Simferopol		77·4	318	e 12 3	+ 5	—	—	—	—	—
Moscow		79·2	328	i 12 5	− 3	i 22 2	− 6	12 18	pP	—
Istanbul		79·9	313	i 12 10	− 2	—	—	e 16 1	PP	—
Bucharest		82·8	316	e 12 32	+ 5	e 22 43	− 2	e 16 7	PP	—
Belgrade		86·8	315	i 12 48 k	+ 1	e 23 23	− 2	e 29 12	SS	e 66·1
Skalnate Pleso		87·6	320	e 16 41	PP	e 23 25	− 7	—	—	—
Budapest	N.	88·1	317	12 53	− 1	23 37	0	—	—	e 52·6
Kalossa	N.	88·1	317	e 12 51	− 3	e 23 37	0	—	—	—
Ogyalla		88·8	318	e 13 0	+ 3	e 23 46	+ 2	—	—	—
Raciborzu		89·0	321	e 13 0	+ 2	e 23 46	+ 1	e 16 32	PP	—
Zagreb		90·1	315	e 13 4	+ 1	e 23 52	− 3	—	—	—
Upsala		90·5	329	e 13 28?	+23	i 23 55	− 4	i 23 32	SKS	e 45·1
Prague		91·4	320	e 12 51	−18	e 23 36	[− 5]	e 24 2	S	e 39·5
Triest		91·6	315	e 13 10	0	e 23 55	−14	e 17 0	PP	—
Rome		92·3	312	i 13 16	+ 3	e 24 19	+ 4	e 23 51?	SKS	—
Collmberg		92·4	320	e 13 14	0	e 23 42	[− 5]	e 24 3	ScS	e 54·1
Potsdam		92·4	322	e 13 14	0	e 24 3	−13	e 16 35	PP	e 48·1
Cheb		92·8	320	e 17 0	PP	e 23 44	[− 5]	e 24 1	SKKS	e 39·6
Padova		92·9	314	13 22	+ 6	e 23 44	[− 6]	e 25 0	PS	—
Copenhagen		93·0	325	e 13 15	− 2	e 23 45	[− 5]	25 45	PS	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Bologna		93·3	314	e 13 19	+ 1	e 23 52	[0]	e 17 2	PP		—
Jena		93·4	320	e 13 17	− 1	e 23 47	[− 5]	e 25 50	PS		—
Salo		93·9	315	e 13 20a	− 1	i 24 25	− 4	e 23 50	SKS		—
Stuttgart		94·8	318	e 13 24a	− 1	e 24 5	[+ 5]	e 17 15	PP		55·1
Strasbourg		95·8	318	e 13 29	0	i 24 47	+ 2	e 17 13	PP		47·1
Bergen		96·7	330	—	—	e 24 49	− 4	e 26 24	PS		45·3
De Bilt		97·3	322	e 13 25	−11	e 24 5	[− 8]	e 26 35	PS		e 45·1
Tamanrasset	z.	97·6	293	i 13 38k	0	e 24 50	−10	i 17 29k	PP		—
Clermont-Ferrand		99·1	316	e 13 47	+ 3	i 24 48	{ 0}	e 18 0	PP		47·6
Paris		99·2	318	e 13 44	− 1	e 26 59	PS	e 17 48	PP		e 55·1
Kew		100·8	321	e 13 12	−40	e 24 46	[+15]	e 18 4	PP		e 55·1
Aberdeen	E.	100·9	327	—	—	i 24 27	[− 4]	i 26 54	PS		e 57·2
Jersey	E.	102·2	319	e 13 34	−24	e 25 5?	{− 5}	—	—		—
Alicante		102·3	308	14 34	+35	24 26	[−12]	18 36	PP		e 52·4
Rathfarnham Castle		104·0	324	e 14 0	− 6	26 6	+12	—	—		—
Almeria		104·0	307	e 14 23	+17	26 11	+17	18 47	PP		58·0
Scoresby Sund		104·5	343	—	—	24 48	[0]	27 56	PS		—
Granada		104·9	307	e 14 9k	− 1	i 25 50	−11	32 39	SS		i 56·5
Toledo		104·9	310	e 19 28	PP	—	—	e 20 48	PPP		e 68·5
Shasta Dam		125·7	41	i 19 3	[− 1]	—	—	—	—		—
Hungry Horse		125·9	28	i 19 3	[− 1]	i 22 0	PKS	—	—		—
Tinemaha	z.	130·3	43	i 19 6	[− 7]	i 22 35	SKP	—	—		—
Logan		131·5	34	e 19 14	[− 1]	e 25 55	[−29]	i 22 37	PKS		—
Pasadena		131·9	45	i 19 17	[+ 1]	22 39	SKP	i 19 34	pPKP		e 39·1
Salt Lake City		132·1	34	e 19 22	[+ 6]	e 22 28	SKP	e 21 37	PP		e 66·8
Riverside	z.	132·5	45	i 19 18	[+ 1]	i 22 42	SKP	i 19 35	pPKP		—
Boulder City		133·2	42	e 19 19	[+ 1]	e 22 45	SKP	e 21 45	PP		—
Palomar		133·2	46	e 19 31	[+13]	—	—	—	—		—
Pierce Ferry		133·7	40	i 19 20	[+ 1]	i 22 46	PKS	—	—		—
Tucson		138·1	43	e 19 21	[− 6]	i 23 1	PKS	i 20 8	pPKP		e 84·6
Weston		141·2	352	i 19 33	[0]	e 41 51	SSP	e 22 42	PP		—
Cleveland		142·3	4	e 19 33	[− 2]	e 33 21	PS	e 42 21	SS		64·2
St. Louis		143·5	16	i 19 35	[− 2]	e 29 41	{ 0}	i 22 44	PP		—
Bermuda		149·0	338	e 31 27	?	e 34 35	PS	e 43 5	SS		e 63·2
Tacubaya		154·0	51	e 20 17	[+24]	i 49 45	SSS	—	—		—
La Paz		157·7	206	i 19 59a	[+ 1]	26 29	[−33]	i 20 17	pPKP		74·1
Bogota		176·2	—	e 20 12	[0]	e 26 11	[−62]	—	—		—

Additional readings :—
Kodaikanal SSE =12m.1s.
Calcutta iE =11m.33s.
Poona isPEN =8m.45s., iPPEN =9m.4s., iP_cPEN =9m.45s., QEN =17m.30s.
Vladivostok iPS =17m.27s., iS_cS =19m.37s.
Tashkent ePS =17m.21s., eS_cS =19m.11s., eSS =21m.5s.
Riverview iZ =9m.41s., iE =17m.26s., eE =17m.47s., eZ =20m.29s., and 21m.41s.
Irkutsk ePP =11m.47s., PS =17m.51s.
Sverdlovsk iPP =13m.45s., iPP =15m.30s., iS_cS =21m.4s., SSS =28m.11s.
Wellington PP?Z =13m.49s., PS?Z =22m.27s., SSS =29m.11s., Q =31·1m.
Helwan eZ =12m.34s. and 13m.15s., PSN =22m.5s.
Moscow sS =22m.27s.
Bucharest eE =13m.19s., eS?E =22m.26s., eE =22m.35s., eS?N =22m.40s., eE = 22m.54s.
Budapest SE =23m.45s.
Kalossa eE =12m.55s. and 23m.20s.
Raciborzu eEN =13m.16s., eSKS?EN =23m.28s., eN =24m.21s., and 27m.20s.
Zagreb eZ =26m.46s.
Upsala epS?E =24m.21s., pPSN =25m.33s., eSSE =30m.5s.?, eSSSE =34m.5s.?, eSSSN =34m.25s.
Prague e =14m.7s. and 14m.24s., ePP =16m.25s., eS =24m.23s., ePS =25m.5s., eSS = 30m.23s., eSSS =35m.5s.
Triest iSKKS =24m.30s., ePS =25m.18s.?, eSS =30m.18s.?
Rome iSKKSN =24m.11s., ePSE =25m.21s., eSSN =30m.11s., eN =36m.50s.
Collmberg eZ =13m.28s., eN =24m.8s.
Potsdam ePE =13m.17s., iPPZ =16m.58s.a, eSN =24m.18s., iE =24m.37s., iPSZ = 25m.38s.
Cheb e =23m.54s., eSS =30m.35s., eSSS =35m.17s.
Copenhagen 24m.8s., i =24m.45s., 31m.6s.
Bologna e =24m.14s.
Jena ePN =13m.20s.

Continued on next page.

Stuttgart e=13m.29s.k, eZ=13m.37s., eS?=24m.59s., eSP=25m.59s., e=27m.53s., eSS=30m.59s., eQ=52·1m.
Strasbourg i=13m.43s., e=14m.48s. and 15m.40s., ePP=17m.17s., epPP?=18m.11s., ePPP=19m.21s., e=22m.25s., eSKS?=24m.5s., ePS=26m.10s. and 26m.14s., e=26m.25s., ePPS=26m.53s., e=28m.37s., 30m.32s., and 30m.36s., eSS?=31m.12s. and 31m.27s., eSSS?=35m.42s., eQ=40·6m.
Bergen eN=25m.43s.
Tamanrasset iZ=13m.49s.k, eSSZ=30m.58s.
Clermont-Ferrand e=18m.52s., iSKS?=23m.32s., ePPS=27m.5s., eSS?=32m.5s.
Paris e?=13m.18s.?, ipPP?=18m.19s., e=23m.59s., eSS=32m.5s.?
Kew ePPSEZ=27m.10s., eE=40m.34s., eQEN=48·1m.
Alicante S=25m.42s.
Almeria PPP=21m.3s., SKS=24m.59s., PPS=28m.55s., SS=33m.47s.
Scoresby Sund 33m.41s.
Tinemaha iZ=19m.36s. and 23m.0s.
Logan i=22m.56s., ePS=31m.59s.
Tucson iPKP=19m.29s., e=24m.44s.
Cleveland iZ=22m.38s. and 23m.37s., epPSE=36m.33s., eN=41m.23s. and 43m.5s.
St. Louis iPKP$_2$=19m.46s., i=21m.8s., 23m.11s., and 30m.0s.
La Paz PKP$_2$=20m.37s., iPPZ=24m.17s., iE=39m.29s., SSE=43m.37s., SSN=44m.23s.
Long waves were also recorded at Punta Arenas, Santa Lucia, San Juan, Ivigtut, and other North American Stations.

March 4d. 8h. 19m. 5s. Epicentre 18°·5S. 169°·1E. (as on 1946, Oct. 15d.).

$A=-·9319$, $B=+·1795$, $C=-·3154$; $\delta=+14$; $h=+5$;
$D=+·189$, $E=+·982$; $G=+·310$, $H=-·060$, $K=-·949$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		17·3	236	e 4 7	+ 3	i 7 28	+12	—	—	—
Auckland	N.	19·0	164	e 3 55?	−31	—	—	—	—	—
Tuai	N.	21·4	163	4 52	+ 1	8 41	− 4	—	—	—
Riverview		22·1	222	—	—	i 8 58	0	—	—	e 10·5
Wellington		23·2	170	5 4	− 5	9 10	− 8	—	—	—
Shasta Dam		86·6	45	i 12 47	+ 1	—	—	—	—	—
Pasadena	z.	86·7	53	i 12 47k	0	—	—	—	—	—
Riverside	z.	87·2	54	i 12 50k	+ 1	—	—	—	—	—
Palomar		87·4	54	i 12 52	+ 2	—	—	—	—	—
Tinemaha	z.	87·9	51	i 12 54	+ 1	—	—	—	—	—
Boulder City		89·3	52	i 13 2	+ 3	—	—	—	—	—
Pierce Ferry		90·6	52	i 13 5	0	—	—	—	—	—
Tucson		91·6	57	i 13 11	+ 1	—	—	—	—	—
Hungry Horse		95·2	41	e 13 25	− 2	—	—	—	—	—
La Paz	E.	113·8	118	e 18 47	[+ 6]	—	—	—	—	—
Zagreb		144·8	327	e 19 39a	[0]	—	—	—	—	—
Stuttgart	z.	145·7	336	e 19 40	[0]	—	—	—	—	—
Strasbourg		146·4	338	e 19 41	[− 1]	—	—	—	—	—
Paris		147·9	343	i 19 48	[+ 4]	—	—	—	—	—
Clermont-Ferrand		150·4	341	e 19 49	[+ 1]	—	—	—	—	—
Tamanrasset	z.	164·1	292	e 20 5	[0]	—	—	e 21 0	PKP$_2$	—

Additional readings:—
Brisbane iZ=5m.6s.
Wellington i=6m.10s. and 9m.57s.
Tucson e=14m.1s.
Zagreb e=19m.59s.
Strasbourg e=20m.8s. and 21m.37s.
Paris e=20m.0s., i=20m.18s.
Clermont-Ferrand e=20m.44s. and 21m.22s.

March 4d. 10h. 19m. 30s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
(as on 1948, July 25d.).

Felt strongly on the N.W. frontier of India, the Eastern parts of Cashmir, and throughout Afghanistan; also felt at various intensities from the Punjab to Jaipur (Rajpoutan). Damage at Rawalpindi and Peshawar, slight damage at Srinigar.

Depth 230km. Suggested epicentres 36°·0N. 70°·5E. (Pasadena).
36°40′N. 70°55′E. (U.S.S.R.).

$A = +·2683$, $B = +·7576$, $C = +·5951$; $\delta = +9$; $h = 0$;
$D = +·943$, $E = -334$; $G = +·199$, $H = +·561$, $K = -·804$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		2·1	342	i 0 36?	− 6	—	—	—	—	—
Stalinabad		2·3	323	i 0 43	− 1	—	—	—	—	—
Murgab		3·2	59	i 0 50	− 4	—	—	—	—	—
Samarkand		4·1	319	i 1 3	− 1	i 1 44	−10	—	—	—
Andijan		4·3	20	i 1 5	− 2	i 1 58	− 1	—	—	—
Tashkent		4·7	349	i 1 12	0	i 2 9	+ 1	i 1 25	P*	—
Tchimkent		5·6	354	i 1 23	0	i 2 29	+ 1	—	—	—
Frunse		6·9	26	i 1 37	− 3	—	—	—	—	—
Almata		8·2	35	i 1 54	− 3	3 24	− 4	—	—	—
Bombay		17·8	172	i 3 52	− 2	i 7 21	+18	—	—	—
Poona		18·3	170	i 3 53	− 7	i 7 8	− 4	i 4 33	pP	—
Grozny		20·0	297	i 4 21	+ 4	—	—	—	—	—
Tiflis		20·5	293	i 4 23	+ 1	8 1	+ 8	—	—	—
Erevan		20·6	288	e 4 27?	+ 4	—	—	—	—	—
Calcutta	E.	20·9	128	i 4 24a	− 2	i 7 58	− 2	—	—	—
Leninakan		21·1	290	i 4 32?	+ 4	i 8 9?	+ 5	—	—	—
Sverdlovsk		21·2	345	i 4 31	+ 2	i 8 4	− 2	i 5 10	pP	—
Piatigorsk		22·1	299	4 34	− 3	—	—	—	—	—
Sotchi		24·4	297	i 5 1	+ 2	—	—	—	—	—
Kodaikanal	E.	27·1	166	i 5 24	0	i 10 6	+22	i 6 36	sP	13·6
Theodosia		27·6	299	i 5 29?	0	e 9 48?	− 4	—	—	—
Ksara		28·3	275	e 5 38	+ 3	10 14	+11	—	—	—
Irkutsk		28·4	46	i 5 36	0	9 54	−11	—	—	—
Simferopol		28·5	299	5 39	+ 2	i 10 9	+ 3	i 6 31	PP	—
Yalta		28·5	298	i 5 35	− 2	—	—	—	—	—
Moscow		29·2	322	i 5 43	0	10 19	+ 1	6 27	pP	—
Colombo	E.	30·9	163	5 50	− 8	10 30?	−14	—	—	11·8
Istanbul		32·3	291	i 6 12a	+ 2	10 44	−22	—	—	—
Helwan		33·3	270	i 6 17	− 1	i 11 22	0	e 6 52	pP	—
Bucharest		34·3	297	i 6 30	+ 3	i 11 41	+ 4	i 7 36	pP	—
Cernauti		34·4	304	6 29	+ 1	11 40	+ 2	—	—	—
Campulung		35·0	300	e 6 36	+ 3	e 11 43	− 5	i 9 21	PcP	—
Sofia		36·4	295	i 6 46	+ 1	i 12 15	+ 6	i 9 9	PcP	—
Helsinki		37·2	326	i 6 52a	+ 1	i 12 24	+ 3	i 7 39	pP	—
Belgrade		38·2	298	i 7 1	+ 1	i 14 10	SS	e 7 55	PP	—
Skalnate Pleso		38·2	307	7 2	+ 2	e 12 35	− 1	—	—	—
Budapest		39·0	303	i 7 9	+ 3	12 53	+ 5	8 21	PP	—
Kalossa	E.	39·1	302	7 10	+ 3	12 56	+ 6	8 23	PP	e 18·0
	N.	39·1	302	7 11	+ 4	12 59	+ 9	8 27	PP	e 18·0
Raciborzu		39·5	308	i 7 12	+ 2	e 13 1	+ 5	e 8 1	pP	—
Ogyalla		39·6	304	i 7 16	+ 5	e 13 0	+ 3	—	—	—
Nanking		39·8	83	i 7 13	0	i 13 7	+ 7	8 6	pP	—
Upsala		40·7	322	i 7 20a	0	i 13 11	− 5	i 8 30?	sP	e 15·5
Taranto		41·3	292	7 24	− 1	13 24	+ 2	8 22	pP	—
Zagreb		41·3	301	i 7 26	+ 1	i 13 16	− 6	i 8 21	pP	—
Prague		41·9	308	i 7 30	0	i 13 27	− 4	e 8 17	pP	—
Lund		42·6	316	i 7 38	+ 2	i 13 47	+ 6	—	—	—
Potsdam		42·7	311	i 7 36a	0	i 13 46	+ 4	i 8 29	pP	—
Collmberg		42·8	309	7 37	0	i 13 44	0	i 8 30	pP	—
Triest		42·8	302	i 7 38	+ 1	i 13 48	+ 4	i 8 30	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copenhagen		43·0	316	i 7 39	0	i 13 52	+ 5	8 38	pP	—
Messina		43·1	290	e 7 38a	− 2	i 13 51	+ 3	9 2	PP	—
Cheb		43·2	308	i 7 43	+ 3	13 54	+ 4	—	—	—
Catania		43·7	289	i 7 46a	+ 1	i 14 2	+ 5	i 8 31	pP	—
Jena		43·7	308	e 7 41	− 4	i 13 59	+ 2	e 8 38	pP	—
Padova		44·3	300	7 49	0	14 7	+ 1	8 47	pP	—
Rome		44·5	296	i 7 50a	+ 1	i 14 6	− 2	i 8 44	pP	—
Bologna		44·7	299	i 7 54a	+ 2	i 14 19	+ 8	i 8 35	pP	—
Florence		44·9	299	i 7 55a	+ 1	i 14 19	+ 5	i 8 44	pP	—
Prato		45·0	300	i 7 56	+ 1	i 14 18	+ 2	—	—	—
Salo		45·1	302	i 7 56a	0	i 14 20	+ 3	i 8 47	pP	—
Ravensburg		45·3	304	i 7 58a	+ 1	i 19 0	sSS	i 8 48	pP	—
Chur		45·5	303	i 7 59	0	i 14 24	+ 1	i 17 27	SS	—
Stuttgart		45·5	306	e 7 58a	− 1	i 14 28	+ 5	i 8 46	pP	—
Zürich		46·1	304	e 8 3a	− 1	e 14 36	+ 5	e 8 51	pP	—
Strasbourg		46·4	306	i 8 7a	+ 1	i 14 42	+ 7	i 8 57	pP	i 21·5
Vladivostok		46·6	63	i 8 4	− 3	—	—	—	—	—
Basle		46·7	304	e 8 8a	0	e 14 43	+ 3	e 8 58	pP	—
Bergen		46·8	323	i 8 9a	0	14 44	+ 3	8 44	pP	19·5
Neuchatel		47·2	304	i 8 13	+ 1	e 16 5	SS	—	—	—
De Bilt		47·5	312	i 8 15a	+ 1	i 14 56	+ 5	i 9 4	pP	e 20·5
Tunis		47·6	289	i 8 17	+ 2	i 15 1	+ 9	i 9 7	pP	21·8
Hukuoka		48·4	76	i 8 19	− 2	16 27	sS	11 29	PPP	—
Marseilles		49·2	299	i 8 40?	+13	i 15 24?	+ 9	—	—	—
Kagosima		49·3	79	i 8 27	− 1	16 40	sS	—	—	19·4
Paris		49·8	307	i 8 32	0	i 15 24	+ 1	i 9 24	pP	e 26·5
Clermont-Ferrand		50·1	303	e 8 33	− 1	i 15 32	+ 5	i 9 29	pP	22·5
Kôti		50·8	75	8 38	− 1	16 58	sS	—	—	—
Aberdeen	E.	51·0	319	i 8 42	+ 1	i 15 40	+ 1	i 9 52	sP	—
Kew		51·0	311	i 8 41a	0	i 15 43	+ 4	i 9 52	sP	e 28·5
Durham		51·1	316	i 8 44	+ 2	i 15 44	+ 3	i 9 21	pP	—
Edinburgh		51·8	317	8 42	− 5	15 47	− 3	9 31	pP	—
Osaka		51·9	73	i 8 47	− 1	17 21	sS	—	—	—
Barcelona		52·0	299	i 8 47	− 1	i 15 54	+ 1	i 9 39	pP	e 22·5
Jersey	E.	52·6	309	i 8 53	0	i 16 2	+ 1	i 10 9	sP	—
Algiers		53·0	292	i 8 56	0	i 16 5	− 1	i 9 41	pP	26·5
Tortosa		53·4	298	i 8 59	0	i 16 14	+ 2	10 8	sP	25·1
Rathfarnham Castle		54·1	315	i 9 3	− 1	i 16 18	− 3	—	—	—
Mizusawa		54·4	65	9 7	+ 1	16 28	+ 3	—	—	—
Batavia		54·5	134	i 9 0a	− 7	i 16 16	−11	—	—	33·5
Tokyo		54·7	69	9 9	+ 1	17 57	sS	—	—	—
Alicante		55·0	296	9 12	+ 2	16 43	+10	9 23	pP	—
Scoresby Sund		56·7	337	9 24	+ 2	17 3	+ 7	12 43	PPP	—
Almeria		57·0	295	i 9 25	+ 1	i 17 5	+ 5	i 10 25	P_cP	26·8
Toledo		57·0	298	i 9 24	0	i 17 0	0	10 12	pP	—
Tamanrasset	z.	57·1	277	9 24	− 1	i 16 56	− 5	i 10 13a	pP	—
Granada		57·7	296	i 9 27a	− 2	i 17 12	+ 3	9 42	pP	i 27·1
Malaga	z.	58·5	296	i 9 33k	− 2	i 17 18	− 1	i 10 8k	pP	26·8
Reykjavik		58·7	330	i 9 37	+ 1	e 17 34	+12	e 10 24	pP	e 23·7
Tananarive		59·4	206	9 39	− 2	i 17 30	0	i 10 29	pP	e 28·7
Klyuchi		60·5	41	e 10 11?	+22	—	—	—	—	—
Lisbon		61·1	299	i 9 52a	− 1	17 53	+ 1	10 44k	pP	—
Ivigtut		70·5	334	i 10 50	− 2	i 19 50	+ 4	11 47	pP	—
College		74·4	17	i 11 14	− 1	i 20 32	+ 2	i 12 25	pP	e 31·0
Perth		80·4	143	11 45	− 3	i 21 30	− 4	15 42	PP	—
Sitka		83·6	14	i 12 8	+ 4	i 22 10	+ 4	i 15 15	PP	i 40·8
Halifax		89·0	329	12 30	0	22 38	[+ 1]	13 26	pP	36·5
Seven Falls	E.	89·6	335	12 35	+ 2	23 2	− 1	13 32	pP	33·5
Shawinigan Falls	N.	90·8	336	12 40	+ 1	23 18	+ 5	13 38	pP	—
Saskatoon		91·5	359	12 52	+10	23 0	[+ 9]	13 44	pP	37·5
Weston		93·9	333	e 12 54	+ 1	23 9	[+ 4]	i 13 49	pP	—
Victoria		94·3	10	i 13 0	+ 5	23 44	0	i 13 58	pP	44·5
Hungry Horse		95·2	4	i 12 58	− 1	—	—	—	—	—
Seattle		95·2	9	e 13 5	+ 6	e 23 56	+ 5	e 16 38	PP	e 42·9
Fordham		96·2	334	e 13 4	0	i 23 18	[+ 1]	i 14 2	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Philadelphia		97·4	334	e 17 7	PP	i 24 24	+14	e 23 24	SKS	e 43·4
Butte	N.	97·6	3	i 13 11	+ 1	e 24 29	+17	e 13 51	pP	e 46·0
Pennsylvania	E.	97·6	337	i 17 3	PP	i 24 17	+ 5	i 23 27	SKS	—
Bozeman		98·0	2	e 13 13	+ 1	i 24 5	−10	e 14 10	pP	e 42·3
Cleveland		98·1	340	i 13 13	+ 1	e 23 26	[− 1]	i 14 8	pP	—
Woodstock		98·6	335	e 17 22	PP	i 23 35	[+ 6]	e 25 16	PS	—
Chicago		99·4	345	e 13 15?	− 3	i 24 25?	− 2	i 17 22?	PP	i 42·8
Bermuda		99·5	323	e 13 25	+ 6	i 24 20	− 8	i 14 41	pP	e 40·3
Brisbane		100·4	117	i 13 19	− 4	i 23 32	[− 6]	i 17 3	PP	—
Ferndale		101·9	12	e 17 40	PP	i 25 34	PS	—	—	—
Lincoln	E.	101·9	351	e 14 51	sP	i 24 50	+ 2	e 17 44	PKP	e 44·4
Logan		101·9	2	i 13 28	− 1	i 23 44	[− 1]	i 17 39	PP	e 41·7
Shasta Dam		102·1	11	i 13 29	− 1	e 23 49	[+ 3]	e 18 17	PP	—
Mineral		102·5	10	i 13 32	0	e 23 52	[+ 4]	i 17 33	PKP	—
Riverview		102·8	123	i 13 30a	− 3	i 23 50	[0]	i 14 26	pP	e 42·1
Salt Lake City		102·9	2	i 13 20	−14	i 24 45	−11	i 17 34	PP	e 41·1
St. Louis		103·0	345	i 13 33	− 1	i 24 59	+ 2	i 14 30	pP	—
Reno		103·5	8	i 13 39a	+ 3	i 23 59	[+ 6]	i 17 47	PKP	e 41·8
Ukiah		103·5	11	e 13 37	+ 1	i 24 0	[+ 7]	e 14 38	pP	e 43·1
Columbia		104·8	337	e 18 6	PP	e 24 4	[+ 5]	e 19 16	PPP	e 42·2
Berkeley		104·9	11	i 13 44a	+ 1	e 24 1	[+ 2]	i 17 45	PKP	—
San Francisco		104·9	11	e 17 18	?	i 24 4	[+ 5]	e 18 5	PP	—
Branner		105·3	11	i 13 49	P	e 24 7	[+ 6]	e 25 45	PS	e 28·6
Santa Clara		105·4	11	e 13 46	P	i 23 58	[− 4]	i 18 11	PP	e 41·6
Lick	Z.	105·5	11	i 13 48	P	i 24 8	[+ 6]	i 18 12	PP	—
Tinemaha		106·2	8	i 13 50a	P	i 24 19	[+14]	i 18 1	PKP	—
Fresno		106·3	9	i 13 50	P	i 24 11	[+ 5]	i 17 55	PKP	—
Honolulu		106·5	47	i 18 14	PP	i 24 10	[+ 4]	i 25 49	S	e 42·7
Pierce Ferry		107·4	4	i 13 55	P	—	—	i 19 15	PP	—
Boulder City		107·5	5	i 13 57	P	e 27 24	PS	i 37 30	SSS	—
Pasadena		109·1	8	i 14 2a	P	i 24 18	[0]	i 15 2	pP	44·4
Riverside	Z.	109·3	8	e 14 4	P	i 40 50	SKPP′	i 18 6	PKP	—
Lubbock		109·7	354	14 4	PP	—	—	18 47	pPKP	—
Mobile		110·0	341	17 54	[−10]	e 26 8	S	e 18 51	pPKP	—
Palomar		110·0	7	e 14 8	P	e 40 45	SKPP′	i 29 8	PKKP	—
Tucson		111·4	2	i 14 14	P	i 24 27	[0]	i 14 54	pP	e 50·4
Fort de France		111·5	309	e 18 1	[− 6]	i 26 11	S	19 4	PP	—
San Juan		111·6	316	e 14 13	P	e 24 36	[+ 8]	e 15 21	pP	e 43·1
Chihuahua	Z.	114·9	357	e 18 9	[− 4]	e 28 47	PS	i 19 17	PP	—
Merida		119·7	339	e 19 42	PP	i 26 39	S	i 29 9	PS	—
Apia		120·3	85	e 18 28	[+ 4]	—	—	e 21 47	PPP	—
Auckland	N.	121·0	115	18 49	[+23]	25 13	[+11]	22 0	PPP	e 66·5
Arapuni	E.	122·1	117	21 18	?	e 24 18	[−48]	e 36 36	SS	—
Wellington		122·7	120	18 28	[− 1]	25 40	[+32]	i 19 26	pPKP	50·5
Tacubaya		123·4	349	i 18 35	[+ 4]	e 30 26	PS	i 20 10	PP	e 49·5
Puebla		123·5	348	e 20 2	PP	e 31 21	sPS	—	—	—
Tuai	N.	123·5	117	18 31	[0]	—	—	—	—	—
Manzanillo		124·3	355	e 19 44	?	e 25 15	[+ 3]	e 20 16	PP	—
Balboa Heights		126·6	322	e 18 38	[+ 1]	—	—	—	—	—
Bogota		127·2	314	i 18 39	[+ 1]	i 26 19	[+58]	i 20 42	PP	72·5
La Paz		138·3	288	i 18 47k	[−12]	i 25 52	[+ 7]	i 19 1	pPKP	65·5
La Plata	E.	138·6	257	18 59	[0]	28 19	SKKS	21 51	PP	—
	N.	138·6	257	18 54	[− 5]	28 25	SKKS	21 42	PP	73·5
Santa Lucia	E.	148·2	265	e 19 17	[+ 1]	29 16	S	34 33	PPS	—
	N.	148·2	265	19 15	[− 1]	—	—	41 27	SS	—
Santiago		148·2	265	19 25	[+ 9]	i 30 54	?	22 53	PP	—
Punta Arenas	N.	148·6	226	e 19 22	[+ 6]	25 52	[− 9]	22 55	PP	—

Additional readings :—
Poona isPN = 5m.2s., iEN = 5m.42s.
Kodaikanal P_cPE = 8m.24s.
Moscow SSS = 11m.29s.
Helwan eE = 7m.3s., PPE = 7m.16s., PPPE = 7m.30s.
Bucharest iPP?E = 7m.43s., iP_cPN = 9m.27s., iP_cPE = 9m.33s., iE = 11m.20s. and 11m.33s., iSS?EN = 13m.2s., iS_cS?E = 16m.43s., iS_cSN = 16m.56s.
Campulung iN = 6m.57s., iE = 7m.1s. and 8m.7s., eP_cPN = 9m.27s., eSE = 11m.39s.

Continued on next page.

Sofia i =7m.36s., 7m.59s., 8m.20s., and 13m.39s., iSS =14m.41s.
Helsinki isP =8m.1s., ePP =8m.30s., epPP =9m.25s., ipS =13m.40s., isS =14m.27s.
Belgrade iP$_c$P =9m.42s.
Budapest PPN =8m.25s., PPPN =8m.59s., PPPE =9m.2s., P$_c$PE =9m.20s., P$_c$PN = 9m.24s., P$_c$SN =13m.14s., iE =14m.13s. and 14m.25s., SSN =15m.30s., SSSE = 15m.40s., SSSN =15m.53s., iE =16m.11s., SKSN =17m.24s.
Kalossa E. PPP =8m.47s., i =8m.54s., e =10m.16s., c =13m.7s., SSS =15m.53s., e =16m.45s. ; N. PPP =8m.55s., i =9m.11s., 9m.47s., 10m.44s., and 13m.7s., SSS = 15m.54s., i =16m.51s.
Raciborzu ePN =7m.15s., ePP?NZ =8m.18s., ePPP?EN =8m.49s., eZ =8m.52s., eP$_c$P?Z =9m.52s., eZ =12m.56s. and 15m.5s., eSS?EN =15m.8s.
Nanking PP =9m.1s., sS? =14m.25s., SS =16m.19s.
Upsala iN =7m.51s., iPPE =9m.5s., ipPPE =9m.35s., iN =11m.16s., iE =12m.49s., ipP$_c$SN =14m.3s., iN =14m.27s., iE =14m.30s.?
Taranto e =10m.13s. and 28m.12s.
Zagreb eEZ =7m.34s., iPP =9m.15s., i =10m.20s., 12m.7s.?, 13m.25s., isSE =14m.57s., iSS =16m.53s., iE =19m.11s., i =19m.35s., eZ =25m.0s., eE =29m.3s.
Prague eE =7m.56s., e =8m.42s., 9m.6s., 14m.50s., 15m.42s., and 18m.0s.
Potsdam iPN =7m.40s., ipPE =8m.34s.?, iPPE =9m.25s., isPP =10m.28s., isS?N = 15m.0s., iSSN =16m.11s. and other unidentified phases.
Collmberg iZ =7m.40s. and 7m.44s., isPE =8m.50s., ipPPZ =10m.7s., esPPN = 10m.32s., iZ =10m.35s., iN =13m.48s., isSN =14m.59s., iE =15m.9s., iSSN = 16m.58s., iS$_c$SE =17m.9s., isSSN =17m.47s.
Triest isP =8m.53s., iP$_c$P =9m.32s., isS =15m.9s., iS$_c$S =17m.11s.
Copenhagen 9m.30s., pPP =10m.32s., sS =15m.8s.
Catania iPP =9m.9s., iPPP =10m.17s.
Jena iP =7m.45s., iP$_c$P =8m.58s., iPPEZ =9m.34s., isPPN =10m.36s., isPPZ = 10m.40s., isSN =15m.15s., isSE =15m.26s., iSSN =16m.46s., iN =17m.10s. and 17m.14s., iE =17m.18s., iZ =17m.50s., iE =18m.20s., iN =18m.30s.
Padova i =7m.55s., sS? =15m.42s., i =17m.21s.
Rome isS =15m.33s.
Bologna iZ =8m.16s. and 9m.8s., iPPP =10m.5s., esS =15m.39s., iS$_c$S =17m.23s.
Florence i =10m.41s., iSS =17m.21s.
Salo i =8m.1s. and 9m.45s., iE =14m.33s., iN =15m.22s., isSN =15m.46s., iS$_c$SE = 17m.26s.
Ravensburg iPP =9m.51s., isPP =11m.6s., iS$_c$PZ =13m.4s.
Stuttgart iZ =8m.1s. and 8m.7s., isP =9m.10s., iP$_c$P =9m.34s., iPP =9m.51s., ipPP = 10m.26s., isPP =11m.0s., iS$_c$PZ =13m.6s., isS =15m.45s., iSS =17m.28s., isSS = 19m.0s.
Strasbourg i =8m.34s. and 8m.48s., isP =9m.14s., iP$_c$P =9m.36s., iPP =9m.59s., ipPP = 10m.41s., isPP =11m.2s., iPPP? =11m.36s., iS =14m.45s., i =15m.46s., isS = 15m.59s. and 16m.2s., iS$_c$S =17m.17s. and 17m.20s., i =17m.32s., 17m.43s., and 17m.50s., iSS =18m.7s., isSS =19m.11s., iSSS =19m.30s., i =19m.48s.
Bergen eN =8m.12s., eEZ =9m.4s., eZ =9m.24s.?, PPN =9m.41s., PPPEZ =10m.37s., eZ =11m.12s., eN =11m.16s., 12m.4s., and 15m.6s., S$_c$SE =17m.50s.
De Bilt iZ =11m.15s., isS =16m.16s.
Tunis i =8m.20s., 8m.47s., and 8m.50s., isP =9m.33s., iP$_c$P =9m.40s., iPP =10m.11s. i =10m.32s., ipPP =10m.56s., iPPP =11m.15s., i =11m.53s., iP$_c$S =13m.38s., iS$_c$P =14m.19s., isS =16m.24s. and 16m.35s., iS$_c$S =17m.36s., iSS = 18m.30s., i =20m.6s. and 21m.27s.
Paris i =9m.39s., isP =9m.43s., iP$_c$P =9m.56s., iPP =10m.20s., 10m.26s., and 10m.33s., ipPP =11m.18s., iPPP =11m.33s. and 11m.40s., isPP =11m.44s., i =11m.53s. and 12m.32s., iS$_c$P =13m.31s., isS =16m.42s. and 16m.47s., iS$_c$S =17m.58s., i =18m.15s., eSS? =19m.24s., esSS =20m.15s., eSSS =21m.6s., esSSS? =22m.0s., ePKP,PKP = 38m.47s., ePKP,PKS =41m.42s.
Clermont-Ferrand iP =8m.36s., isP =9m.57s., iPP =10m.35s., isPP =11m.48s., isS = 16m.46s., i =16m.57s., iSS =18m.58s., iSSS? =20m.25s.
Aberdeen eE =7m.25s., iPPE =10m.24s., iPPPE =11m.24s., iE =14m.20s., iPSE = 16m.14s., iSSE =18m.48s., iSSSE =20m.55s.
Kew iEN =8m.50s., esPPEN =11m.51s., e =13m.3s., iE =13m.55s., isSN =17m.4s., iN =18m.3s., iSSEN =19m.38s., iN =26m.13s., iE =28m.22s.
Durham iPPPE =12m.2s., iN =12m.37s., iEN =14m.51s., iN =15m.34s., sSN =17m.9s., iEN =17m.16s., iS$_c$SEN =18m.8s., iEN =19m.57s., 20m.53s., and 21m.7s.
Edinburgh P$_c$P =9m.48s., PP =10m.36s., PPP =11m.44s., P$_c$S =13m.34s., sS =17m.13s., S$_c$S =17m.59s., SS =19m.12s.
Barcelona PP =10m.25s., e =11m.8s., i =17m.17s.
Jersey sPPE =12m.4s., iE =17m.30s.? and 21m.30s.?
Algiers PP? =10m.49s., iPP =10m.53s., sS =17m.31s., iS$_c$S? =17m.54s., pS$_c$S? = 18m.50s., SS =19m.50s., SSS? =21m.26s.
Tortosa P$_c$PE =9m.52s., PPN =11m.9s., pPPEN =12m.8s., PPPN =12m.22s., P$_c$SE = 15m.55s., S$_c$SE =18m.10s., SSN =20m.5s., SSSEN =22m.10s.
Alicante P$_c$P =10m.5s., PP =11m.13s., PPP =12m.13s., P$_c$S =13m.31s., S$_c$S =17m.57s.
Scoresby Sund 10m.36s., pPPP =13m.34s., 14m.11s., sS =18m.17s., SS =20m.30s.
Almeria iPP =11m.33s., iPPP =12m.45s., iPPS =17m.23s., iS$_c$S =19m.13s., iSS = 20m.45s., iSSS =22m.49s.
Toledo i =9m.37s., pPE =10m.15s., iP$_c$PE =10m.22s., iPP?E =11m.49s., S$_c$P =13m.51s., P$_c$S =14m.6s., eS =18m.27s., S$_c$S =18m.48s., SSE =20m.55s., E =22m.12s., SSSE =23m.27s.

Continued on next page.

Tamanrasset eZ =13m.59s., esSZ =18m.25s., eSSZ =20m.59s., eZ =38m.47s.
Granada P_cP =10m.12s., pP_cP =10m.42s., PP =11m.36s., PPP =13m.3s., P_cS = 14m.3s., PS =18m.18s., S_cS =18m.48s., iSS =21m.45s., SSS =22m.57s.
Malaga iPPZ =11m.56s., iPPPZ =13m.0s., isSZ =18m.52s., iSSZ =21m.32s.
Reykjavik eE =10m.2s. and 10m.13s., epS?EN =18m.11s., esSEN =18m.57s., and several other readings without phase.
Tananarive isP =10m.52s., PP =11m.57s., PPP =13m.6s., iP_cS =14m.17s., sS =19m.2s., SP =19m.39s., SS? =21m.25s., SSS =24m.12s.
Lisbon PPNZ =12m.12s., PPEZ =12m.21s., Z =14m.12s., N =14m.23s., E =14m.40s., S =17m.58s., SP =18m.13s., S_cS?Z =18m.45s., isSE =19m.20s., sSZ =19m.30s., SSE =21m.36s.
Ivigtut 12m.7s., PP =13m.31s., 20m.23s., i =21m.13s., 22m.13s., and 25m.30s., SSS = 27m.54s.
College e =12m.1s., iPP =13m.41s., epPP =14m.46s., isPP =15m.12s., iPPP =15m.59s., e =20m.49s., isS =21m.30s., eSS =25m.33s.
Perth S =23m.5s.
Sitka i =13m.32s., e =22m.54s., isS =23m.26s., iSP =23m.35s., i =24m.40s., eSS = 27m.10s., esSS? =29m.24s., iSSS =34m.30s.
Halifax PP =15m.54s., sS =23m.4s., PS =24m.8s., e =24m.40s., SSS =30m.24s.
Seven Falls PPE =15m.30s., SKSE =22m.41s., PSE =24m.47s.
Shawinigan Falls PPN =16m.17s., SKSN =22m.48s., PSN =24m.27s.
Saskatoon PPP =17m.28s., PS =24m.18s., PPS =24m.35s., e =25m.43s., SSS =32m.18s.
Weston PP =16m.39s.
Victoria PP =16m.50s., S =23m.56s., sS =24m.51s., PS =25m.29s., PPS =26m.18s., SS =29m.30s.
Seattle epPP =17m.23s., ePPP =18m.56s., eSKS =22m.38s., eSKKS =23m.20s., i = 24m.56s., and 26m.54s., e =31m.8s.
Fordham iNZ =17m.4s., 18m.13s., and 20m.14s., iN =24m.56s., isSNZ =25m.55s.
Philadelphia e =18m.21s. and 20m.23s., epS =25m.4s., ePS =26m.2s., e =26m.43s. and 37m.37s.
Butte iPPN =17m.12s., eN =18m.20s., iN =22m.10s., iSKSN =23m.30s., isSN =25m.5s., eSSN =30m.38s., eN =32m.52s. and 39m.24s.
Pennsylvania iE =28m.51s.
Bozeman esP =14m.38s., ePP =17m.9s., i =18m.26s., iSKS =23m.26s., isS =25m.10s., e =32m.42s. and 38m.1s.
Cleveland iZ =14m.31s., iPPE =17m.15s., iPPZ =17m.19s., ipPP?E =18m.25s., iPPP = 19m.28s., ipPS?N =26m.52s.
Woodstock iPP =17m.34s., e =27m.7s., eSS =33m.55s.
Chicago epPP =18m.33s.?, i =19m.6s.? and 22m.17s.?, iSKS =23m.30s.?, ipS =25m.15s.? iPS =26m.6s.?, e =26m.25s.?, eSS? =31m.51s.?, i =36m.41s.?
Bermuda iPP? =17m.28s., iPPP =20m.0s., e =20m.50s., eSKS =23m.20s., iPS =26m.18s. iSS =31m.30s.
Brisbane ePE =13m.22s., iZ =14m.15s. and 16m.24s., iSKSN =22m.32s., iSKSE = 22m.36s., eZ =23m.39s., iEN =27m.38s., and 32m.47s.
Lincoln eE =18m.53s., iSKSE =23m.46s., iE =25m.25s., ePS?E =26m.28s.
Logan i =20m.54s., 22m.50s., and 25m.27s., eSP =26m.46s., eSS =31m.57s.
Mineral eN =13m.40s., ePKPE =17m.44s., eSKSZ =23m.56s., eN =25m.33s.
Riverview ePPN =17m.47s., iPPSN =28m.1s., iPPSEZ =28m.4s., iSSEN =32m.18s., and many i phases given without identification.
Salt Lake City i =13m.38s., epPP =18m.27s., i =19m.0s., e =21m.0s., and 22m.40s., iSKS =23m.30s., iSP =26m.23s., iPS? =26m.46s., eSS? =32m.10s., e =33m.39s.
St. Louis iZ =17m.57s., iSKS?N =23m.51s.
Reno iZ =13m.46s.a, iN =16m.44s. and 17m.16s., iPPN =18m.2s., iPPE =18m.10s., iE =19m.30s., iSKSE =24m.5s., iE =24m.36s.
Ukiah ePP =17m.52s., epPP =18m.49s., eS =24m.38s., i =25m.36s., eSS =33m.42s.
Columbia e =25m.22s. and 32m.53s.
Berkeley iZ =14m.4s., iE =15m.2s., iE =17m.56s., iZ =17m.59s., iPPZ =18m.12s., iZ =18m.16s., iE =18m.34s., eE =29m.20s., iZ =29m.23s. and 29m.43s., iPKP, PKPZ =37m.41s., iZ =40m.3s.
Branner ePKPE =17m.49s., eN =17m.56s.
Santa Clara eZ =14m.45s., iZ =19m.6s. and 28m.11s.
Lick iZ =29m.21s.
Tinemaha iPKKPZ =29m.20s., iZ =30m.35s., 32m.40s., and 34m.29s., ePKP,PKPZ = 37m.38s., eZ =39m.56s.
Fresno iZ =16m.51s., iPKPN =18m.0s., eN =39m.51s.
Honolulu i =19m.28s. and 21m.42s., e =28m.7s., eSS =33m.2s., esSS =34m.4s.
Pierce Ferry iPPP =20m.17s., iPKP,PKP =37m.36s.
Boulder City i =29m.15s.
Pasadena esPZ =15m.17s., iPKPZ =18m.1s., iPP =18m.43s., isPP =19m.38s., ePPP?Z = 20m.54s., iSKKS?EN =25m.16s., eSPP?Z =28m.30s., iPKKP =29m.10s., iPKP,PKPZ =37m.34s., iSKP,PKPZ =40m.50s., and other unidentified phases.
Riverside iPPZ =18m.40s., iPKKPZ =29m.10s., iPKP,PKPZ =37m.33s.
Mobile 22m.26s., e =26m.50s., esS? =28m.26s., e =29m.7s.
Palomar eZ =34m.7s., iPKP,PKPZ =37m.32s.
Tucson isP =15m.33s., iPKP =18m.1s., ePP =18m.49s., epPPP =22m.3s., iS =26m.14s., ipS =27m.14s., iPS =29m.2s., eSS =33m.55s., esSS? =35m.49s., iSSS =39m.20s.
Fort de France isS =27m.56s.

Continued on next page.

San Juan iPP =18m.54s., e =20m.11s., i =26m.12s., eS =26m.14s., e =33m.38s., eSSS = 38m.39s.
Chihuahua ePPPZ =21m.51s.
Merida i =28m.24s., e =45m.24s. and 47m.30s.
Auckland SKKP?N =31m.16s., SSN =34m.10s.
Arapuni eE =31m.30s.
Wellington PP =20m.3s., PKS =21m.5s., PPPZ =22m.49s., SKKSZ =27m.2s., PS?Z = 29m.50s.?, PPSZ =30m.54s., PPP (Δ >180°) =35m.48s., SS =36m.30s.?, SSS = 41m.12s.?, and other unidentified i readings.
Tacubaya i =21m.34s. and 21m.53s., iZ =22m.14s., e =24m.7s., eSKKSE =26m.28s., eSPP =30m.58s., e =31m,27s., i =33m.8s., eS =36m.51s., i =38m.29s. and 41m.21s.
Puebla e =20m.24s., esPS =31m.30s.
Manzanillo eSKKS =26m.23s., e =33m.26s.
Bogota iSKP =22m.3s., i =22m.55s., iPPPP =27m.17s., eS =30m.1s.
La Paz isPKP? =19m.59s., iPPZ =21m.50s., ipPP? =22m.44s., iEN =33m.28s., iN = 35m.35s., iSSEN =39m.30s., iN =41m.14s.
La Plata E., 19m.36s., 20m.8s., 22m.12s., PKS =22m.35s., 23m.24s.
N., 19m.2s., 20m.6s., 22m.17s., PKS =22m.48s., SS =39m.36s., PSS =41m.18s., Q =55·5m.
Santa Lucia E., 20m.12s., i =20m.40s., iPP? =22m.45s., 23m.41s., 31m.5s., 33m.11s., 34m.10s., 36m.21s., and 38m.15s., SSS? =38m.56s.
N., 19m.58s., 21m.5s., i =21m.29s., 24m.41s., 25m.1s., 35m.13s., 36m.29s., 40m.16s., i =41m.36s., 43m.13s., i =44m.0s., 47m.9s., and 47m.53s.
Punta Arenas N =19m.26s., 19m.59s., 20m.26s., 25m.44s., 27m.40s., and 39m.43s.

March 4d. 15h. 26m. 59s. Epicentre 41°·2N. 84°·5E. (as on Feb. 24d.).

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Almata		6·0	293	i 1 22	−10	i 2 36	− 7	—
Murgab		8·6	254	2 15	+ 6	e 3 54	+ 6	—
Andijan		9·2	271	e 2 21	+ 5	e 4 7	+ 4	—
Tchimkent		11·2	281	2 51	+ 7	—	—	—
Tashkent		11·4	276	—	—	5 6	+10	—
Obi-garm		11·6	263	e 3 6?	+16	e 5 17?	+16	—
Stalinabad		12·4	263	i 3 1	0	e 5 23	+ 2	—
Samarkand		13·4	269	e 3 13	− 1	—	—	—
Calcutta	E.	18·9	168	e 4 39	+15	e 8 29	+36	—
Sverdlovsk		22·0	323	4 53	− 5	i 8 50	− 6	—
Bombay		24·4	207	e 10 1	S	(e 10 1)	+22	—
Grozny		28·6	287	e 6 14	+14	—	—	—
Moscow		33·6	312	e 6 42	− 2	e 12 0	− 6	—
Copenhagen		47·7	313	8 40	0	—	—	21·0
Collmberg	z.	48·6	306	e 8 46	− 1	—	—	—
Stuttgart		51·8	305	e 9 10	− 2	—	—	e 27·0
Paris		55·8	307	i 9 41	0	e 17 5	−23	e 29·0
Hungry Horse		89·3	12	e 13 0	+ 1	—	—	—

Long waves were also recorded at Kodaikanal, Upsala, Potsdam, and Kew.

March 4d. Other shocks from Hindu Kush epicentre of 10h.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	57	41?	14	29	59	16	52	59	20	37	37
5	31	13	14	32	20	16	58	53	20	47	56
11	44	45	14	44	58	17	8	17	20	54	28
11	47	35	14	57	46	17	37	32	21	8	11
11	58	15	15	6	57	17	39	18	21	12	49
12	5	18	15	12	24	17	57	55	21	17	17
12	14	45	15	14	31	18	1	0	21	20	5
12	35	16				18	10	3	21	39	7
12	39	30	16	13	11	18	27	23	21	57	54
13	37	59	16	16	3?	18	39	59	22	0	44
13	41	57	16	22	2?	19	34	47	22	21	0
14	3	50?	16	37	28	19	45	54	22	45	26
14	12	57	16	45	5	19	51	5	23	43	53
14	13	56	16	51	41	20	2	2	23	55	21

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	57	50	13	33	46	17	39	18	21	12	53
5	31	10	14	3	49	17	58	0	21	17	20
10	57	19	14	13	18	18	1	28	21	20	7
10	59	48	14	14	26	18	28	20	21	39	10
11	29	33	14	32	24	18	40	2	21	58	0
11	44	48	14	57	50	19	34	50	22	0	47
11	58	16	16	13	13	19	51	6	22	21	8
12	5	20	16	16	2	20	37	41	22	45	28
12	14	48	16	22	2	20	47	58	23	43	58
12	41	28	16	53	1	20	54	52	23	55	26
13	15	52	16	58	45	21	8	48			

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	57	58	16	22	16	17	58	13	21	39	22
11	58	31	16	53	10	18	40	57	22	1	43
12	14	57	16	59	22	19	35	4	22	20	42
14	33	18	17	6	34	19	52	3	23	44	10
14	58	45	17	39	30	20	37	51	23	55	40
16	16	15									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	58	12	14	33	28	17	40	30	19	35	54
10	58	21?	16	23	11	18	41	18	19	52	18
11	59	26									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	58	14	14	32	49	19	35	17	22	2	5
11	30	50	14	58	16	19	51	33	22	21	29
11	58	44	16	22	31	20	38	11	23	44	23
12	6	35	16	59	29	21	40	27	23	55	52
14	4	52	17	39	46						

Tashkent.

h.	m.	s.	h.	m.	s.
2	58	19	14	59	14

Tchimkent

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	58	32	14	59	35	18	41	18	21	40	55
11	46	35	16	14	42	19	36	45	21	58	40
12	0	12	16	17	45	19	52	43	22	2	33
12	7	4	16	23	41	20	39	18	23	45	44
12	16	35	16	54	44	21	15	38	23	57	10
14	34	9	17	41	7	21	19	6			

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	58	44	14	34	41	16	24	12	23	46	14

March 4d. Readings also at 0h. and 2h. (near Ashkabad), 11h. (Shasta Dam (2)), 12h. (Hungry Horse and Shasta Dam), 14h. (College), 17h. (Auckland, Wellington, Overton, and Pierce Ferry), 18h. (Palomar, Pasadena, Riverside, Tinemaha, and Shasta Dam), 19h. (Tucson, Boulder City, Overton, Pierce Ferry, and Hungry Horse), 22h. (Mizusawa), 23h. (Overton and Pierce Ferry).

March 5d. 1h. 38m. 58s. Epicentre 28°·4N. 138°·0E. (as on 1947, February 11d.).

$A = -\cdot6547$, $B = +\cdot5895$, $C = +\cdot4731$; $\delta = -3$; $h = +2$;
$D = +\cdot669$, $E = +\cdot743$; $G = -\cdot352$, $H = +\cdot317$, $K = -\cdot881$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok	15·5	343	e 3 44	+ 2	i 6 42	+ 7	—	—	—
Irkutsk	34·5	322	—	—	10 35?	?	—	—	—
Stalinabad	57·4	299	e 8 9	?	—	—	—	—	—
College	58·0	29	i 9 52	− 5	—	—	—	—	—
Sverdlovsk	59·9	321	10 18	+ 8	18 30	+ 9	e 19 48	S_eS	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shasta Dam		78·7	49	e 12 3	− 3	—	—	—	—	—
Mineral	z.	79·4	49	e 12 8	− 1	—	—	—	—	—
Hungry Horse		80·1	40	e 12 17	+ 4	—	—	—	—	—
Reno	z.	81·0	50	i 12 17a	− 1	—	—	—	—	—
Tinemaha	z.	83·3	51	i 12 37	+ 7	—	—	—	—	—
Pasadena	z.	84·8	53	i 12 37	0	—	—	—	—	—
Logan		85·0	44	e 12 37	− 1	—	—	—	—	—
Riverside	z.	85·5	53	i 12 38	− 3	—	—	—	—	—
Boulder City		86·2	50	i 12 44	0	—	—	—	—	—
Overton	z.	86·2	49	i 12 44	0	—	—	—	—	—
Palomar	z.	86·2	53	e 12 43	− 1	—	—	—	—	—
Pierce Ferry		86·7	49	i 12 45	− 2	—	—	—	—	—
Stuttgart		90·6	328	e 13 19	+14	—	—	—	—	e 50·0
Triest		90·6	324	e 12 15?	−50	—	—	—	—	e 50·0
Tucson		91·0	51	e 13 8	+ 1	—	—	e 16 42	PP	—
La Paz		152·8	69	i 20 10	[+18]	—	—	—	—	—

Additional readings :—
College i =9m.58s.
Sverdlovsk SSS =25m.20s.
Reno iZ =12m.24s., eE =12m.56s., eN =13m.4s. and 13m.34s.
Pasadena iZ =12m.43s.
Logan e =12m.43s.
Riverside iZ =12m.45s.
Boulder City i =12m.51s.
Palomar eZ =12m.50s.
Pierce Ferry i =12m.53s.
Tucson e =13m.38s.
Long waves were also recorded at other European stations.

March 5d. Readings also at 0h. (Murgab, Tchimkent, near Obi-garm (3), Stalinabad (2), and near Ashkabad (2)), 3h. (near New Plymouth, Tuai, Wellington, Christchurch, La Paz, Tchimkent, near Stalinabad, Murgab, and Andijan), 4h. (Tchimkent, Frunse, near Stalinabad, Murgab, Andijan, and Samarkand), 6h. (Andijan, Tchimkent (2), near Kulyab (4), Stalinabad (4), and Murgab (3)), 7h. (Samarkand, near Kulyab, Stalinabad, Murgab, and near Ashkabad), 9h. (near Stalinabad (2) and Kulyab (2)), 11h. (Samarkand, Andijan, Tchimkent, near Kulyab, Stalinabad, and Murgab), 12h. (near Kulyab, Stalinabad, and Tchimkent), 13h. (Grozny, Tiflis, near Leninakan, Tchimkent, near Kulyab, Obi-garm, Stalinabad, Murgab, Samarkand, and Andijan), 14h. (Ashkabad, Tchimkent, Frunse, near Obi-garm (2), Kulyab, Stalinabad, Murgab, Samarkand, Andijan, and Tashkent), 15h. (Murgab, Kulyab, near Obi-garm, Stalinabad, near Collmberg, Jena, Shasta Dam, and near Tucson), 16h. (Samarkand, Tchimkent, near Kulyab, Stalinabad (2), Obi-garm, Murgab, and near Ashkabad), 17h. (near Mizusawa), 18h. (near Tucson and near Copiapo), 20h. (Tchimkent, near Almata, Andijan, Frunse, Kulyab, Obi-garm (2), Samarkand, Stalinabad (2), Murgab, and Tashkent), 21h. (near College), 22h. (Tchimkent, Frunse, Almata, near Kulyab, Stalinabad, Murgab, Obi-garm, Samarkand, Andijan, near Copiapo, and Santa Lucia).

March 6d. 5h. Kurile Isles.

Mizusawa PE =23m.10s., SE =23m.34s.
Shasta Dam iP =28m.29s.
Hungry Horse iP =28m.30s.
Tinemaha ePZ =29m.3s.
Overton eZ =29m.14s., iZ =29m.21s.
Pasadena iPZ =29m.14s., iZ =29m.28s.
Riverside ePZ =29m.18s., iZ =29m.32s.
Boulder City iP =29m.19s.
Pierce Ferry iP =29m.22s.
Tucson eP =29m.47s., i =29m.54s.
Stuttgart eZ =30m.36s.
Strasbourg eP =30m.41s., e =31m.6s.
Zürich eZ =30m.42s.
Basle eZ =30m.46s.
Paris iP =30m.46s., e =31m.1s, and 31m.25s,

March 6d. 11h. 27m. 54s. Epicentre 42°·2N. 84°·1E. (as on February 23d.).

$A = +·0764$, $B = +·7391$, $C = +·6692$; $\delta = -7$; $h = -2$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata		5·3	284	i 1 25	+ 3	e 2 27	+ 2	—	—	—
Frunse		7·1	279	e 1 48?	0	e 3 8?	− 2	—	—	—
Murgab		8·6	247	2 6	− 3	i 3 44	− 4	—	—	—
Andijan		8·9	264	e 2 10	− 2	—	—	—	—	—
Tchimkent		10·7	275	e 2 46	+ 8	—	—	—	—	—
Tashkent		11·1	270	e 2 49	+ 6	—	—	—	—	—
Obi-garm		11·5	257	i 2 47	− 1	e 4 53	− 6	—	—	—
Stalinabad		12·2	258	i 2 53	− 5	e 5 14	− 2	—	—	—
Samarkand		13·2	265	—	—	e 5 30	−10	—	—	—
Irkutsk		17·0	47	e 4 5	+ 4	e 7 6	− 4	—	—	—
Calcutta	E.	19·9	168	—	—	e 8 26	+11	—	—	—
Ashkabad		20·2	266	e 4 34?	− 5	—	—	—	—	—
Sverdlovsk		21·0	323	i 4 46	− 1	—	—	i 8 45	P_cP	—
Bombay		25·1	206	e 5 32	+ 4	e 9 53	+ 2	—	—	—
Hyderabad	N.	25·2	192	5 31	+ 2	9 59	+ 7	—	—	—
Poona		25·2	203	e 5 31	+ 2	e 9 52	0	i 10 47	SS	16·1
Grozny		28·0	286	e 5 46	− 9	—	—	—	—	—
Leninakan		30·0	282	6 36	PP	—	—	—	—	—
Copenhagen		46·8	313	8 33	0	—	—	—	—	—
Collmberg		47·8	307	e 8 39	− 2	—	—	e 8 45	P	—
Stuttgart	Z.	51·0	305	e 9 4	− 2	—	—	—	—	—
Strasbourg		51·9	305	e 9 13	+ 1	—	—	—	—	—
Paris		55·0	307	i 9 34	− 1	—	—	i 9 40	P	—
College		65·8	22	i 10 48	− 1	—	—	—	—	—
Hungry Horse		88·4	12	i 12 55	0	—	—	—	—	—
Shasta Dam		94·1	20	i 13 21	− 1	—	—	—	—	—

Additional readings :—
Poona iEN = 10m.2s., iE = 10m.31s. and 11m.19s.
Strasbourg e = 8m.54s. and 8m.59s.
Long waves were also recorded at De Bilt, Kew, Potsdam, and Upsala.

March 6d. 16h. 36m. 40s. Epicentre 29°·8N. 51°·8E. (as on 1946, March 12d.).

$A = +·5375$, $B = +·6831$, $C = +·4945$; $\delta = +6$; $h = +2$;
$D = +·786$, $E = -·618$; $G = +·306$, $H = +·389$, $K = -·869$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad		9·8	32	e 2 24	0	—	—	—	—	—
Leninakan		12·6	332	e 3 2	− 1	—	—	e 3 18	PP	—
Tiflis		13·2	336	e 3 8	− 3	e 5 34	− 6	—	—	—
Ksara		14·1	290	e 3 21	− 2	—	—	—	—	e 7·5
Grozny		14·3	342	e 3 27	+ 1	—	—	—	—	—
Piatigorsk		15·8	336	3 44	− 1	—	—	—	—	—
Samarkand		15·9	48	e 3 50	+ 3	—	—	—	—	—
Stalinabad		16·5	54	i 3 58	+ 4	i 7 4	+ 6	—	—	—
Sotchi		16·8	328	e 3 54	− 4	e 7 24	SS	—	—	—
Helwan		17·8	275	i 4 17	+ 6	e 7 47	SS	4 42	PPP	—
Tashkent		18·2	47	i 4 20	+ 4	i 7 41	+ 4	e 4 53	PPP	—
Tchimkent		19·0	44	i 4 28	+ 2	—	—	—	—	—
Andijan		20·0	52	e 4 39	+ 2	e 8 20	+ 3	—	—	—
Murgab		20·2	59	e 4 44	+ 5	8 29	+ 8	—	—	—
Yalta		20·2	321	4 34	− 5	8 11	−10	—	—	—
Istanbul		21·6	308	e 4 50	− 4	—	—	—	—	e 13·0
Bombay	E.	22·0	116	e 4 16	−42	e 9 20	SS	—	—	—
Almata		24·1	49	e 5 22	+ 4	—	—	—	—	—
Sverdlovsk		27·7	10	5 50	− 2	e 10 27	− 6	e 6 33	PP	—
Moscow		27·8	343	e 5 49	− 4	e 10 26	− 9	—	—	—
Triest		33·6	309	e 6 38	− 6	e 9 41	?	—	—	—
Collmberg		35·9	318	6 53	−11	—	—	e 8 3	PP	—
Chur		36·8	310	e 7 10	− 1	—	—	—	—	—
Stuttgart	Z.	37·4	314	e 7 14	− 2	—	—	—	—	—
Zürich		37·5	311	i 7 12	− 5	—	—	—	—	—

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Basle		38·2	311	e 7 22	− 1	e 15 44	SS	—	—	—
Strasbourg		38·3	313	e 7 22	− 2	—	—	e 7 45	?	—
Paris		41·8	312	i 7 51	− 2	—	—	—	—	—
Tamanrasset	z.	41·9	274	i 7 59 a	+ 5	—	—	e 8 23	?	—
College		84·4	8	e 12 38	+ 2	—	—	—	—	—
Hungry Horse		101·2	351	e 14 5	+11	—	—	—	—	—
Pierce Ferry		113·1	347	e 9 48	?	—	—	—	—	—

Additional readings :—
Helwan eZ = 5m.35s. and 7m.32s., SSZ = 8m.10s.
Tashkent eSS = 7m.56s.
Paris i = 7m.56s. and 8m.0s.
Long waves were also recorded at Calcutta.

March 6d. Readings also at 0h. (Tashkent, Samarkand, Andijan, near Obi-garm, and Stalinabad), 1h. (near Kulyab (2), Obi-garm (4), and Stalinabad (2)), 2h. (Stuttgart, Basle, Strasbourg, near Clermont-Ferrand, and near Bogota), 3h. (near Ashkabad), 4h. (Sverlovsk, Grozny, near Piatigorsk, Tiflis, Leninakan, Hungry Horse, Andijan, Murgab, Stalinabad (2), Samarkand, near Obi-garm (2), and Kulyab), 6h. (Ashkabad (3), near Obi-garm, Kulyab, and Stalinabad), 7h. (near Tchimkent (2), Stalinabad (3), Andijan (2), Obi-garm (2), Kulyab, Murgab, Samarkand, and Tashkent), 9h. (near Obi-garm), 11h. (Cleveland, Frunse, near Kulyab, Obi-garm, Samarkand, Stalinabad, Murgab, and Andijan), 12h. (Hungry Horse and Ashkabad), 13h. (Ashkabad, Copiapo, near Kulyab, Obi-garm, and Stalinabad), 14h. (Overton), 15h. (College, Hungry Horse, and near Murgab), 17h. (Pierce Ferry, near Istanbul, Samarkand, near Stalinabad, and Obi-garm), 18h. (Tchimkent, near Obi-garm, Stalinabad, Murgab, Samarkand, Andijan, and near Ashkabad), 19h. (near Obi-garm), 22h. (Tashkent, near Almata, and near Obi-garm), 23h. (near Murgab, Andijan, and near Obi-garm (2)).

March 7d. 11h. Alaska.

College iP = 43m.2s., eS? = 43m.13s., iL = 43m.22s.
Sitka eP = 44m.35s., eL = 46m.40s.
Hungry Horse iP = 47m.48s.
Shasta Dam eP = 48m.14s.
Mineral iPZ = 48m.20s.
Reno ePZ = 48m.36s., eE = 48m.49s., eN = 48m.59s., eSZ = 58m.49s., eE = 58m.56s., eN = 59m.22s.
Berkeley ePZ = 48m.37s., iZ = 48m.42s. and 48m.46s.
Lick iPZ = 48m.44s., iZ = 48m.48s.
Overton iPZ = 49m.11s.
Boulder City eP = 49m.15s.
Pierce Ferry eP = 49m.15s.
Tucson e = 49m.56s., eL = 64m.14s.
Shawinigan Falls eN = 50m.28s.
Long waves were also recorded at other United States and Canadian stations and at Scoresby Sund.

March 7d. 14h. Region of Santa Cruz Islands. Depth probably 100km.

Brisbane iPZ = 41m.39s., iPPEN = 41m.57s., iZ = 42m.7s., iSEN = 45m.35s., iLN = 49m.43s.
Vladivostok iP = 47m.17s., iS = 55m.55s., iSSS = 62m.42s.
Berkeley iPZ = 49m.16s.k, iZ = 49m.24s.
College iP = 49m.18s., e = 52m.42s.
Lick iPZ = 49m.18s.
Shasta Dam iP = 49m.20s.
Mineral iPZ = 49m.23s.
Pasadena iPZ = 49m.26s., iZ = 49m.34s., and 50m.1s.
Riverside iPZ = 49m.27s., iZ = 49m.38s.
Reno ePZ = 49m.29s.k, eN = 50m.0s., iE = 50m.4s.
Tinemaha iPZ = 49m.31s.k, iZ = 49m.39s., eZ = 50m.9s.
Palomar iPZ = 49m.32s.k.
Pierce Ferry iP = 49m.39s.
Boulder City iP = 49m.42s.
Tucson iP = 49m.53s., eL = 78m.10s.
Logan eP = 49m.58s.
Arapuni eE = 50m.
Wellington e = 52m.48s., L = 56m.
Auckland eN = 54m.
Stuttgart ePKP?Z = 56m.20s.
Strasbourg ePKP? = 56m.33s., epPKP? = 56m.45s.
Tamanrasset ePKPZ = 56m.54s., e = 62m.18s.
Ksara ePP? = 58m.21s.

March 7d. Readings also at 1h. (Hungry Horse), 2h. (Santa Lucia), 3h. (Ksara, Mount Wilson, Riverside, and Tinemaha), 4h. (Ksara, near College, near Basle, Neuchatel, and Zürich), 5h. (Boulder City, Overton, Pierce Ferry, near Tucson, and near Obi-garm (2)), 6h. (La Paz, Logan, near Obi-garm (2), and near Stalinabad), 7h. (Batavia, Logan, and near Stalinabad), 8h. (near Murgab, Stalinabad, and Andijan), 9h. (near Stalinabad (2)), 10h. (Riverside, Tinemaha, Samarkand, near Tacubaya, near Murgab (2), and Stalinabad), 11h. (Cleveland and near Obi-garm), 12h. (near Obi-garm) 13h. (Hungry Horse, Overton, Pierce Ferry, Shasta Dam, near San Juan and near Obi-garm), 16h. (Collmberg), 17h. (Collmberg, Punta Arenas, Tchimkent, Frunse, near Obi-garm, Stalinabad, Murgab, Samarkand, Andijan, Tashkent, near Tucson, near Lick and Branner), 18h. (Boulder City, Overton, Pierce Ferry, and Shasta Dam), 20h. (Ashkabad, near Ebingen and Stuttgart), 22h. (near Ashkabad), 23h. (Boulder City, Pierce Ferry, Shasta Dam, and near Messina).

March 8d. 2h. 22m. 12s. Epicentre 46°·4N. 12°·2E.

A = +·6764, B = +·1462, C = +·7218 ; δ = −11 ; h = −4 ;
D = +·211, E = −·977 ; G = +·706, H = +·153, K = −·692.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Triest		1·3	125	e 0 24	− 1	i 0 42	− 2	e 0 36	PP
Salo		1·4	236	e 0 25	− 2	0 45	− 1	—	—
Chur		1·9	284	e 0 34	0	e 0 59	0	—	—
Padova		1·9	187	e 0 30	− 4	e 1 25	?	—	—
Zagreb		2·7	103	e 1 24	S*	e 1 32	S_g	—	—
Zürich		2·7	289	e 0 50	+ 5	e 1 26	+ 7	—	—
Stuttgart		3·1	319	e 0 52	+ 1	e 1 30	+ 1	e 1 2	P_g
Basle		3·4	291	e 0 58	+ 3	e 1 52	S_g	—	—
Strasbourg		3·7	308	e 1 14	P_g	e 1 39	− 6	e 2 5	S_g
Jena	E.	4·6	355	e 1 30	P_g	e 2 29	S_g	—	—
Collmberg	Z.	4·9	6	—	—	e 2 43	S_g	—	—

Additional readings :—
Stuttgart eP = 54s., eS = 1m.42s., eS_g = 1m.48s.
Strasbourg e = 1m.24s., 2m.11s., 2m.20s., and 2m.24s.
Jena eN = 2m.33s.

March 8d. Readings also at 0h. (Ashkabad), 1h. (Ashkabad (2) and near Stalinabad), 2h. (near Obi-garm and near Ashkabad), 4h. (Boulder City, Hungry Horse, Pierce Ferry, and Shasta Dam), 6h. (Wellington, Boulder City, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Riverside, Palomar, Tinemaha, and near Obi-garm), 7h. (near Obi-garm, Stalinabad, and Samarkand), 8h. (Overton), 9h. (Tacubaya, Samarkand, Almata, near Murgab, Andijan, Obi-garm, Stalinabad, Tashkent, Tchimkent, Frunse, and near Alicante), 10h. (Ksara and near Obi-garm), 11h. (near Mizusawa, near Messina, near Zürich, Basle, Stuttgart, and Strasbourg), 12h. (College), 13h. (Apia, Auckland, Wellington, Boulder City, Overton, Pierce Ferry, Shasta Dam, and near College), 15h. (near Andijan and near Copiapo), 17h. (Alicante, Poona, Frunse (2), Almata, near Kulyab (2), Stalinabad (2), Obi-garm (2), Murgab, Samarkand (2), Andijan (2), and Tashkent (2)), 18h. (Samarkand, Andijan, near Murgab, Obi-garm, and Stalinabad), 19h. (near Tucson, near Berkeley, Lick, Branner, and San Francisco), 20h. (near Tucson), 21h. (Ashkabad and College), 22h. (near Ashkabad, near Berkeley, Lick, Branner, and San Francisco), 23h. (Boulder City, Hungry Horse, Pierce Ferry (2), and Shasta Dam).

March 9d. 4h. 16m. 31s. Epicentre 44°·1N. 11°·6E. (as on 1939, Feb. 11d.).

A = +·7058, B = +·1449, C = +·6935 ; δ = +9 ; h = −3 ;
D = +·201, E = −·980 ; G = +·679, H = +·139, K = −·720.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bologna	0·4	335	e 0 11	P*	e 0 20	− 1	—	—	—
Florence	0·4	219	i 0 3a	P_g	i 0 8	S_g	i 0 11	S*	—
Padova	0·4	28	0 25	S	0 45	?	—	—	—
Prato	0·4	239	i 0 2	−11	i 0 7	−14	—	—	—
Salo	1·7	333	e 0 31	0	i 1 1	S_g	—	—	—
Triest	2·2	44	e 0 44	P_g	i 1 7	+ 1	i 1 14	S_g	—
Rome	2·3	164	e 0 40	0	1 8	− 1	e 0 42	P*	—
Chur	3·1	332	e 0 51a	0	e 1 30	+ 1	e 1 39	S_g	—
Zagreb	3·6	59	e 0 59	+ 1	e 1 36	− 6	—	—	—
Zürich	3·9	327	e 1 1	− 1	e 2 7	S_g	—	—	1

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel	4·3	313	e 1 7	− 1	e 1 58	− 2	—	—	—
Basle	4·4	323	e 1 11	+ 1	e 2 5	+ 3	e 2 23	S_g	—
Stuttgart	4·9	342	e 1 16	− 1	e 2 9	− 6	e 1 39	P_g	—
Strasbourg	5·2	331	e 1 20	− 1	e 2 20	− 2	e 1 45	P_g	—
Jena	6·8	0	e 1 44	0	e 2 57	− 6	—	—	—
Paris	7·8	310	i 2 12	P*	i 4 7	S_g	i 2 25	P_g	e 4·4

Additional readings :—
Bologna iNZ = 17s., iZ = 23s., i = 31s.
Triest eP_g = 49s., iS_g = 1m.27s.
Rome eN = 55s., iS_gE = 1m.14s.
Stuttgart eZ = 1m.36s., eS_g = 2m.51s.
Strasbourg eP? = 1m.35s., e = 1m.50s., 2m.28s., and 2m.36s., eS = 2m.39s., eS_g? = 2m.56s.
Jena eP_gE = 3m.43s., eP_gN = 4m.4s., eE = 5m.46s., eN = 5m.55s.
Long waves were also recorded at Potsdam and Collmberg.

March 9d. 4h. 21m. 5s. Epicentre 41°·8N. 71°·7E. (as on 1948, Sept. 10d.).

A = + ·2348, B = + ·7099, C = + ·6641 ; δ = + 12 ; h = − 2 ;
D = + ·949, E = − ·314 ; G = + ·209, H = + ·630, K = − ·748.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		1·2	155	i 0 18	− 6	i 0 36	− 5	—	—	—
Tchimkent		1·6	288	i 0 40	+10	i 1 10	+19	—	—	—
Tashkent		1·9	255	i 0 39	+ 5	i 1 14	+15	—	—	—
Frunse		2·4	63	i 0 35	− 6	i 1 1	−11	—	—	—
Obi-garm		3·5	207	i 1 1	+ 4	e 1 44	+ 4	—	—	—
Murgab		3·8	153	e 1 1	0	e 1 44	− 3	—	—	—
Almata		4·2	67	e 1 0	− 7	e 1 46	−11	—	—	—
Samarkand		4·2	241	i 1 11	+ 4	i 2 6	+ 9	—	—	—
Sverdlovsk		16·6	338	e 3 54	− 2	e 7 14	+14	—	—	—
Grozny		19·1	283	e 4 33	+ 6	—	—	—	—	—
Tiflis		20·0	279	e 4 45	+ 8	8 31	+14	—	—	—
Leninakan		20·9	277	e 4 50?	+ 4	—	—	—	—	—
Piatigorsk		21·0	286	e 4 56	+ 9	—	—	—	—	—
Bombay		22·8	177	e 5 1	− 4	e 9 11	0	—	—	—
Poona	E.	23·2	175	e 5 10	+ 1	e 9 14	− 4	—	—	12·9
Sotchi		23·5	285	e 5 15	+ 3	—	—	—	—	—
Calcutta	E.	23·7	139	—	—	e 9 21	− 6	—	—	—
Irkutsk		24·4	53	e 5 12?	− 9	—	—	—	—	—
Hyderabad	N.	25·0	165	5 20	− 7	9 49	0	—	—	—
Moscow		26·1	314	e 5 36	− 1	—	—	—	—	—
Potsdam	Z.	40·2	306	—	—	e 16 11	SS	—	—	—
Collmberg		40·5	305	e 7 42	0	—	—	e 9 22	PP	—
Jena		41·4	303	e 7 50	0	—	—	—	—	—
Stuttgart	Z.	43·4	301	e 8 7	+ 1	—	—	—	—	—
Chur	Z.	43·7	299	e 8 9k	+ 1	—	—	—	—	—
Strasbourg		44·4	302	e 8 15	+ 1	—	—	—	—	—
Paris		47·6	304	i 8 39	0	—	—	e 9 13	?	—
College		69·3	18	i 11 5	− 6	—	—	—	—	—

Long waves were also recorded at Kodaikanal, Copenhagen, De Bilt, and Upsala.

March 9d. 5h. 25m. 31s. Epicentre 41°·2N. 84°·5E. (as on 4d.).

Approximate determination.

A = + ·0723, B = + ·7512, C = + ·6561 ; δ = 0 ; h = − 2 ;
D = + ·995, E = − ·096 ; G = + ·063, H = + ·653, K = − ·755.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata	6·0	293	i 1 41	+ 9	i 2 58	S*	—	—	—
Frunse	7·6	286	e 1 54	− 1	—	—	—	—	—
Murgab	8·6	254	i 2 11	+ 2	—	—	—	—	—
Andijan	9·2	271	e 2 15	− 1	—	—	—	—	—
Tchimkent	11·2	281	e 2 43	− 1	—	—	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		11·6	263	i 2 50	0	e 5 2	+ 1	—	—	—
Stalinabad		12·4	263	i 2 57	− 4	i 5 15	− 6	—	—	—
Samarkand		13·4	269	e 3 9	− 5	—	—	—	—	—
Ashkabad		20·4	268	e 4 40	− 1	—	—	—	—	—
Sverdlovsk		22·0	323	4 53	− 5	e 8 47	− 9	—	—	—
Hyderabad	N.	24·2	194	—	—	10 3	+28	—	—	—
Bombay		24·4	207	—	—	e 10 2	+23	—	—	—
Poona	E.	24·7	205	9 59	S	(9 59)	+15	e 10 44	SS	13·8
Grozny		28·6	287	e 6 0	0	—	—	—	—	—
Moscow		33·6	312	e 6 42	− 2	—	—	—	—	—
College		66·7	22	e 10 59	+ 4	—	—	—	—	—

Long waves were also recorded at Kodaikanal, Copenhagen, De Bilt, and Upsala.

March 9d. 12h. 28m. 37s. Epicentre 37°·0N. 121°·5W. (as on 1947, June 22d.).

Intensity VII at Hollister, with considerable damage; VI at Alameda, Alviso, Berkeley, Fairfax, Hayward, Los Baños, Morgan Hill, Oakland, San Francisco, Santa Cruz, etc.; less strong at many other places. Macroseismic area 20,000 sq. miles.

Epicentre 37°01′N, 121°29′W.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949, Serial No. 748, Washington, 1951, p. 9-11, with macroseismic chart, p. 14.

$A = -·4183$, $B = -·6826$, $C = +·5992$; $\delta = -4$; $h = -1$;
$D = -·853$, $E = +·522$; $G = -·313$, $H = -·511$, $K = -·801$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick		0·4	340	i 0 9k	P_g	—	—	—	—	—
Santa Clara		0·5	314	i 0 3	−11	i 0 21	− 2	—	—	—
Branner		0·7	307	i 0 16	− 1	—	—	—	—	—
Berkeley		1·1	325	i 0 21	− 1	i 0 35	− 4	—	—	—
San Francisco		1·1	315	i 0 22	0	i 0 35	− 4	—	—	—
Fresno		1·4	101	i 0 26	− 1	i 0 43	− 3	—	—	—
Ukiah		2·5	328	e 0 48	P*	i 1 21	S_g	i 0 58	P_g	i 1·6
Tinemaha		2·6	88	i 0 46	+ 2	i 1 20	S*	—	—	—
Reno		2·9	22	i 0 49k	+ 1	—	—	i 0 59	P_g	—
Santa Barbara		2·9	151	i 0 49	+ 1	i 1 27	+ 3	—	—	—
Haiwee		3·0	107	i 0 50	0	i 1 38	S_g	—	—	—
Mineral		3·4	359	i 0 55	0	i 1 39	+ 2	i 1 7	P_g	—
Shasta Dam		3·8	349	i 0 59	− 2	—	—	—	—	—
Pasadena		3·9	135	i 1 2	0	i 1 46	− 4	—	—	—
Ferndale	N.	4·2	330	i 1 27	P_g	—	—	—	—	—
Pierce Ferry		6·1	96	i 1 34	0	—	—	—	—	—
Salt Lake City		8·4	60	e 2 8	+ 2	e 3 17	−26	e 3 5	?	e 3·8
Tucson		10·0	115	i 2 26	0	e 4 26	+ 4	—	—	i 5·0
Butte	N.	11·2	34	e 2 49	+ 5	—	—	—	—	e 5·9
Hungry Horse		12·6	23	i 2 49	−14	—	—	—	—	—
Rapid City	E.	15·6	57	e 4 53	+70	e 7 49	+72	—	—	e 9·3
Lubbock		16·4	95	4 3	+10	—	—	—	—	—
St. Louis		24·7	76	e 5 26	+ 2	e 10 42	SS	—	—	—
Cleveland	E.	31·1	69	i 9 51	?	—	—	—	—	—
Alicante		87·4	42	—	—	26 39	?	—	—	—

Additional readings :—
Reno iEN = 0m.53s.
Mineral iN = 1m.18s. and 1m.45s.
Ferndale iE = 1m.39s., iN = 2m.29s., iE = 2m.33s., iN = 3m.1s.
Tucson i = 3m.3s. and 4m.56s.
Cleveland iE = 9m.55s.
Long waves were also recorded at other North American stations and at Scoresby Sund.

March 9d. 14h. 55m. 33s. Epicentre 15°·8S. 171°·2W. Depth of focus 0·020.

Intensity III-IV at Apia. Apia Observatory, Western Samoa. Preliminary Seismological Bulletin, January-March, 1949, p. 3.

Epicentre 16°·5S. 174°·5W.; depth of focus 150km. (Strasbourg).

A = −·9577, B = −·0973, C = −·2706; δ = −12; h = +6;
D = −·101, E = +·995; G = +·269, H = +·027, K = −·963.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		3·1	50	i 0 46	− 4	1 21	− 7	—	—	—
Auckland	N.	23·1	203	4 57	+ 5	8 56	+ 8	—	—	—
Arapuni	E.	23·9	200	—	—	e 9 27?	SS	—	—	—
Tuai	N.	24·1	197	4 59	− 3	9 3	− 2	—	—	—
New Plymouth	E.	25·4	201	5 16	+ 2	—	—	i 5 38	pP	—
Wellington		27·1	199	5 25	− 5	9 41	−13	—	—	—
Kaimata	N.E.	29·4	202	5 46	− 4	10 29	− 2	—	—	—
Riverview		36·0	234	i 6 46a	− 1	i 12 9	− 4	i 8 2	PP	e 15·9
Berkeley	Z.	72·3	42	i 11 11a	+ 1	—	—	i 11 21	PcP	—
Lick	Z.	72·4	42	i 11 12k	+ 2	—	—	i 11 50	pP	—
Pasadena	Z.	72·8	42	i 11 13k	0	—	—	i 11 52	pP	—
Fresno	Z.	73·2	43	i 11 18	+ 3	—	—	i 11 54	pP	—
Palomar		73·3	48	e 11 14	− 2	—	—	i 11 54	pP	—
Riverside	Z.	73·3	47	i 11 16	0	—	—	i 11 54	pP	—
Tinemaha	Z.	74·4	44	i 11 23k	+ 1	—	—	i 12 2	pP	—
Reno	Z.	74·8	42	e 11 27	+ 3	—	—	i 12 8	pP	—
Boulder City		76·1	47	i 12 6	pP	—	—	—	—	—
Pierce Ferry		76·8	47	i 11 36	0	—	—	—	—	—
Tucson		77·2	51	i 11 38	0	—	—	i 12 15	pP	e 38·7
College		82·9	11	i 12 9	+ 1	—	—	i 12 41	pP	—
Hungry Horse		83·2	36	i 12 9	0	—	—	—	—	—
Collmberg		144·1	351	e 19 17	[0]	—	?	e 24 5	?	—
Jena		144·6	352	e 19 20	[+ 3]	—	—	e 20 2	pPKP	—
Paris		146·9	4	e 19 24	[+ 2]	—	—	i 20 10	pPKP	—
Stuttgart	Z.	147·0	355	e 19 23	[+ 1]	—	—	e 20 9	pPKP	—
Strasbourg		147·3	357	i 19 28	[+ 6]	—	—	i 20 14	pPKP	—
Basle		148·3	357	e 19 30	[+ 6]	e 25 57	[−17]	e 20 23a	pPKP	—
Zürich		148·4	356	e 19 9	[−15]	—	—	—	—	—
Chur		148·9	355	e 19 27	[+ 2]	—	—	i 19 31a	?	—
Triest		149·5	350	i 19 33	[+ 8]	—	—	—	—	—
Clermont-Ferrand		150·1	4	i 19 34	[+ 8]	—	—	i 20 18	pPKP	—
Helwan	Z.	152·7	305	i 19 40	[+10]	—	—	e 23 24	PP	—
Tamanrasset	Z.	173·0	2	e 19 53	[+ 3]	—	—	i 20 36k	pPKP	—

Additional readings :—
Auckland iN = 6m.41s., sS?N = 9m.31s.
Riverview iPPPEZ = 8m.15s., eZ = 15m.6s., iS_cSEN = 16m.55s.
Reno iN = 11m.41s., iE = 12m.19s.
Tucson i = 12m.37s.
College i = 12m.19s.
Jena eN = 20m.31s.
Paris $iPKP_3$ = 19m.35s., $ipPKP_3$ = 20m.23s., ePP = 21m.48s., e = 22m.22s.
Stuttgart iPKPZ = 19m.27s.a, eZ = 19m.41s. and 19m.53s., ePP?Z = 23m.32s.
Strasbourg e = 19m.43s., i = 20m.21s. and 21m.14s., iPP = 21m.45s.
Helwan eZ = 19m.53s. and 24m.9s.
Tamanrasset eZ = 20m.2s., $iPKP_2Z$ = 21m.22s.k, $epPKP_2Z$ = 22m.4s., ePPZ = 25m.12s., ePPP = 29m.7s.

March 9d. Readings also at 0h. (Samarkand, near Obi-garm, Andijan, Murgab, and Stalinabad), 2h. (near Batavia), 3h. (College), 4h. (Obi-garm, Almata, Samarkand, near Frunse, Tchimkent, and Tashkent), 11h. (Klyuchi, near College, Samarkand, Andijan, Tchimkent, near Stalinabad, and Obi-garm), 12h. (near Santa Clara, Berkeley, Lick, Branner, Fresno, San Francisco, Mineral, and Reno), 13h. (College, near Florence, and near Copiapo). 14h. (Tamanrasset and near Andijan), 15h. (College, Mount Wilson, Riverside, Tinemaha, Stuttgart, near Bologna, and Florence), 16h. (Boulder City, Hungry Horse, and Pierce Ferry), 17h. (College and Copiapo), 18h. (College), 20h. (Tchimkent, Frunse, near Obi-garm (2), Stalinabad, Murgab, Andijan, and near Tucson), 21h. (Wellington, Auckland, Pierce Ferry, Shasta Dam, and Stuttgart), 22h. (near Florence, Salo, and Bologna (2)).

March 10d. 21h. 27m. 8s. Epicentre 38°·1N. 20°·4E. (given by Strasbourg).

A = +·7394, B = +·2750, C = +·6145 ; δ = −5 ; h = −1 ;
D = +·349, E = −·937 ; G = +·576, H = +·214, K = −·789.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		3·4	315	2 0	S_g	—	—	—	—	—
Sofia		5·1	25	e 1 5	−15	e 2 26	+ 6	—	—	—
Belgrade		6·7	0	e 1 31a	−11	i 3 30	S*	e 2 10	P_g	—
Rome		7·2	304	(e 1 45)	− 4	(e 3 16)	+ 3	—	—	—
Istanbul		7·3	63	e 2 27	P_g	i 2 59	−16	—	—	—
Bucharest		7·6	32	e 1 55	0	e 3 24	+ 1	e 2 35	P_g	—
Zagreb		8·4	338	e 2 2?	− 4	—	—	—	—	e 4·5
Padova		9·0	318	—	—	e 4 24	+26	—	—	e 6·9
Triest		9·0	329	e 2 57	P_g	e 4 26	S*	e 3 14	PP	5·5
Salo		10·5	319	e 2 57	+22	e 4 55	+20	—	—	—
Zürich		12·7	321	e 3 14k	+ 9	—	—	—	—	e 7·9
Basle		13·3	319	e 3 16	+ 3	—	—	—	—	—
Ksara		13·3	104	—	—	(e 5 41)	− 1	—	—	e 9·7
Stuttgart		13·4	326	e 3 12	− 2	—	—	—	—	e 7·9
Strasbourg		13·9	323	e 3 33	+12	—	—	e 3 40	PP	—
Collmberg		14·2	341	e 3 25	+ 1	—	—	—	—	—
Jena		14·3	337	e 3 28	+ 2	—	—	—	—	e 8·3
Clermont-Ferrand		15·0	306	e 3 42	+ 7	—	—	—	—	—
Paris		16·8	315	e 4 1	+ 3	—	—	—	—	—
De Bilt		17·6	328	—	—	i 7 47	+24	—	—	9·9
Kew		19·8	319	—	—	e 8 39	+26	—	—	e 14·9
Tamanrasset	z.	19·9	224	e 4 37	+ 1	—	—	—	—	e 10·3
Ottawa	z.	67·9	311	e 10 56	− 6	—	—	—	—	—
College		77·0	355	e 11 42	−14	—	—	—	—	—
Hungry Horse		84·9	331	i 12 28	−10	—	—	—	—	—
Pierce Ferry		95·0	324	e 13 18	− 8	—	—	—	—	—
La Paz	z.	98·9	255	21 22	PKS	—	—	—	—	—

Additional readings and notes :—
Taranto e = 2m.6s. and 2m.44s.
Belgrade i = 3m.54s. and 5m.7s.
Rome eP*N = 3m.49s., eS_gN = 4m.33s ; the P and S entered have been reduced by 2m. and 1m. respectively to fit the table.
Bucharest eN = 3m.9s.
Ksara S reading increased by 13 minutes.
Stuttgart eZ = 3m.21s.
Strasbourg ePPP? = 4m.0s.
Clermont-Ferrand e = 4m.18s.
Tamanrasset iZ = 4m.46s.a, eZ = 5m.22s.
Potsdam gives long waves only.

March 10d. Readings also at 0h. (Ottawa, Padova, Salo, Zürich, Stuttgart, near Bologna (2), Florence, Triest, and near San Juan), 1h. (Florence, near Bologna (3), and near Pierce Ferry), 2h. (College, near Andijan, Obi-garm (2), and Stalinabad (2)), 4h. (Apia, Palomar, Riverside, Tinemaha, Hungry Horse, and College), 7h. (Ashkabad), 8h. (Bologna and Pierce Ferry), 9h. (Frunse, Stalinabad, near Andijan, and Obi-garm), 10h. (near Santa Lucia), 11h. (Wellington, Shasta Dam, Hungry Horse, College, near Andijan, Belgrade, Padova, Salo, Stuttgart (2), near Basle (2), Chur (2), Zagreb (2), Florence, Bologna, Zürich (2), and Triest (2)), 12h. (Samarkand, near Obi-garm, and Stalinabad), 13h. (Murgab, near Obi-garm, Stalinabad, and near Andijan), 14h. (Bologna, Bogota, and La Paz), 15h. (La Paz), 18h. (Poona, Samarkand, near Obi-garm, Stalinabad, and Tchimkent), 19h. (near Mizusawa), 20h. (Obi-garm, Tchimkent, near Murgab, and Stalinabad), 21h. (near Ashkabad), 22h. (Ottawa, Stuttgart, Brisbane, and near Riverview, Dalton-Gunning area, N.S.W., Proc. R.Soc., N.S.W., 1950, 84, No. 1, pp. 17-27, with maps), 23h. (Riverview, Calcutta, Andijan, Frunse, Murgab, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent).

March 11d. 18h. 24m. 22s. Epicentre 7°·5N. 126°·7E. (as on 1945, May 29d.).

A = −·5926, B = +·7950, C = +·1297; δ = +2; h = +7;
D = +·802, E = +·598; G = −·078, H = +·104, K = −·992.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		24·0	237	e 5 20	+ 3	i 10 10	+38	—	—	—
Vladivostok		35·8	6	e 7 8	+ 5	—	—	—	—	—
Andijan		58·4	313	e 9 59	− 1	18 5	+ 3	—	—	—
Obi-garm		59·8	311	e 10 7	− 2	—	—	—	—	—
Stalinabad		60·4	311	e 10 10	− 3	—	—	—	—	—
Samarkand		62·1	311	e 10 58	+33	—	—	—	—	—
Sverdlovsk		70·8	328	11 17	− 3	20 33	− 2	—	—	—
College		81·3	26	i 12 16	− 4	—	—	e 13 41	PP	—
Moscow		83·4	326	e 12 27	− 3	e 22 47	− 4	e 22 38?	SKS	—
Hungry Horse		103·1	37	e 13 56	− 6	—	—	—	—	—

March 11d. 19h. 22m. 28s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030. (as on 4d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		2·1	342	i 0 41	− 1	i 1 12	− 2	—	—	—
Stalinabad		2·3	323	i 0 43	− 1	i 1 17	0	—	—	—
Murgab		3·2	59	i 0 55	+ 1	i 1 36	+ 1	—	—	—
Samarkand		4·1	319	i 1 3	− 1	i 1 52	− 2	—	—	—
Andijan		4·3	20	1 7	0	i 1 59	0	—	—	—
Tashkent		4·7	349	e 1 12	0	i 2 8	0	—	—	—
Tchimkent		5·6	354	i 1 23	0	i 2 27	− 1	—	—	—
Frunse		6·9	26	e 1 40	0	e 2 59	+ 1	—	—	—
Almata		8·2	35	i 1 57	0	i 3 50	+ 2	—	—	—
New Delhi	N.	9·8	143	e 3 22	+65	i 3 52	−13	—	—	—
Poona	E.	18·3	170	e 6 55	?	e 7 9	− 3	—	—	e 8·8
Grozny		20·0	297	e 4 46	PP	—	—	—	—	—
Leninakan		21·1	290	e 4 39	+11	—	—	—	—	—
Sverdlovsk		21·2	345	e 4 30	+ 1	—	—	8 35	PcP	—
College		74·4	17	i 11 14	− 1	—	—	e 12 30	PP	—
Shasta Dam		102·1	11	i 12 36	−54	—	—	—	—	—
Boulder City		107·5	5	i 10 23	?	—	—	—	—	—

Additional readings :—
College e = 12m.5s.
Boulder City i = 10m.56s.

March 11d. 20h. 27m. 38s. Epicentre 31°·5N. 93°·5E.

A = −·0521, B = +·8526, C = +·5199; δ = −6; h = +1;
D = +·998, E = +·061; G = −·032, H = +·519, K = −·854.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	10·0	208	e 2 30	+ 3	i 4 38	+16	i 5 56	S_g	—
New Delhi	N.	14·4	263	—	—	e 5 53	−16	—	—	i 7·0
Frunse		18·8	313	e 4 31	+ 8	—	—	—	—	—
Andijan		19·4	304	e 4 29	− 1	—	—	—	—	—
Hyderabad	N.	19·6	228	e 4 38	+ 6	—	—	—	—	—
Obi-garm		20·7	298	e 4 42?	− 2	e 8 8?	−23	—	—	—
Stalinabad		21·4	298	e 4 47	− 4	e 8 31	−14	—	—	—
Tashkent		21·8	305	e 4 56	0	e 8 40	−12	e 9 28	SS	—
Poona		21·9	239	i 4 53	− 4	i 8 54	0	10 52	Q	12·6
Bombay		22·5	241	e 5 2	0	e 9 1	− 4	—	—	11·0
Samarkand		23·0	298	e 5 17	+10	—	—	—	—	—
Kodaikanal	E.	25·9	220	—	—	10 18	+14	—	—	—
Stuttgart		63·5	313	e 10 43	+ 9	—	—	—	—	e 34·4
College		72·8	24	e 12 0	+28	—	—	e 14 39	PP	—

Poona gives also iEN = 5m.3s.
Long waves were also recorded at Upsala, Potsdam, De Bilt, Strasbourg, and Kew.

March 11d. 22h. 28m. 12s. Epicentre 25°·8N. 98°·4E. (as on 1941, Oct. 31d.).

$A = -·1317$, $B = +·8918$, $C = +·4329$; $\delta = +5$; $h = +3$;
$D = +·989$, $E = +·146$; $G = -·062$, $H = +·428$, $K = -·902$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	9·7	253	e 2 26	+ 4	i 4 30	+15	5 14	S_g	6·1
New Delhi	N.	19·0	283	—	—	e 7 46	− 9	i 7 59	SS	—
Hyderabad	N.	20·3	250	4 46	+ 6	8 41	+18	8 32	PcP	—
Poona		23·8	258	i 5 20	+ 5	i 9 33	+ 5	i 6 7	PP	16·3
Murgab		24·1	307	5 19	+ 1	—	—	—	—	—
Bombay		24·6	259	e 5 30	+ 7	e 9 54	+12	—	—	12·9
Almata		24·7	320	i 5 29	+ 5	e 9 53	+ 9	—	—	—
Kodaikanal	E.	25·1	237	e 5 29	+ 1	e 10 0	+ 9	—	—	—
Frunse		25·9	317	e 5 38	+ 3	—	—	—	—	—
Andijan		26·3	310	5 38	− 1	—	—	—	—	—
Irkutsk		26·8	8	5 41	− 3	e 10 16	− 3	—	—	—
Stalinabad		28·0	305	5 52	− 3	10 34	− 4	—	—	—
Tashkent		28·6	310	e 5 56?	− 4	e 10 48?	0	e 6 52	PP	—
Tchimkent		28·8	313	i 6 0	− 2	—	—	—	—	—
Samarkand		29·6	304	e 6 11	+ 2	—	—	—	—	—
Vladivostok		32·3	49	i 6 28	− 5	e 14 0	SSS	e 16 43	ScS	—
Sverdlovsk		41·1	329	e 7 46	− 1	13 59	− 2	17 0	SS	—
Sotchi		50·4	307	e 8 57	− 4	—	—	—	—	—
Moscow		52·7	322	e 9 17	− 1	e 16 44	− 2	—	—	—
Ksara		54·1	294	e 9 24	− 5	—	—	—	—	—
Collmberg		67·5	318	e 10 57	− 3	—	—	—	—	—
Jena	N.	68·5	317	e 11 3	− 3	—	—	—	—	—
Salo	Z.	70·6	313	e 11 20	+ 1	—	—	—	—	—
Stuttgart		70·6	315	e 11 16	− 3	—	—	—	—	e 37·8
Paris		74·7	317	i 11 41	− 2	—	—	—	—	—
Kew		75·4	321	e 10 48?	−59	—	—	—	—	e 38·8
College		76·3	24	i 11 48	− 4	—	—	e 14 55	PP	—
Tamanrasset	Z.	82·8	292	i 12 26k	− 1	—	—	—	—	—
Hungry Horse		100·7	21	i 13 48	− 4	—	—	—	—	—
Bogota		148·9	345	e 19 52	[+ 6]	—	—	—	—	—

Additional readings :—
Calcutta $S_gE = 5$m.51s.
Hyderabad SSN = 9m.8s.
Poona iE = 6m.26s. and 9m.42s., eE = 10m.36s. and 10m.58s.
Tashkent eSS = 12m.18s., eSSS = 13m.12s.
Jena eE = 11m.6s.
Paris eP = 11m.44s.
Long waves were also recorded at Batavia, Copenhagen, Potsdam, De Bilt, and Strasbourg.

March 11d. Readings also at 2h. (College, Hungry Horse, Samarkand, near Obi-garm and Stalinabad), 3h. (near Riverview), 4h. (Riverview, Shasta Dam, Hungry Horse, College, and near Ashkabad), 5h. (near Tacubaya, near College, and near Ashkabad), 7h. (near Andijan), 8h. (Samarkand, near Murgab, Obi-garm, and Stalinabad), 9h. (near Istanbul), 10h. (La Paz and near Tacubaya), 11h. (College, Hungry Horse, Pierce Ferry, and near Andijan), 12h. (Riverview and near Andijan), 14h. (Overton), 15h. (Murgab, Samarkand, near Obi-garm, and Stalinabad), 16h. (Hungry Horse), 17h. (Basle and near Ottawa), 18h. (Santa Lucia, Hungry Horse, Samarkand, and near Stalinabad), 19h. (New Delhi, Murgab, Obi-garm, Samarkand, Stalinabad, near Almata, and near Malaga), 20h. (Bombay, Ksara, Tashkent, Sverdlovsk, Stuttgart, and College), 23h. (Belgrade, Padova, Rome, Salo. Taranto, Triest, Zagreb, Stuttgart, Hungry Horse, Obi-garm, and near Andijan).

March 12d. 19h. 27m. 53s. Epicentre 61°·0N. 148°·0W.

Intensity III at Anchorage, Alaska.

L. M. Murphy and F. P. Ulrich.
U.S. Earthquakes, 1949, Serial No. 748. Washington, 1951, p. 29. Epicentre given by Strasbourg.

$A = -·4133$, $B = -·2582$, $C = +·8732$; $\delta = -4$; $h = -9$;
$D = -·530$, $E = +·848$; $G = -·741$, $H = -·463$, $K = -·487$.

		Δ	Az.	P.	O−C.	Supp.			L.
		°	°	m. s.	s.	m.	s.		m.
College		3·9	1	e 0 59	− 3	—		—	e 2·0
Hungry Horse		23·1	108	i 5 12	+ 4	—		—	i 12·4
Shasta Dam		25·7	130	i 5 33	0	—		—	—
Mineral	z.	26·3	130	i 5 30	− 9	—		—	—
Reno		27·7	128	e 5 53	+ 1	i 7	1	PPP	—
Berkeley	z.	28·2	133	i 5 55k	− 1	—		—	—
Tinemaha		30·4	128	i 6 18a	+ 2	i 6	26	pP	—
Overton	z.	32·4	124	i 6 35	+ 1	—		—	—
Boulder City		32·7	124	i 6 37	+ 1	—		—	—
Pierce Ferry		32·9	123	i 6 39	+ 1	—		—	—
Pasadena		33·0	130	i 6 39a	0	i 6	46	pP	—
Riverside	z.	33·5	130	i 6 43a	0	i 6	48	pP	—
Palomar		34·2	129	i 6 49a	0	—		—	—
Tucson		37·6	123	i 7 19	+ 1	—		—	e 22·2
St. Louis		41·7	96	e 7 53	+ 1	—		—	—
Ottawa	z.	43·6	77	e 8 8	0	—		—	—
Cleveland	N.	43·7	85	i 8 9	+ 1	—		—	—
Shawinigan Falls	N.	44·1	73	e 8 12	0	—		—	—
Weston		48·0	76	i 8 43	0	—		—	—
Paris		68·0	21	i 11 4	+ 1	—		—	—
Stuttgart	z.	69·0	16	e 11 22?	+13	—		—	—

Additional readings :—
College i = 1m.7s. and 1m.16s.
Mineral iZ = 5m.48s.
Reno iZ = 6m.1s.
Berkeley iZ = 6m.4s.
Tinemaha $ePcPZ$ = 9m.8s., $eScP$ = 12m.52s.
Overton iZ = 6m.58s.
Pasadena iZ = 6m.56s.
Cleveland iPZ = 8m.18s.
Long waves were also recorded at Chicago, Philadelphia, Lincoln, and Sitka.

March 12d. Readings also at 2h. (near Granada), 3h. (Tacubaya and Manzanillo), 7h. (Istanbul and near Andijan), 8h. (near College), 9h. (Ksara), 10h. (near Irkutsk, near Andijan, and near Basle), 11h. (near College), 12h. (near Andijan), 15h. (Andijan, Tchimkent, near Almata, and Frunse), 18h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Almata, Samarkand, near Andijan, Frunse, Murgab, Obi-garm, Stalinabad, Tashkent, and Tchimkent), 19h. (Padova, Salo, Stuttgart, near Basle, and Zürich), 20h. (near Tucson), 21h. (Tacubaya (2), Samarkand, Tchimkent, near Andijan, Murgab, Obi-garm, and Stalinabad).

March 13d. 12h. 35m. 19s. Epicentre 12°·5S. 106°·5E. Depth of focus 0·010.

Epicentre given by U.S.S.R.

$A = -·2774$, $B = +·9364$, $C = -·2151$; $\delta = +6$; $h = +6$;
$D = +·959$, $E = +·284$; $G = +·061$, $H = -·206$, $K = -·977$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Batavia		6·3	3	i 1 35	+ 3	3 20	SSS	—		—	—
Calcutta	E.	39·1	334	e 8 14	+55	e 13 9	− 2	—		—	—
Poona	E.	44·6	314	i 14 3	?	i 14 11	−21	—		—	—
Murgab		59·1	331	9 50	− 2	—	—	—		—	—
Vladivostok		60·0	23	e 12 46?	PP	e 18 55?	PPS	—		—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		61·5	329	e 10 8	− 1	—	—	—	—	—
Andijan		61·7	332	e 10 7	− 3	e 19 49	S_eS	—	—	—
Stalinabad		61·8	329	10 9	− 2	—	—	—	—	—
Samarkand		63·6	327	e 10 23	0	—	—	—	—	—
Tchimkent		64·2	332	i 10 26	− 1	—	—	—	—	—
Grozny		78·4	321	e 11 54	+ 2	21 44	+ 6	—	—	—
Leninakan		78·4	317	e 11 54	+ 2	—	—	—	—	—
Sverdlovsk		78·8	338	11 46	− 8	21 26	−16	—	—	—
Ksara		81·3	307	e 12 22	+15	e 21 43?	−25	—	—	—
Helwan	N.	83·6	302	—	—	i 23 5	SP	—	—	—
College		107·9	25	e 13 29	P	—	—	(e 18 42)	PP	e 18·7
Shasta Dam		128·9	47	e 18 46	[−11]	—	—	i 18 55	pPKP	—
Hungry Horse		131·0	34	i 18 46	[−15]	i 22 10	PKS	i 19 19	pPKP	—
Tinemaha	z.	133·1	50	e 18 50	[−15]	e 22 5	PKS	e 19 3	pPKP	—
Pasadena	z.	134·1	54	e 18 50	[−16]	e 22 17	PKS	i 19 2	pPKP	—
Riverside	z.	134·8	54	e 19 0	[− 8]	—	—	—	—	—
Boulder City		136·1	50	e 18 47	[−23]	—	—	i 19 3	pPKP	—
Overton	z.	136·2	51	i 18 57	[−13]	—	—	—	—	—
Pierce Ferry		136·7	51	e 18 56	[−15]	—	—	e 21 3	?	—
Tucson		140·6	53	e 19 12	[− 6]	e 22 14	PKS	—	—	—
Harvard		150·1	356	i 19 27	[− 7]	—	—	i 19 59	PKP_2	—
Weston		150·2	356	i 19 26	[− 8]	—	—	—	—	—

Additional readings :—
Pasadena eZ = 19m.26s.
Harvard i = 20m.41s.?

March 13d. 18h. 43m. 3s. Epicentre 21°·0S. 67°·5W. Depth of focus 0·005.
(as on 1947, July 16d.).
Intensity IV between 20° and 21° S. Lat. Macroseismic radius 300km. Suggested epicentre 22°·0S. 68°·5W.

F. Greve.
Boletin del año 1949, Instituto sismologico. Santiago p. 12.

A = +·3576, B = −·8633, C = −·3563 ; δ = +11 ; h = +4 ;
D = −·924, E = −·383 ; G = −·136, H = +·329, K = −·934.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		4·5	351	i 1 19a	+12	i 2 13	+14	—	—	—
Copiapo	N.	6·8	202	i 1 50	+11	2 51	− 5	2 8	PP	—
Santa Lucia	N.	12·7	190	e 2 56	− 4	4 20	−60	—	—	—
La Plata	E.	16·2	151	4 3	+18	6 42	0	—	—	i 7·2
	N.	16·2	151	4 27	+42	6 44	+ 2	—	—	7·2
Rio de Janeiro		22·6	99	i 4 59	+ 3	i 9 3	+ 9	5 31	PP	—
Bogota		26·3	346	i 5 33	+ 2	i 9 59	+ 2	e 6 2	pP	—
Fort de France		36·0	12	—	—	e 16 32	S_eS	—	—	—
San Juan		39·2	3	e 7 23	0	e 13 10	− 9	e 8 19	PP	e 20·8
Tacubaya		50·7	321	i 8 56	+ 1	—	—	—	—	—
Philadelphia		61·1	354	—	—	e 18 16	− 6	e 18 25	PS	e 25·8
Fordham		61·8	356	e 10 14	0	e 18 31	0	e 19 23	sS	—
Weston		63·2	358	i 10 23	− 1	e 19 1	+12	—	—	—
Harvard		63·3	358	i 10 31	+ 7	—	—	i 10 54	pP	—
St. Louis		63·3	340	i 10 17	− 7	i 18 36	−14	i 10 47	pP	—
Cleveland		63·5	349	i 10 24	− 2	i 18 47	− 5	i 10 54	pP	—
Ottawa	z.	66·5	354	i 10 44	− 1	—	—	i 10 58	pP	—
Tucson		67·2	322	i 10 46	− 3	e 14 4	PP	i 11 34	pP	—
Shawinigan Falls	N.	67·4	357	i 9 51	−60	—	—	—	—	—
Palomar	N.	71·7	318	i 11 17	0	—	—	i 11 48	pP	—
Pierce Ferry		71·8	322	i 11 15	− 3	—	—	—	—	—
Boulder City		72·2	321	i 11 17	− 3	—	—	e 11 45	pP	—
Overton	z.	72·4	322	i 11 19	− 2	—	—	—	—	—
Riverside		72·4	318	i 11 19k	− 2	—	—	i 11 50	pP	—
Pasadena		73·0	318	i 11 22k	− 3	i 20 42	− 3	i 11 51	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Logan		74·7	328	i 11 30	− 4	—	—	e 14 26	PP	—
Tinemaha		75·0	320	i 11 33	− 3	—	—	i 11 53	pP	—
Fresno	z.	75·7	320	i 11 36	− 4	—	—	—	—	—
Reno		77·5	321	i 11 49k	− 1	e 22 9	SKS	i 12 21	pP	—
Branner	z.	77·6	319	i 11 49a	− 2	—	—	i 12 19	pP	—
Berkeley	z.	77·9	319	i 11 50k	− 2	—	—	i 12 20	pP	—
San Francisco	E.	78·0	319	e 11 51	− 2	—	—	—	—	—
Mineral	z.	79·1	321	i 11 56	− 3	—	—	—	—	—
Shasta Dam		79·8	321	i 11 57	− 6	—	—	—	—	—
Hungry Horse		80·6	331	i 12 5	− 2	—	—	—	—	—
Malaga	z.	82·7	47	i 12 25k	+ 7	—	—	i 12 56a	pP	—
Tamanrasset	z.	83·4	62	i 12 26a	+ 4	—	—	i 12 58a	pP	—
Granada		83·5	47	12 3k	−19	22 27	−10	—	—	—
Almeria		84·1	47	12 19	− 6	22 35	− 8	15 21	PP	44·0
Toledo		84·6	44	i 12 31	+ 3	22 46	− 2	i 13 3	pP	—
Alicante		86·2	47	12 34	− 1	22 58	[+ 5]	13 6	pP	41·1
Rome	E.	96·6	48	e 21 5	?	i 23 56	[+ 2]	—	—	—
Stuttgart	z.	97·2	40	e 13 29	+ 2	—	—	—	—	—
Triest		98·9	44	—	—	i 24 8	[+ 3]	—	—	—
College		104·8	334	e 13 58	− 2	e 27 36	PS	e 18 3	PP	—
Helwan		107·5	64	—	—	e 24 49	[+ 4]	e 28 57	PPS	—
Ksara		112·2	61	e 18 8	?	e 28 49	PS	e 19 17	PP	—
Calcutta		157·5	81	e 21 11	PKP_3	e 30 46	SKKS	—	—	—

Additional readings :—
La Paz iNZ =1m.29s. and 1m.45s., iZ =1m.57s., iNZ =2m.29s., iS_E =2m.42s.
La Plata N =5m.21s.
Santa Lucia N =3m.38s. and 4m.58s., E =5m.31s., N =6m.21s., E =6m.43s., N = 7m.1s., E =7m.44s.
Bogota isS =10m.47s., iScPEN ? =13m.57s.
San Juan e =7m.49s. and 8m.41s., i =14m.3s., e =16m.41s.
Harvard i =10m.36s.
St. Louis i =11m.1s., isS =19m.26s., i =20m.57s.
Cleveland esSE =19m.38s., eE =20m.6s. and 21m.0s.
Ottawa eZ =11m.15s.
Tucson i =11m.16s.
Overton iZ =12m.34s.
Riverside iZ =11m.40s. and 12m.4s.
Pasadena iZ =11m.38s. and 12m.6s., isSEN =21m.33s.
Logan i =12m.14s.
Tinemaha iZ =11m.45s. and 12m.4s.
Reno iZ =12m.8s.k, iE =12m.16s., iZ =12m.35s., eSN =22m.16s.
Berkeley iZ =12m.35s.
Tamanrasset eZ =12m.32s., isPZ =13m.20s.k.
Almeria PPP =17m.17s., PPS =24m.47s., SS =27m.57s.
Toledo e =23m.46s.
Alicante PP =14m.36s., PPP =16m.11s.
College e =14m.29s.

March 13d. Readings also at 0h. (Pierce Ferry), 3h. (Pierce Ferry and La Paz), 4h. (College, Boulder City, Shasta Dam, Hungry Horse, Bogota, and near La Paz (2)), 7h. (Padova, Salo, near Triest and Stuttgart), 9h. (La Paz, Bogota, Pasadena, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry (2), Shasta Dam, Hungry Horse (2), College, Calcutta, Bombay, and Poona), 10h. (Shasta Dam, Hungry Horse, near College, and near Batavia), 12h. (College, Pasadena, Riverside, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 13h. (Overton, Obi-garm, Samarkand, Stalinabad, near Ashkabad, and near Alicante), 14h. (Hungry Horse), 15h. (Rome, Sitka, College (2), Hungry Horse, Boulder City, and Pierce Ferry), 17h. (near Boulder City and Pierce Ferry), 18h. (Boulder City, Pierce Ferry, Tucson, Hungry Horse, College, near Andijan, Murgab, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 20h. (Reno, near Berkeley, Branner, Fresno, Lick, San Francisco, Santa Clara, Andijan, near Obi-garm, Stalinabad, and near Grozny), 23h. (near Andijan (2), Obi-garm (2), Murgab, Samarkand, and Stalinabad (2)).

March 14d. 3h. 6m. 33s. Epicentre 52°·8N. 168°·2W. (as on 1948, May 22d.).

$A = -·5943$, $B = -·1242$, $C = +·7945$; $\delta = -15$; $h = -6$;
$D = -·204$, $E = +·979$; $G = -·778$, $H = -·162$, $K = -·607$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		15·9	33	i 3 52	+ 5	—	—	—	—	e 7·8
Sitka		19·3	64	i 4 31	+ 2	e 8 9	+ 7	e 5 9	PP	e 11·8
Shasta Dam		33·1	93	i 6 39	− 1	—	—	—	—	—
Mineral	z.	33·8	93	i 6 45	− 1	—	—	—	—	—
Hungry Horse		34·0	75	i 6 47	− 1	—	—	—	—	—
Berkeley	z.	34·9	97	i 6 49a	− 6	—	—	—	—	—
Branner	z.	35·3	97	e 6 57	− 2	—	—	—	—	—
Reno	z.	35·4	93	e 6 59k	− 1	—	—	—	—	—
Lick	z.	35·6	97	i 7 1	0	—	—	—	—	—
Fresno	z.	37·2	96	i 7 14	− 1	—	—	—	—	—
Tinemaha		37·9	94	i 7 21	+ 1	—	—	i 7 37	pP	—
Logan		38·9	82	e 7 27	− 2	—	—	—	—	—
Pasadena	z.	39·9	97	e 7 37	0	—	—	i 7 52	pP	—
Riverside	z.	40·5	97	e 7 41	− 1	—	—	i 7 56	pP	—
Overton	z.	40·5	92	e 7 42	0	—	—	—	—	—
Boulder City		40·7	93	i 7 46	+ 2	—	—	—	—	—
Pierce Ferry		41·1	92	i 7 47	0	—	—	—	—	—
Palomar	N.	41·2	97	e 7 55	+ 7	—	—	—	—	—
Tucson		45·6	93	e 8 22	− 2	—	—	e 9 53	PP	—
St. Louis		53·6	72	i 8 43	−42	i 16 14	−44	e 18 43	?	—
Ottawa		57·0	57	e 9 51	+ 1	—	—	—	—	30·4
Weston		61·3	57	i 10 20	0	e 16 19	?	—	—	—
Stuttgart	z.	78·8	2	e 12 7	+ 1	—	—	—	—	—
Salo		82·0	0	e 12 3	−20	—	—	—	—	—
Ksara		91·2	341	e 13 17	+ 9	e 22 49	?	—	—	—

Additional readings :—
College e =4m.17s. and 6m.25s.
Sitka e =5m.37s., 6m.18s., and 7m.7s.
Berkeley iZ =7m.6s. and 7m.10s., eE =19m.57s.
Reno iE =7m.15s., eN =7m.18s., iZ =7m.46s., iE =7m.49s.
Palomar iN =8m.6s.
Weston i =10m.43s.
Stuttgart eZ =12m.17s.
Salo e =12m.34s. and 13m.20s.
Long waves were also recorded at Victoria, Chicago, Philadelphia, Seven Falls, and Honolulu.

March 14d. 6h. 10m. 12s. Epicentre 37°·0N. 121°·5W. (as on 9d.).

Felt throughout the same region as the shock of 9d., but less strongly. Intensity VI at Gilroy Hollister and Morgan Hill; V at Alviso, San Francisco, and Santa Cruz.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949, Serial 748, Washington, 1951, p. 11, with macroseismic chart, p. 12.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick		0·4	340	i 0 9	P_g	i 0 15	S_g	—	—	—
Santa Clara		0·5	314	i 0 13	− 1	i 0 22	− 1	—	—	—
Branner		0·7	307	i 0 16	− 1	i 0 26	− 2	—	—	—
Berkeley		1·1	325	i 0 21a	− 1	i 0 37	− 2	—	—	—
San Francisco		1·1	315	i 0 22	0	i 0 38	− 1	—	—	—
Fresno	z.	1·4	101	i 0 26	− 1	i 0 42	− 4	—	—	—
Ukiah		2·5	328	e 0 57	P_g	e 1 25	S_g	—	—	e 1·7
Tinemaha		2·6	88	i 0 46	+ 2	i 1 18	+ 1	—	—	—
Reno		2·9	22	i 0 51k	+ 3	i 1 27	+ 3	i 0 58	P_g	—
Santa Barbara	z.	2·9	151	i 0 48	0	e 1 20	− 4	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mineral		3·4	359	i 0 55	0	i 1 46	S*	i 1 6	P_g	—
Shasta Dam		3·8	349	i 1 1	0	—	—	—	—	—
Pasadena		3·9	135	e 1 2	0	i 1 49	− 1	—	—	—
Riverside		4·5	130	e 1 10	− 1	i 1 58	− 7	—	—	—
Boulder City		5·5	99	e 1 26	+ 1	—	—	i 1 45	P_g	—
Overton	z.	5·7	92	i 1 27	− 1	—	—	i 1 45	P_g	—
Pierce Ferry		6·1	96	e 1 34	0	—	—	—	—	—
Logan		8·9	54	e 2 25	P*	—	—	—	—	e 4·8
Tucson		10·0	115	e 2 26	− 1	e 4 11	− 9	e 3 15	P_g	e 4·9
Hungry Horse		12·6	23	e 3 7	+ 4	—	—	—	—	—

Additional readings :—
Berkeley iEZ = 25s., iE = 36s., iSE = 40s.
Fresno iZ = 39s., iN = 2m.46s.
Reno iE = 1m.15s., iZ = 1m.22s., iSN = 1m.30s., iEZ = 1m.34s., iN = 1m.40s.
Tucson e = 4m.39s.
Long waves were also recorded at Salt Lake City.

March 14d. 12h. 45m. 56s. Epicentre 45°·6N. 15°·3E.

Intensity VI at Petrova Vas (45°37′N. 15°10′E.), Suhor and Vivodina ; V at Karlovac Slavetic and Loka. Epicentre as adopted. Macroseismic radius 24km.

M. D. Uzelac.
Annuaire microséismique et macroséismique de Institut séismologique de Beograd, 1949, Nouvelle Série, No.9, Belgrade, 1950, p. 54.

$A = +·6772$, $B = +·1852$, $C = +·7121$; $\delta = -1$; $h = -4$;
$D = +·264$, $E = -·965$; $G = +·687$, $H = +·188$, $K = -·702$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Zagreb		0·5	66	i 0 12	− 2	i 0 18	− 5	—	—
Triest		1·1	273	i 0 24	+ 2	i 0 38	+ 1	—	—
Padova		2·7	245	—	—	e 1 21	+ 2	e 1 27	S_g
Salo		3·4	272	e 1 8	P_g	e 1 36	− 1	e 1 49	S_g
Zürich		5·0	293	e 1 18s	0	e 2 30	S*	e 2 48	S_g
Stuttgart		5·2	309	e 1 29?	+ 8	e 2 52	S_g	e 1 41	P_g
Basle		5·7	293	—	—	e 3 23	S_g	—	—
Jena	E.	5·9	336	—	—	e 3 1	S*	e 3 17	S_g

Jena gives also eN = 3m.11s.

March 14d. Readings also at 0h. (Sitka, College, Victoria, Bozeman, Butte, Mount Wilson, Riverside, Tinemaha, Boulder City, Overton, Pierce Ferry, Reno, Shasta Dam, Mineral, and Hungry Horse), 1h. (Chicago, Ottawa, Philadelphia, and Ksara), 2h. (near Obi-garm), 4h. (Hungry Horse, Pierce Ferry, and near Bogota), 5h. (near Samarkand, Tchimkent, Andijan, Murgab, Obi-garm, and Stalinabad), 6h. (Tacubaya), 7h. (Tucson and Tacubaya), 8h. (College and Hungry Horse), 9h. (Frunse, Murgab, Almata, Neuchatel, and near Zürich), 10h. (near Zürich), 11h. (near Samarkand, Andijan, Murgab, Obi-garm (2), and Stalinabad), 12h. (College, near Basle, Neuchatel, Zürich, and Stuttgart), 13h. (College, Hungry Horse, Pierce Ferry, and near Andijan), 15h. (College), 16h. (Hungry Horse), 17h. (La Paz and Tamanrasset), 18h. (Bogota, Rome, and near Apia), 19h. (Mount Wilson, Tinemaha, Tucson, Boulder City (2), Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Berkeley, near Branner, Fresno, Lick, San Francisco, Reno, and Mineral), 20h. (near Leninakan, Grozny, and Tiflis), 23h. (College, Overton, Samarkand, near Obi-garm and Stalinabad).

March 15d. Readings at 1h. (College, Salo, near Triest and Zagreb), 3h. (near Catania and Messina), 5h. (Salo, near Triest and Zagreb), 6h. (Santa Lucia), 7h. (La Paz), 11h. (near Taranto), 12h. (Andijan (2), Frunse, Samarkand (2), Tashkent (2), near Murgab, Obi-garm (2), and Stalinabad (2)), 16h. (Klyuchi), 17h. (Ksara, Belgrade, Rome, Basle, Strasbourg, Stuttgart, Paris, Jena, Clermont-Ferrand, Tamanrasset, and Pierce Ferry), 18h. (Tchimkent, Samarkand, near Obi-garm, Stalinabad, and near Mizusawa), 20h. (Butte, Bozeman, Boulder City, near Hungry Horse, and near Leninakan), 21h. (Overton and near Tucson), 22h. (Basle, Zürich, and Overton), 23h. (near Obi-garm).

March 16d. 22h. 15m. 7s. Epicentre 5°·4S. 151°·3E.

Intensity IV-V at Kokopo and III-IV at Rabaul.
Epicentre 5°·5S., 151°·0E. Depth 60km. (Pasadena).

Monthly seismic bulletin, Brisbane, March, 1949, p.2.

$A = -\cdot8737$, $B = +\cdot4784$, $C = -\cdot0878$; $\delta = -7$; $h = +7$;
$D = +\cdot480$, $E = +\cdot877$; $G = +\cdot077$, $H = -\cdot042$, $K = -\cdot996$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·4	175	i 4 58a	− 4	i 8 58	− 6	i 5 20	PP	—
Riverview		28·6	180	i 5 58a	− 2	i 10 42	− 6	i 6 7	pP	14·7
Melbourne	E.	33·1	189	i 6 56	+16	i 11 53	− 6	—	—	—
Subic Bay		36·6	304	i 7 13	+ 3	e 12 56	+ 3	—	—	e 18·4
Apia		37·4	106	e 7 24	+ 8	—	—	e 7 35	pP	e 15·9
Auckland	N.	38·3	149	7 22	− 2	13 8	−11	8 48	PP	19·9
Arapuni	E.	39·6	149	6 53?	−42	13 41	+ 3	—	—	16·9
Tuai	N.	40·9	149	7 42	− 4	e 13 49	− 9	—	—	—
Kaimata	NE.	41·4	158	7 47	− 3	—	—	—	—	—
Wellington		41·7	154	7 47	− 5	14 13	+ 3	9 37	PP	19·9
Perth		42·6	227	e 8 3	+ 4	14 23	0	9 53	PP	—
Christchurch		42·7	157	7 58	− 2	—	—	—	—	—
Batavia		44·3	267	i 8 8	− 5	e 14 44	− 4	—	—	18·1
Mizusawa		45·0	249	8 24	+ 5	e 18 17	SS	—	—	—
Vladivostok		51·1	342	i 9 7	+ 1	i 16 26	+ 2	i 16 41	PPS	—
Honolulu		56·3	60	e 9 49	+ 4	i 17 29	− 5	—	—	e 23·8
Calcutta		67·4	297	e 11 1	+ 2	i 19 46	− 9	i 20 15	PS	—
Irkutsk		69·6	331	11 16	+ 3	—	—	e 15 29	PPP	—
Colombo	E.	72·3	279	11 34	+ 5	20 44	− 8	—	—	37·9
Kodaikanal	E.	75·1	283	i 11 49	+ 3	i 21 25	+ 1	26 17	SS	36·6
Hyderabad	N.	75·3	290	e 11 48	+ 1	26 14	SS	14 30	PP	33·5
New Delhi	N.	78·6	301	e 12 14	+ 9	i 22 20	+18	i 22 58	PS	i 33·4
Poona		79·8	290	e 12 9	− 3	i 22 18	+ 4	e 15 13	PP	35·9
Bombay		80·8	290	e 12 20	+ 3	i 22 24	− 1	e 15 29	PP	32·1
College		82·7	22	i 12 25	− 2	i 22 34	−10	e 15 28	PP	e 37·4
Murgab		83·3	309	i 12 33	+ 3	i 22 49	− 1	—	—	—
Frunse		83·8	314	e 12 37	+ 5	e 22 56	+ 1	—	—	—
Andijan		84·9	312	12 43	+ 5	23 31	S_cS	—	—	—
Sitka		85·4	32	i 12 41	+ 1	i 23 4	− 7	e 24 3	PS	e 35·1
Obi-garm		86·6	310	i 12 7?	−39	i 22 46?	−37	i 15 31?	PP	—
Tchimkent		87·3	313	12 53	+ 3	i 23 29	0	—	—	—
Tashkent		87·3	312	i 12 53	+ 3	i 23 33	+ 4	e 16 12	PP	—
Stalinabad		87·3	310	i 12 53	+ 3	i 23 14	[− 2]	i 23 24	SKKS	—
Samarkand		88·8	310	e 13 1	+ 4	e 25 3	PS	—	—	—
Ukiah		89·4	51	e 13 5	+ 5	e 23 57	+ 8	e 25 8	PS	e 37·0
Berkeley		90·3	52	i 13 4a	0	i 23 57	0	i 16 51	PP	e 40·7
Santa Clara		90·5	52	e 13 4	− 1	i 23 56	− 3	e 25 20	PS	e 41·3
Shasta Dam		90·5	49	i 13 4	− 1	—	—	e 16 28	PP	—
Victoria		90·6	42	13 7	+ 2	i 24 2	+ 2	16 53	PP	40·9
Lick	Z.	90·7	52	i 13 6	0	—	—	—	—	—
Mineral	Z.	91·0	49	i 13 7	0	—	—	—	—	—
Seattle		91·3	42	—	—	e 24 0	− 6	—	—	e 40·6
Fresno	Z.	92·1	53	i 13 12	0	—	—	i 16 49	PP	e 43·2
Reno	Z.	92·3	50	i 13 14a	+ 1	e 23 44	[− 2]	e 16 50	PP	e 43·6
Pasadena		93·2	56	i 13 18a	+ 1	e 24 25	+ 2	e 16 58	PP	e 38·3
Tinemaha		93·4	53	i 13 19a	+ 1	—	—	—	—	—
Riverside	Z.	93·9	56	i 13 22	+ 1	—	—	—	—	—
Palomar	N.	94·3	57	i 13 24	+ 1	e 23 51	[− 6]	—	—	—
Sverdlovsk		94·6	327	i 13 24	0	i 23 54	[− 5]	17 14	PP	—
Boulder City		96·1	54	i 13 31	0	—	—	i 17 14	PP	—
Pierce Ferry		96·8	54	i 13 34	0	—	—	i 17 25	PP	—
Hungry Horse		96·9	41	i 13 34	0	—	—	i 38 29	P'P'	—
Butte	N.	97·9	43	—	—	e 24 16	[0]	e 24 38	SKKS	e 41·2
Logan		98·5	48	i 13 38	− 4	e 24 14	[− 6]	e 17 32	PP	e 44·8
Salt Lake City		98·5	49	e 14 23	?	e 25 2	− 6	e 17 35	PP	e 40·9

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bozeman		99·0	44	—	—	e 24 26	[+ 4]	e 36 2	SSS	e 43·3
Tucson		99·3	57	i 13 46	+ 1	e 25 8	− 6	i 17 46	PP	e 42·0
Tananarive		101·3	250	22 15	PKS	24 52	{−11}	32 32	SS	e 48·8
Grozny		104·8	313	e 18 39	PP	e 24 51	[+ 1]	e 25 16?	SKKS	—
Tiflis		105·7	311	e 14 17?	+ 3	i 24 52	[− 2]	i 18 43	PP	—
Leninakan		106·5	311	e 18 44?	PP	—	—	—	—	—
Piatigorsk		106·6	314	e 19 0	PP	25 0	[+ 2]	—	—	—
Moscow		107·4	327	e 14 22	+ 3	24 54	[− 7]	18 51	PP	—
Tacubaya		110·1	71	e 19 2	PP	—	—	—	—	59·3
Helsinki		111·8	334	e 19 23	PP	e 28 49	PS	e 39 4	SSS	e 60·9
Yalta		112·7	316	19 34	PP	—	—	—	—	—
Ksara		113·9	304	19 42?	PP	29 18	PS	—	—	—
Scoresby Sund		114·5	357	19 41	PP	25 29	[− 1]	29 32	PS	54·9
Upsala		115·1	336	—	—	e 24 23	[−69]	e 29 12	PKKP	e 51·9
St. Louis		115·2	49	e 18 45	[+ 2]	i 26 52	{+11}	e 19 39	PP	—
Chicago		116·3	45	—	—	e 25 35	[− 2]	e 35 38	SS	e 49·3
Istanbul		117·3	313	e 18 54	[+ 7]	e 21 54	PKS	—	—	—
Helwan		118·4	301	18 51	[+ 1]	27 10	{+ 7}	20 13	PP	—
Bergen	N.	119·1	341	—	—	e 30 23	PS	e 41 18	SSS	—
Copenhagen		119·8	334	18 54	[+ 2]	27 36	{+23}	20 20	PP	—
Cleveland		120·7	43	i 18 55	[+ 1]	e 27 18	{ 0}	e 29 53	PS	—
Budapest		121·2	323	e 19 0	[+ 5]	e 25 53?	[− 1]	e 30 43	PS	e 61·9
Ogyalla		121·5	324	e 18 55	[− 1]	—	—	e 21 11	PP	—
Belgrade		121·7	320	e 18 56k	[0]	e 27 7	{−18}	—	—	e 65·2
Potsdam		121·7	331	e 18 57	[+ 1]	i 30 35	PS	i 20 35a	PP	e 62·4
Ivigtut		122·1	11	30 47	PS	—	—	—	—	56·9
Collmberg		122·4	329	e 18 59	[+ 2]	e 37 29	SSP	e 42 23	SSS	e 60·9
Prague		122·4	328	e 18 58	[+ 1]	—	—	e 20 35	PP	—
Ottawa		122·7	37	—	—	e 27 48	{+16}	e 37 12	SS	51·9
Jena		123·3	330	e 19 1	[+ 2]	e 37 35	SS	e 23 33	PPP	—
Cheb		123·4	330	e 20 42	PP	e 26 22	[+21]	—	—	—
Zagreb		123·9	323	e 19 3	[+ 3]	e 30 41	PS	—	—	e 62·9
Aberdeen	E.	124·0	342	(i 20 59)	PP	(i 27 57)	{+16}	(e 44 34)	Q	(e 56·5)
Seven Falls	E.	124·7	33	e 20 2	[+60]	e 28 17	{+32}	—	—	53·9
Triest		125·3	324	e 19 15	[+12]	i 26 6?	[0]	e 22 15	SKP	50·8
De Bilt		125·4	334	e 20 53	PP	e 31 13	PS	e 32 31	PPS	e 55·9
Philadelphia		125·7	43	e 22 17	PKS	e 27 55	{+ 3}	e 32 26	PPS	e 53·0
Taranto		125·8	316	19 16	[+12]	e 38 21	SSP	—	—	—
Stuttgart		125·9	329	i 19 6a	[+ 2]	e 32 28	PPS	e 21 4	PP	e 60·9
Fordham		126·1	41	i 19 5	[+ 1]	—	—	i 20 56	PP	54·9
Strasbourg		126·7	330	i 19 7a	[+ 1]	e 26 6	[− 5]	e 21 7	PP	61·9
Harvard		126·8	38	i 19 6	[0]	—	—	—	—	e 63·9
Chur		126·9	327	e 19 8	[+ 2]	—	—	—	—	e 61·9
Weston		127·0	38	i 19 8	[+ 2]	37 55	SS	—	—	52·3
Padova		127·1	324	e 19 11	[+ 5]	e 22 4	PKS	e 21 2	PP	—
Zürich		127·1	329	e 18 51k	[−15]	e 22 26	PKS	—	—	e 59·9
Salo		127·2	326	19 8a	[+ 1]	e 22 17	PKS	e 21 8	PP	—
Bologna		127·4	323	e 19 10a	[+ 3]	e 22 34	PKS	e 31 26?	PS	—
Basle		127·5	329	e 19 8	[+ 1]	e 30 57	PS	—	—	—
Florence		127·8	323	e 19 9	[+ 1]	—	—	e 21 57	?	—
Prato		127·9	323	e 19 9	[+ 1]	e 31 18	PS	—	—	—
Kew		128·1	337	i 19 11	[+ 3]	e 22 28	PKS	i 21 14	PP	e 58·9
Neuchatel		128·2	329	e 19 10	[+ 1]	—	—	—	—	—
Pavia		128·2	326	e 19 12	[+ 3]	—	—	—	—	—
Rome		128·2	321	i 19 12a	[+ 3]	32 53	PPS	21 19	PP	—
Paris		129·0	333	19 13	[+ 3]	22 49	PKS	i 21 21	PP	62·9
Jersey	E.	130·6	337	e 18 56	[−17]	—	—	—	—	65·9
Clermont-Ferrand		130·9	331	i 19 17	[+ 3]	i 26 29	[+ 7]	i 21 36	PP	63·9
La Plata	N.	131·6	147	22 35	PKS	39 23	SS	67 39	Q	76·9
Barcelona		134·5	327	e 22 53	PP	—	—	—	—	e 72·1

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		134·8	88	e 19 25	[+ 4]	—	—	—	—	—
La Paz		135·5	120	i 19 23	[+ 1]	i 32 13	PS	i 22 1	PP	63·4
Tortosa		135·8	327	19 21	[− 2]	22 58	PKS	24 54	PPP	e 67·9
Bermuda		136·8	46	e 22 11	PP	e 40 22	SS	e 40 48	SSP	e 57·4
Alicante		138·1	326	19 33	[+ 6]	23 7	PKS	19 49	PKP_2	e 67·4
Toledo		138·8	330	e 19 22	[− 6]	e 26 29	[− 8]	e 22 27	PP	67·7
Almeria		140·3	326	i 19 37	[+ 6]	26 41	[+ 1]	22 45	PP	70·9
Granada		140·6	327	i 19 8a	[−24]	41 43	SSP	19 52	pPKP	i 76·3
San Juan		141·1	66	e 19 35	[+ 3]	e 26 35	[− 6]	e 22 31	PP	e 59·7
Malaga	z.	141·4	327	i 19 30a	[− 3]	33 6	SKSP	i 22 58	PP	70·0
Lisbon		142·1	334	19 30	[− 4]	—	—	17 14	?	73·6
Tamanrasset	z.	142·6	302	i 19 35a	[0]	—	—	e 19 52	pPKP	—
Fort de France		146·7	71	—	—	e 37 47	?	e 51 19	Q	—

Additional readings :—
Riverview iPPZ =6m.46s., iP_cPE =9m.14s., iSN =10m.37s., iSSE =11m.58s., and other readings without phase.
Auckland PP?N =8m.37s., P_cPN =9m.27s., iN =10m.24s., eN =11m.29s. and 12m.53s., SS?N =14m.30s.
Tuai S?N =13m.32s.
Wellington i =8m.33s., iZ =8m.59s., eZ =10m.47s., iZ =11m.45s., S =13m.59s., SS =17m.19s., Q =19m.17s.
Perth SS =16m.53s., SSS =17m.33s.
Mizusawa PN =8m.34s., eSE =18m.20s.
Honolulu iP =9m.56s., eS_cS =19m.58s.
New Delhi eN =12m.38s., iN =23m.43s. and 28m.53s.
Sitka ePS =25m.2s., eSS =29m.5s.
Poona iE =12m.39s., iN =23m.48s., PKKSN =33m.40s., $SKKS_2$ =37m.32s.
Bombay eSN =22m.31s., SSN =28m.15s., SSE =28m.22s.
College e =17m.3s., i =23m.50s., eSS =28m.2s.
Obi-garm iSKS =22m.30s.?
Tashkent ePS =24m.52s., iSS =29m.53s., iSSS =33m.23s.
Berkeley iE =13m.7s., iPPZ =21m.32s., iSE =23m.32s., iZ =23m.35s., iN =24m.5s. and 26m.6s., eN =36m.53s.
Victoria SKKS =23m.42s., SS =29m.53s.
Lick eN =13m.12s.
Reno iZ =13m.28s., iPPEN =17m.38s., eSKSE =23m.48s., eN =24m.5s., eZ =24m.17s., eE =24m.35s.
Pasadena iPSEN =25m.42s.
Tinemaha iZ =13m.35s.
Palomar eN =13m.42s.
Sverdlovsk iSKKS =24m.15s., PS =25m.59s., SS =31m.5s.
Pierce Ferry i =18m.54s., iPKP,PKP =38m.34s.
Logan i =24m.36s., eSS =31m.52s.
Salt Lake City eS =23m.56s., e =24m.11s., eSS =25m.59s., eSSS =29m.55s.
Tucson e =15m.38s. and 20m.41s., ePS? =26m.33s., eSSS =36m.8s., e =38m.29s.
Tananarive PS =27m.16s.
Tiflis PPP =20m.59s., iPS =28m.3s., SS =33m.53s.
Helsinki ePPP =25m.37s., ePPS =34m.51s., e =43m.22s.
Scoresby Sund PPS =30m.39s., SS =36m.5s.
Upsala eSS?E =36m.9s., eE =38m.53s.?, eN =42m.53s.?, eE =43m.17s., e =48m.53s.?
St. Louis epPP =19m.49s., i =25m.54s. and 27m.9s., e =28m.18s. and 29m.25s.
Helwan eZ =18m.56s., 19m.35s., and 22m.28s., PPPZ =22m.53.s, eE =26m.5s., PSE =30m.8s.
Copenhagen 26m.14s., PS =30m.16s., PPS =31m.42s.
Cleveland iPKPZ =19m.7s., eSKSE =26m.9s., eSKKSN =27m.15s., iSSN =36m.45s.
Belgrade e =25m.33s. and 30m.18s.
Potsdam iZ =20m.56s.a, iPPPZ =23m.9s., iZ =23m.30s., ePS?Z =30m.4s., iZ =32m.0s. and 36m.3s., iSSPZ =37m.27s.
Jena eN =30m.5s. and 30m.9s.
Aberdeen readings reduced by 10 mins.
Triest iPPP =23m.45s., iPS =31m.19s., iPPS =32m.27s., iSS =37m.45s., ePSPS =38m.58s.
De Bilt eSS =37m.53s.?
Philadelphia eSS =37m.51s., eSSS =42m.22s.
Stuttgart epP?Z =19m.25s., e =20m.38s., ePPP =23m.43s., ePSKS =30m.53s., iPPS =32m.44s., e =33m.41s., eSS =37m.53s., eSSS =42m.35s.
Strasbourg ePP =21m.0s. and 21m.3s., eSKP? =22m.26s., ePPP =23m.50s. and 23m.53s. eSKS =26m.26s., eSKKS =27m.59s. and 28m.19s., ePS =31m.7s., 31m.14s., and 31m.28s., ePKKS =32m.23s., ePPS =32m.45s., eSS =38m.3s., eSSS =42m.58s., and many other readings without phase.
Harvard i =19m.22s.
Kew eSKSEN =26m.32s., eEN =29m.2s., eZ =31m.2s., ePSEN =31m.31s., eSS =39m.21s., eEN =41m.6s., eSSSEN =42m.50s.

Continued on next page.

Rome SKP =22m.29s., SS =39m.13s., SSS =44m.13s.
Paris pPKP? =19m.29s., i =20m.46s., pPP? =21m.41s., i =21m.59s. and 22m.33s., iPPP =24m.14s., PPS =33m.7s., i =35m.47s. and 37m.41s., eSS =38m.41s., SSS = 43m.16s.
Clermont-Ferrand iSKP =22m.40s., i =23m.0s., iPPP =24m.34s., i =24m.45s., ePS = 32m.0s., iPPS =33m.31s., eSSS =43m.57s., Q =56m.53s.?
La Plata N =51m.11s. and 52m.17s.
La Paz iPP? =22m.56s., SSE =40m.9s.
Tortosa SKKSE =28m.23s., SSE =39m.13s., SSSE =43m.48s.
Bermuda e =23m.6s., eSKSP =32m.53s.
Alicante PP =23m.14s., PPP =26m.25s., SKKS =29m.17s., SS =41m.13s., SSP =42m.9s.
Toledo i =19m.30s. and 23m.4s., e =25m.51s., i =26m.24s., eE =41m.29s.
Almeria PKS =23m.11s., PPP =25m.37s., SKSP =32m.51s., PPS =35m.10s., SS = 41m.21s., SSS =46m.41s.
Granada iPP =22m.8s.a, pPP =23m.19s., PPS =36m.6s., SSS =50m.34s.
San Juan e =20m.9s., i =23m.11s., e =34m.28s. and 36m.3s., eSS =40m.10s.
Malaga QZ =59m.0s.
Lisbon N =21m.25s., 44m.53s.?, and 50m.17s., E =52m.53s.?
Tamanrasset ePPZ =23m.15s., epPPZ =23m.39s.
Long waves were also recorded at Columbia, Lincoln, Halifax, and Raciborzu.

March 16d. Readings also at 3h. (Samarkand, near Obi-garm and Stalinabad), 4h. (College), 5h. (near Obi-garm (2)), 7h. (Hungry Horse, Overton, and Shasta Dam), 8h. (Hungry Horse), 9h. (Samarkand, near Obi-garm, Stalinabad, and Murgab), 10h. (near College), 11h. (near Boulder City and Pierce Ferry), 12h. (near Andijan, Tchimkent, and Obi-garm), 13h. (near Riverview), 14h. (near College, near Obi-garm, Stalinabad, Samarkand, and Andijan), 15h. (Copiapo, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Tinemaha, and near College (2)), 17h. (near Apia and near Mizusawa), 18h. (near College, near Boulder City, Pierce Ferry, and Tucson), 22h. (near Branner).

March 17d. 3h. 32m. 58s. Epicentre 33°·9N. 139°·6E. Depth of focus 0·010.
(as on 1946, Feb. 17d.).

Intensity IV at Tomisaki ; II-III at Yokohama, Tokyo, Utunomiya, and Osima. Epicentre 34°·0N. 139°·6E. Depth 80km. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan, 1949, Tokyo, 1950, pp. 7, 8, with macroseismic chart.

A = −·6334, B = +·5391, C = +·5552 ; δ = +7 ; h = +1 ;
D = +·648, E = +·762 ; G = −423, H = +·360, K = −·832.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mera		1·0	11	0 15	− 5	0 32	− 4
Omaesaki		1·3	301	0 35	+11	0 47	+ 5
Shizuoka		1·4	317	0 30	+ 5	—	—
Yokohama		1·5	1	0 27a	0	0 45	− 2
Hunatu		1·7	336	0 30a	+ 1	0 55	+ 4
Tokyo		1·8	4	0 30	0	0 49	− 4
Kumagaya		2·2	355	0 38	+ 2	1 3	+ 1
Tukubasan		2·3	10	0 36	− 1	1 3	− 2
Kakioka		2·4	12	0 36	− 2	1 9	+ 2
Maebasi		2·5	350	0 41	+ 1	1 4	− 6
Nagoya		2·5	300	0 44	+ 4	—	—
Mito		2·6	16	0 40	− 1	1 12	0
Utunomiya		2·6	5	0 35	− 6	—	—
Gihu		2·8	303	0 40	− 4	1 20	+ 3
Kameyama		2·8	290	0 42	− 2	1 20	+ 3
Nagano		3·0	339	0 48	+ 1	1 29	+ 7
Kyoto		3·4	291	1 24	S	(1 24)	− 8
Osaka		3·5	284	1 35	S	(1 35)	+ 1
Hukusima		3·9	10	0 56	− 3	1 43	− 1
Sumoto		3·9	277	1 48	S	(1 48)	+ 4
Sendai		4·5	12	1 4	− 3	2 3	+ 4
Mizusawa	E.	5·4	12	1 18	− 2	2 12	− 9
Akita		5·8	4	1 31	+ 6	—	—
Morioka		5·9	11	1 31	+ 5	2 37	+ 4
Shasta Dam		74·2	52	e 11 27	− 1	—	—
Hungry Horse		75·1	42	i 11 13	−20	—	—

March 17d. 21h. 5m. 6s. Epicentre 5°·4S. 151°·3E. (as on 16d.).

Intensity VI at Waterfall Bay (New Britain); III at Rabaul. Epicentre 5·5°S. 151°E., depth 60km. (Pasadena).

Monthly seismic bulletin, Brisbane, March, 1949, p.2.

$A = -\cdot8737$, $B = +\cdot4784$, $C = -\cdot0878$; $\delta = -7$; $h = +7$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·4	175	i 4 57k	− 5	i 9 3	− 1	i 5 35	PP	i 10·8
Riverview		28·6	180	i 6 6a	+ 6	i 10 43	− 5	i 6 15	pP	e 12·9
Melbourne	E.	33·1	189	i 6 52	+12	i 11 55	− 4	—	—	—
Apia		37·4	106	e 7 16	0	—	—	e 7 26	?	e 17·9
Arapuni	E.	39·6	149	—	—	13 54	+16	—	—	17·1
Tuai	N.	40·9	149	7 45	− 1	—	—	—	—	—
Kaimata		41·4	158	7 54	+ 4	13 35	−30	e 8 8	?	—
Wellington		41·7	154	8 0	+ 8	13 57	−13	9 40	PP	20·0
Perth		42·6	227	i 8 14	+15	i 14 22	− 1	i 17 34	SS	i 19·8
Batavia		44·3	267	e 8 52	+39	e 15 26	+38	—	—	22·9
Vladivostok		51·1	342	i 9 7	+ 1	i 16 18	− 6	i 11 3	PP	—
Honolulu		56·3	60	—	—	i 17 28	− 6	e 18 4	PPS	e 25·6
Calcutta	E.	67·4	297	e 11 2	+ 3	e 20 16	+21	i 24 40	SS	—
Irkutsk		69·6	331	11 14	+ 1	20 18	− 3	e 13 40?	PP	—
Colombo	E.	72·3	279	11 16	−13	20 51	− 1	—	—	35·9
Kodaikanal	E.	75·1	283	i 11 48	+ 2	i 21 24	0	26 16	SS	36·6
New Delhi	N.	78·6	301	e 12 7	+ 2	i 22 23	+21	i 22 58	PS	i 33·4
Poona		79·8	290	i 12 13	+ 1	e 22 16	+ 2	i 22 52	PS	33·2
Bombay		80·8	290	e 12 18	+ 1	e 22 26	+ 1	15 27	PP	31·9
Almata		82·2	316	e 12 29	+ 5	—	—	—	—	—
College		82·7	22	i 12 24	− 3	e 22 27	−17	e 15 32	PP	—
Murgab		83·3	309	12 35	+ 5	—	—	—	—	—
Frunse		83·8	314	e 12 35	+ 3	e 22 52	− 3	—	—	—
Andijan		84·9	312	12 41	+ 3	i 22 59	− 7	—	—	—
Sitka		85·4	32	i 12 40	0	e 23 1	−10	i 24 25	PPS	e 35·5
Obi-garm		86·6	310	i 12 49	+ 3	e 23 21	− 2	i 23 8	SKS	—
Tashkent		87·3	312	i 12 51	+ 1	i 23 13	[− 3]	e 16 25	PP	—
Tchimkent		87·3	313	i 12 51	+ 1	i 23 27	− 2	—	—	—
Stalinabad		87·3	310	i 12 50	0	i 23 11	[− 5]	—	—	—
Samarkand		88·8	310	e 13 4	+ 7	—	—	—	—	—
Ukiah		89·4	51	—	—	e 23 44	− 5	e 25 11	PS	e 40·6
Berkeley		90·3	52	i 13 4	0	i 23 56	− 1	i 25 8	PS	e 41·3
Santa Clara		90·5	52	e 13 6	+ 1	i 24 2	+ 3	e 16 54	PP	e 41·6
Shasta Dam		90·5	52	i 13 3	− 2	—	—	i 16 26	PP	—
Victoria		90·6	42	13 2	− 3	23 53	− 7	29 54?	SS	40·9
Lick	Z.	90·7	52	i 13 5	− 1	—	—	—	—	—
Mineral	Z.	91·0	49	i 13 6	− 1	—	—	i 16 41	PP	—
Seattle		91·3	42	—	—	e 22 59	[−41]	e 24 2	S	e 42·2
Fresno	Z.	92·1	53	i 13 12	0	—	—	—	—	—
Reno		92·3	50	i 13 13a	0	i 24 11	− 4	i 16 51	PP	e 44·8
Pasadena		93·2	56	i 13 17a	0	e 24 5	{ 0}	i 16 58	PP	38·5
Tinemaha		93·4	53	i 13 19a	+ 1	—	—	—	—	—
Riverside		93·9	56	i 13 20a	− 1	—	—	—	—	—
Palomar	N.	94·3	57	i 13 25	+ 2	—	—	—	—	—
Sverdlovsk		94·6	327	i 13 23	− 1	24 25	−10	i 17 16	PP	—
Boulder City		96·1	54	i 13 30	− 1	e 24 10	[+ 3]	e 38 27	P'P'	—
Pierce Ferry		96·8	54	i 13 33	− 1	e 24 19	[+ 8]	i 17 25	PP	—
Hungry Horse		96·9	41	i 13 33	− 1	e 30 47	SS	e 17 15	PP	—
Butte	N.	97·9	43	—	—	e 24 37	{− 2}	e 30 6	PKKP	e 41·2
Logan		98·5	48	e 13 33	− 9	i 24 40	{− 4}	e 30 20	PKKP	e 45·4
Salt Lake City		98·5	49	—	—	i 24 17	[− 3]	e 26 9	PS	e 40·6
Bozeman		99·0	44	—	—	i 24 47	{ 0}	i 25 36	S	e 41·3
Tucson		99·3	57	i 13 45	0	e 26 30	PS	i 17 44	PP	e 41·9
Rapid City	E.	104·6	46	e 14 9	0	e 25 51	− 8	e 18 44	PP	e 49·7
Grozny		104·8	313	e 18 58?	PP	—	—	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tiflis		105·7	311	14 14?	0	i 24 52	[− 2]	i 18 42?	PP	—
Leninakan		106·5	311	e 19 0	PP	—	—	—	—	—
Moscow		107·4	327	i 18 49	PP	i 24 57	[− 4]	i 28 9	PS	—
Helsinki		111·8	334	e 19 21	PP	e 28 46	PS	e 38 59	SSS	e 62·9
Yalta		112·7	316	e 19 32	PP	e 28 51	PS	—	—	—
Ksara		113·9	304	i 19 42	PP	29 43	PS	—	—	—
Scoresby Sund		114·5	357	19 45	PP	25 50	[+20]	29 22	PS	53·9
Upsala		115·1	336	e 18 25	[−18]	e 35 24	SS	e 19 54?	PP	e 55·9
Chicago		116·3	45	—	—	e 25 54	[+17]	—	—	e 47·6
Pretoria	z.	116·9	238	i 17 16	?	—	—	—	—	—
Istanbul		117·3	313	e 18 49	[+ 1]	i 26 4	[+24]	—	—	—
Helwan		118·4	301	i 20 12	PP	e 30 15	PS	—	—	—
Bergen		119·1	341	18 39	[−12]	30 9	PS	36 54	SSP	e 53·9
Copenhagen		119·8	334	20 14	PP	26 10	[+21]	23 14	PPP	56·9
Cleveland		120·7	43	i 18 54	[0]	i 26 11	[+19]	i 30 11	PS	50·0
Belgrade		121·7	320	e 18 57	[+ 1]	e 25 53	[− 3]	e 36 32	SS	e 65·5
Ivigtut		122·1	11	—	—	30 42	PS	—	—	57·9
Collmberg		122·4	329	e 18 58	[+ 1]	e 37 18	SS	—	—	e 60·9
Ottawa		122·7	37	—	—	e 26 8	[+ 9]	e 37 6	SS	50·9
Jena		123·3	330	e 19 2	[+ 3]	—	—	e 20 40	PP	—
Aberdeen	E.	124·0	342	i 20 11	PP	i 30 44	PS	e 57 1	Q	e 66·3
Seven Falls	E.	124·7	33	—	—	e 30 36	PS	e 38 12	SSP	51·9
Triest		125·3	324	e 19 16	[+13]	i 26 5	[− 2]	i 32 21	PPS	—
De Bilt		125·4	334	i 21 2	PP	e 37 54?	SS	—	—	e 57·9
Philadelphia		125·7	43	e 20 59	PP	e 26 24	[+16]	e 32 27	PPS	e 53·4
Stuttgart		125·9	329	i 19 5a	[+ 1]	e 22 27	PKS	e 19 26	pPKP	65·9
Fordham		126·1	41	i 19 6	[+ 2]	e 37 56	SS	i 20 56	PP	54·9
Strasbourg		126·7	330	i 19 7a	[+ 1]	e 26 12	[+ 1]	e 21 8	PP	61·9
Harvard		126·8	38	i 19 6	[0]	e 31 6	PS	—	—	e 58·9
Chur		126·9	327	e 19 7a	[+ 1]	—	—	—	—	e 64·9
Weston		127·0	38	i 19 6	[0]	i 31 33	PS	—	—	53·6
Padova		127·1	324	e 23 18	?	—	—	—	—	—
Zürich		127·1	329	e 19 8	[+ 2]	—	—	—	—	—
Salo		127·2	326	e 19 7	[0]	—	—	e 21 7	PP	—
Bologna		127·4	323	e 19 9	[+ 2]	—	—	e 23 8	?	—
Prato		127·9	323	e 19 12	[+ 4]	—	—	—	—	—
Kew		128·1	337	e 19 7?	[− 1]	e 22 48	PKS	e 21 10	PP	e 59·9
Rome		128·2	321	e 19 10a	[+ 2]	22 32	PKS	33 14	PPS	—
Paris		129·0	333	e 19 12	[+ 2]	i 22 55	PKS	i 21 18	PP	e 62·9
Clermont-Ferrand		130·9	331	i 19 16	[+ 2]	i 28 28	{+ 3}	e 21 37	PP	63·9
Barcelona		134·5	327	e 22 50	PP	—	—	—	—	67·5
Bogota		134·8	88	e 19 24	[+ 3]	i 22 51	PKS	e 21 56	PP	57·9
La Paz		135·5	120	i 19 30	[+ 8]	40 4	SS	23 6	PKS	63·9
Tortosa		135·8	327	19 27	[+ 4]	26 52	[+20]	22 56	PKS	e 63·9
Bermuda		136·8	46	e 22 14	PP	e 29 34	{+32}	e 23 4	PKS	e 57·7
Alicante		138·1	326	19 28	[+ 1]	26 22	[−14]	22 58	PKS	e 69·0
Toledo	z.	138·8	330	e 19 29	[+ 1]	i 23 7	PKS	e 22 26	PP	68·8
Almeria		140·3	326	i 19 37	[+ 6]	23 11	PKS	22 47	PP	74·1
Granada		140·6	327	e 19 35k	[+ 3]	41 29	SSP	22 26	PP	71·6
San Juan		141·1	66	e 19 34	[+ 2]	e 23 9	PKS	e 22 31	PP	e 57·2
Malaga	z.	141·4	327	i 19 22a	[−11]	35 10	PPS	i 22 38	PP	67·5
Lisbon		142·1	334	19 36	[+ 2]	—	—	19 39	PKP_3	71·9
Tamanrasset	z.	142·6	302	i 19 41a?	[+ 6]	—	—	i 20 4k	pPKP	—
Fort de France		146·7	71	—	—	i 38 10	?	e 51 42	Q	—

Additional readings :—
Brisbane eE = 5m.6s., iPPN = 5m.15s., iZ = 5m.41s., iN = 6m.33s., iSEN = 8m.59s., iSSN = 9m.37s., iSSZ = 9m.40s.
Riverview iPPZ = 6m.52s., iN = 6m.56s., ePPPE = 7m.7s., iP_cPZ = 9m.25s., iN = 11m.3s., iZ = 11m.10s., iSSE = 12m.1s.
Wellington PPP = 10m.36s., P_cS = 12m.36s., PS = 14m.12s., SS = 18m.17s.
Vladivostok ePPP = 12m.17s., S_cS = 18m.52s., iSS = 19m.58s.
Irkutsk iPS = 20m.44s., SS = 24m.54s., SSS = 28m.18s.
Kodaikanal PSE = 21m.19s.
New Delhi iN = 23m.52s. and 27m.8s.
Poona iSSN = 27m.24s.

Continued on next page.

Bombay PSE =22m.45s., SSN =27m.57s., SSE =28m.11s.
College i =12m.36s.
Sitka i =23m.27s.
Tashkent iPS =24m.55s.?, iSS =29m.12s., iSSS =33m.12s.
Ukiah e =24m.6s., eSS? =29m.6s.
Berkeley iN =24m.0s. and 24m.20s., iZ =25m.20s., eN =39m.18s., eZ =39m.42s., eE = 40m.0s.
Victoria SKKS =23m.37s.
Lick eN =13m.22s.
Santa Clara iPPPSE =25m.17s.
Reno iE =13m.23s., iN =13m.29s., iZ =13m.44s., eSN =24m.8s., eN =24m.37s.
Pasadena ipP?Z =13m.32s., iSZ =24m.48s., iPSZ =25m.31s., eSSZ =30m.12s.
Tinemaha iZ =13m.35s.
Riverside ipP?Z =13m.39s.
Palomar iN =13m.50s.
Sverdlovsk PS =25m.39s., SS =31m.6s., SSS =34m.48s.
Boulder City i =16m.25s.
Pierce Ferry ePKP,PKP =38m.13s.
Hungry Horse e =38m.10s., ePKP,PKP =38m.29s.
Logan e =17m.0s., eSS =35m.57s.
Tucson e =21m.26s., ePKKP =30m.7s., eSSS =35m.20s.
Rapid City iSE =26m.10s., eE =38m.34s.
Tiflis iPPS =27m.56s.?, iPPS =28m.50s.
Helsinki ePPP =25m.8s., ePPS =34m.49s.
Scoresby Sund SKKS =26m.54s., PPS =30m.48s., SS =36m.12s.
Upsala eN =20m.41s., eE =24m.25s., eN =27m.35s., eE =29m.6s., eN =29m.16s., eSS?N =34m.54s?, eSSSE =39m.18s., eSSSN =40m.12s., eN =44m.54s.?
Helwan eZ =20m.26s. and 21m.7s.
Copenhagen SKKS =27m.37s., PS =30m.12s., SS =37m.6s., SSS =41m.24s.
Cleveland iSSN =36m.42s.
Belgrade e =20m.44s. and 21m.54s.
Collmberg eZ =19m.17s., eE =42m.30s.
Jena ePKPE =19m.5s., eN =20m.35s.
Triest eSKP =22m.17s., iPS =31m.15s., ePSPS =38m.51s.
Philadelphia eSS =37m.52s.
Stuttgart ePP =21m.1s., ePPP =23m.54s., ePS =31m.12s., ePPSZ =32m.14s., ePPS = 32m.36s., Q =33m.42s., eSS =38m.24s., eSSS =42m.54s., eQ =60·9m.
Strasbourg e =20m.16s., ePP =21m.2s., e =21m.47s., eSKP =22m.30s., ePPP =24m.11s., eSKS =25m.59s., and 26m.5s., eSKKS =27m.55s. and 28m.0s., ePS =31m.2s., ePPS =32m.57s. and 33m.57s., e =34m.5s., eSSS =42m.57s., e =45m.31s., 47m.54s., 49m.53s., and 50m.15s.
Zürich eZ =19m.49s.
Kew eEN =23m.28s., ePSEN =31m.21s., ePPSEN =33m.5s., eSSEN =39m.22s., eEN = 41m.5s.
Rome SS =38m.54s., SSS =43m.54s.
Paris i =20m.47s. and 21m.54s., iPPP =24m.20s., e =31m.50s., ePPS =33m.15s., eSS = 38m.18s.
Clermont-Ferrand iSKP =22m.38s., i =23m.4s., iPPP =24m.32s., i =24m.46s., iPPS = 33m.31s., iSS =39m.28s., iPSS? =40m.0s., iSSS =43m.56s., Q =54m.54s.
Bogota i =23m.53s., eS?EN =31m.43s.
Tortosa PPPEN =24m.59s., PSE =32m.10s., PPSEN =34m.1s., SSS?E =43m.58s.
La Paz iE =24m.2s.
Bermuda e =35m.4s., eSS =41m.7s.
Alicante PKP_3 =19m.38s., PP =23m.6s., SKKS =29m.38s., SS =42m.8s., SSP = 42m.58s., SSS =47m.52s.
Toledo eZ =41m.4s. and 57m.3s.
Almeria PPP=25m.55s., SKS=26m.47s., SKKS=29m.35s., PPS=25m.11s., SS=41m.21s.
Granada S =30m.17s.
San Juan e =39m.17s.
Malaga QZ =58m.10s.
Lisbon SSS?N =50m.30s.
Tamanrasset iPKP?Z =19m.49s., ePP?Z =23m.26s., epPPZ =23m.51s.
Long waves were also recorded at Auckland, Columbia, and Lincoln.

March 17d. 22h. 53m. 59s. Epicentre 5°·6S. 147°·0E. (as on 1939, Jan. 30d.).

A = −·8347, B = +·5421, C = −·0969; δ = −1; h = +7;
D = +·545, E = +·889; G = +·081, H = −·053, K = −·995.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·5	167	i 4 32	−30	i 8 42	−23	i 5 33	PP	—
Riverview		28·4	173	e 5 58	0	i 10 49	+ 4	i 16 31	S_eS	e 14·1
Arapuni	E.	41·5	146	—	—	e 17 49	SSS	—	—	—
Vladivostok		50·4	346	e 8 27?	−34	—	—	e 11 7	PP	—
Irkutsk		68·1	334	e 11 25?	+21	e 20 5?	+ 2	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		82·1	313	e 12 27	+ 3	—	—	—	—	—
Obi-garm		83·6	310	e 12 37	+ 6	e 22 56	+ 3	—	—	—
Stalinabad		84·3	310	e 12 37	+ 2	—	—	—	—	—
Tashkent		84·5	313	e 12 36	0	e 22 57	− 5	e 23 36	PS	—
Tchimkent		84·5	313	i 12 38	+ 2	i 23 4	+ 2	—	—	—
College		84·8	23	i 12 33	− 4	—	—	e 12 49	P_cP	—
Sverdlovsk		92·6	327	e 13 16	+ 1	e 23 43	[− 5]	—	—	—
Shasta Dam		93·5	49	i 13 19	0	—	—	—	—	—
Pasadena	z.	97·1	56	e 13 33	− 2	—	—	—	—	—
Tinemaha	z.	97·1	53	e 13 35	0	—	—	—	—	i 44·1
Riverside	z.	97·8	56	e 13 36	− 2	—	—	—	—	—
Boulder City		99·9	55	e 13 42	− 6	—	—	—	—	—
Hungry Horse		100·1	42	i 13 46	− 3	—	—	—	—	—
Overton	z.	100·2	54	e 13 48	− 1	—	—	—	—	—
Pierce Ferry		100·5	55	e 13 47	− 4	—	—	—	—	—
Stuttgart		124·1	327	e 19 2	[+ 1]	—	—	e 19 18	?	e 66·0
Weston		130·1	36	i 22 9	PKS	—	—	—	—	—
La Paz		138·9	123	23 1	PKS	—	—	—	—	—
Tamanrasset	z.	139·1	300	i 19 42k	[+13]	e 23 16	PKS	—	—	—
Fort de France		150·9	70	—	—	e 38 25	?	—	—	—

Additional readings :—
Brisbane iPZ =4m.46s., iSSE =9m.11s.
Riverview ipP?Z =6m.7s.
Tashkent eSS =28m.18s.
Pasadena iZ =13m.48s.
Riverside eZ =13m.51s.
Long waves were also recorded at Auckland, Wellington, Sitka, Paris, and Strasbourg.

March 17d. Readings also at 0h. (Bozeman, Sitka, Salt Lake City, near Tacubaya and Puebla), 1h. (La Paz, Fort de France, San Juan, and Hungry Horse), 2h. (College, Strasbourg, Stuttgart, Sverdlovsk, near Andijan, Frunse, Tchimkent, Tashkent, Almata, Murgab, Stalinabad, Samarkand, and Obi-garm), 3h. (Boulder City, College, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Riverside, Tinemaha, De Bilt, Potsdam, Stuttgart, Paris, and Tamanrasset), 5h. (Boulder City, Pierce Ferry, Tucson (2), Mount Wilson (2), Riverside, Tinemaha, near La Paz and near Taranto), 6h. (College, Hungry Horse, Shasta Dam, Tinemaha, and near Tortosa), 7h. (Boulder City, College, Pierce Ferry, Tucson, Mount Wilson, Riverside, Tinemaha, Stuttgart, Strasbourg, and Andijan), 8h. (Auckland, College, Mount Wilson, Riverside, and Tinemaha), 9h. (near Mizusawa), 10h. (Kew, Mount Wilson, Riverside, and Tinemaha), 13h. (near Ashkabad (2)), 14h. (Hungry Horse (2)), 15h. (Grozny and Piatigorsk), 16h. (near Boulder City, Pierce Ferry, Balboa Heights, near Oaxaca, Tacubaya, and Puebla), 17h. (College and near Alicante), 19h. (Hungry Horse, Overton, Pierce Ferry, Shasta Dam, and near Tucson), 20h. (Hungry Horse, Tashkent, Obi-garm, Stalinabad, near Frunse, Almata, Andijan (2), Murgab and near Tortosa), 21h. (Calcutta, Poona, near Murgab, Andijan, and Obi-garm), 22h. (Stuttgart).

March 18d. 3h. 24m. 41s. Epicentre 42°·4N. 147°·0E. Depth of focus 0·025.
(as on 1945, June 22d.).

Intensity II-III at Urakawa. Macroseismic radius >300 km. Epicentre as adopted. Depth 60km.

Seismo. Bull. Cent. Met. Obs., Japan, 1949. Tokyo, 1950, p.8.

$A = -·6212$, $B = +·4034$, $C = +·6718$; $\delta = -6$; $h = -3$;
$D = +·545$, $E = +·839$; $G = -·563$, $H = +·366$, $K = -·741$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	1·4	312	i 0 9	−23	0 24	−34	—	—	—
Sapporo	4·2	282	—	—	i 1 43	−12	—	—	—
Miyako	4·7	236	e 1 9	− 2	2 7	+ 1	—	—	—
Mori	4·8	269	1 10	− 2	—	—	—	—	—
Aomori	4·9	254	i 1 13	− 1	—	—	—	—	—

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Morioka		5·2	241	e 1 14	− 4	2 19	+ 1	—	—	—
Mizusawa	E.	5·5	236	e 1 24	+ 2	2 28	+ 3	—	—	—
Isinomaki		5·9	230	—	—	2 35	+ 1	e 2 30	S	—
Sendai		6·2	230	e 1 32	+ 1	2 45	+ 4	—	—	—
Hukusima		6·8	229	1 43	+ 5	3 2	+ 7	—	—	—
Kakioka		8·1	223	e 1 57	+ 2	3 31	+ 5	—	—	—
Maebasi		8·6	228	—	—	e 3 45	+ 8	—	—	—
Tokyo		8·8	222	e 3 16	?	3 48	+ 6	—	—	—
College		42·2	35	i 7 31	− 5	e 12 41	−60	—	—	e 15·8
Shasta Dam		64·5	58	i 10 16	− 2	—	—	—	—	—
Hungry Horse		64·9	47	i 10 20	− 1	—	—	—	—	—
Tinemaha		69·2	59	e 10 49	+ 1	—	—	—	—	—
Pasadena	z.	71·1	61	e 10 59	0	—	—	—	—	—
Riverside	z.	71·7	61	e 11 2	− 1	—	—	—	—	—
Overton	z.	72·0	57	i 11 5	0	—	—	—	—	—
Boulder City		72·1	58	i 11 6	+ 1	—	—	—	—	—
Pierce Ferry		72·5	57	i 11 8	0	—	—	—	—	—
Tucson		77·0	59	e 11 34	+ 1	—	—	—	—	—
Ksara		81·4	308	e 8 19	?	—	—	—	—	—
Stuttgart	z.	81·9	334	e 11 59	0	—	—	—	—	—
Strasbourg		82·5	334	e 12 19	+17	—	—	—	—	—
Paris		83·9	337	i 12 11	+ 1	—	—	—	—	—

Additional readings :—
Tucson e = 11m.49s.
Stuttgart eZ = 12m.10s.
Paris i = 12m.19s., e = 13m.27s.

March 18d. Readings also at 0h. (Kew, Lick, Reno, near Mineral, Pierce Ferry, near Andijan, Frunse, Murgab, Obi-garm, Samarkand, Tashkent, and Tchimkent), 1h. (Chur, Stuttgart, near Basle, Zürich, near Istanbul, near Bogota, near Pierce Ferry and Boulder City), 4h. (Hungry Horse), 5h. (near Boulder City and Pierce Ferry), 7h. (Overton and Pierce Ferry), 8h. (Overton, Pierce Ferry, and near Boulder City), 10h. (Strasbourg), 11h. (Logan, near Collmberg, Jena, Stuttgart, and near Malaga), 13h. (Helwan), 14h. (College), 16h. (near Triest), 17h. (Tamanrasset, College, and near Tucson), 18h. (Santa Lucia, Frunse, near Andijan, Obi-garm, Samarkand, Stalinabad, Tashkent, and near Tchimkent), 20h. (La Paz), 21h. (Overton).

March 19d. 1h. 3m. 3s. Epicentre 29°·0N. 123°·0E. Approximate.

A = −·4771, B = +·7347, C = +·4823 ; δ = +2 ; h = +2 ;
D = +·839, E = +·545 ; G = −·263, H = +·404, K = −·876.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Vladivostok	15·8	25	—	—	e 7 20	SSS	—	—
Irkutsk	27·1	335	—	—	e 10 49?	+25	—	—
Andijan	42·6	300	8 3	+ 4	—	—	—	—
Tchimkent	44·7	303	e 8 17	+ 1	—	—	—	—
Obi-garm	44·8	298	i 8 17	0	—	—	—	—
Stalinabad	45·5	298	8 23?	0	e 15 2	− 3	—	—
Samarkand	46·8	299	e 8 37	+ 4	e 15 22	− 2	—	—
Sverdlovsk	51·2	322	i 9 14	+ 7	16 33	+ 8	20 15	SS
Ashkabad	54·1	298	e 9 26	− 3	—	—	—	—
Piatigorsk	63·6	301	e 10 31	− 4	—	—	—	—
College	63·8	29	e 10 41	+ 5	—	—	11 28	P_cP
Moscow	64·0	322	i 10 40	+ 2	i 19 14	+ 1	—	—
Ksara	72·3	300	e 11 26	− 3	—	—	e 16 9	PPP
Collmberg	79·2	323	e 12 8	0	—	—	—	—
Stuttgart z.	82·7	323	e 12 26	− 1	—	—	—	—
Strasbourg	83·5	323	e 12 31	0	—	—	—	—
Hungry Horse	87·6	35	i 12 50	− 1	i 23 33	+ 1	i 22 57	SKS
Shasta Dam	87·9	44	i 12 49	− 4	—	—	—	—
Boulder City	95·5	44	e 13 7	−21	—	—	—	—
Pierce Ferry	95·9	44	e 13 10	−20	—	—	—	—
Tucson	100·5	45	e 17 59	PP	—	—	i 13 29	P

Sverdlovsk also gives ePP = 11m.17s.

March 19d. 11h. 42m. 55s. Epicentre 33°·8N. 134°·5E. (as on 1947, Sept. 2d.).

Intensity IV at Tokushima ; II-III at Sumoto, Irako. Macroseismic radius 200-300 km.
Seismo. Bull. Cent. Met. Obs., Japan, for 1949. Tokyo, 1950, p.p. 8, 9, with macroseismic chart.

$A = -\cdot5836$, $B = +\cdot5939$, $C = +\cdot5537$; $\delta = -11$; $h = +1$;
$D = +\cdot713$, $E = +\cdot701$; $G = -\cdot388$, $H = +\cdot395$, $K = -\cdot833$.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Sumoto	0·6	30	0 12k	− 3	0 23	− 3
Kobe	1·0	32	0 20k	− 1	0 34	− 2
Siomisaki	1·1	108	0 15k	− 7	0 30	− 9
Osaka	1·2	45	0 25	+ 1	—	—
Owase	1·4	79	0 28	+ 1	0 47	+ 1
Kyoto	1·6	40	0 29	− 1	0 49	− 2
Toyooka	1·7	9	0 31k	0	0 52	− 2
Kameyama	1·9	57	0 37	+ 3	1 9	S_g
Hamada	2·3	299	0 36	− 4	1 4	− 5
Gihu	2·4	49	0 46	+ 5	1 16	+ 4
Nagoya	2·4	56	0 43	+ 2	1 17	+ 5
Shizuoka	3·4	68	1 12	P_g	1 56	S_g
Hukuoka	3·4	269	0 58	+ 3	1 39	+ 2
Toyama	3·6	36	1 5	P*	2 0	S_g
Hunatu	3·9	63	1 18	P_g	—	—
Kagosima	4·0	238	1 22	P_g	2 6	S*
Wazima	4·0	26	1 58	?	—	—
Nagano	4·1	45	1 23	P*	2 19	S_g
Tokyo	4·7	64	1 29	P_g	—	—
Utunomiya	5·2	56	1 35	P*	—	—
Shasta Dam	77·5	49	i 12 26	+27	—	—
Pierce Ferry	85·5	49	e 11 57	−44	—	—

March 19d. 18h. 19m. 30s. Epicentre 31°·6N. 130°·4E. Depth of focus 0·025.

Intensity VI at Kitakata (Miyazaki Pref.) ; V at Kagosima, Miyaki, Simidu ; IV at Kôti, Tokusima ; II-III at Kumamoto, Wakayama, Uwazima, Kashiwara.
Epicentre 31°·0N. 131°·2E. Depth 60km. Macroseismic radius >300km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1949. Tokyo, 1950, pp. 9, 10, with macroseismic chart.

$A = -\cdot5530$, $B = +\cdot6498$, $C = +\cdot5214$; $\delta = -9$; $h = +1$;
$D = +\cdot762$, $E = +\cdot648$; $G = -\cdot338$, $H = +\cdot397$, $K = -\cdot853$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kagosima	0·1	—	0 19	− 6	—	—	—	—	—
Miyazaki	0·9	70	0 24a	− 4	0 46	− 5	—	—	—
Kumamoto	1·2	12	0 29a	− 2	0 52	− 3	—	—	—
Nagasaki	1·2	338	0 33a	+ 2	0 55	0	—	—	—
Hukuoka	2·0	0	0 36a	− 2	1 5	− 3	—	—	—
Kôti	3·3	54	0 50a	− 3	1 28	− 7	—	—	—
Hamada	3·6	23	0 54	− 3	1 30	−11	—	—	—
Sumoto	4·7	53	1 7a	− 4	1 56	−10	—	—	—
Siomisaki	4·9	67	1 6	− 8	2 2	− 9	—	—	—
Kobe	5·1	51	1 13a	− 3	2 8	− 7	—	—	—
Osaka	5·3	54	1 16	− 3	2 16	− 4	—	—	—
Owase	5·4	62	1 16	− 4	2 18	− 4	—	—	—
Toyooka	5·4	42	1 18	− 2	2 24	+ 2	—	—	—
Kyoto	5·6	51	1 22	− 1	2 24	− 3	—	—	—
Kameyama	6·0	56	1 28	0	2 31	− 5	—	—	—
Hikone	6·1	52	1 38	+ 9	2 45	+ 6	—	—	—
Gihu	6·5	53	1 35	0	2 49	+ 1	—	—	—
Nagoya	6·5	55	1 35	0	2 48	0	—	—	—
Omaesaki	7·2	64	1 57	+13	3 10	+ 5	—	—	—
Shizuoka	7·5	61	1 52	+ 4	3 22	+10	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Toyama		7·6	46	1 55	+ 6	3 18	+ 4	—	—	—
Wazima		7·9	41	2 4	+11	3 15	− 6	—	—	—
Hunatu		8·0	59	2 0	+ 6	3 26	+ 3	—	—	—
Nagano		8·2	50	2 2	+ 5	3 32	+ 4	—	—	—
Yokohama		8·6	61	2 13	+11	3 48	+11	—	—	—
Tokyo		8·8	60	2 10	+ 5	3 54	+12	—	—	—
Kakioka		9·3	58	2 10	− 1	4 1	+ 7	—	—	—
Hukusima		10·3	51	2 24	0	4 27	+10	—	—	—
Sendai		10·9	50	2 32	0	4 36	+ 5	—	—	—
Mizusawa		11·5	46	2 42	+ 2	4 58	+13	—	—	—
Vladivostok		11·6	6	i 2 44	+ 3	e 5 9	+22	—	—	—
Morioka		11·9	44	2 45	0	5 3	+ 9	—	—	—
Irkutsk		28·1	324	5 36	0	—	—	—	—	—
Calcutta	E.	38·3	267	e 7 2	− 1	i 15 46	88	—	—	—
Almata		43·4	302	e 7 45	0	—	—	—	—	—
Batavia		43·8	215	i 7 46	− 2	i 14 5	+ 1	—	—	—
Frunse		45·1	301	e 8 0	+ 1	—	—	—	—	—
New Delhi	N.	45·8	281	e 8 2	− 2	i 15 31	+59	e 17 36	SS	—
Murgab		46·2	295	e 8 9	+ 2	14 42	+ 4	—	—	—
Andijan		47·0	298	e 8 13	− 1	—	—	—	—	—
Tchimkent		48·8	301	i 8 30	+ 3	—	—	—	—	—
Tashkent		49·2	300	8 30	− 1	19 27	SS	i 9 25	pP	—
Obi-garm		49·4	296	i 8 33	+ 1	e 15 28	+ 5	9 29	pP	—
Stalinabad		50·1	296	i 8 36	− 1	e 15 34	+ 1	9 28	pP	—
Samarkand		51·2	298	e 8 46	0	—	—	—	—	—
Poona	E.	52·3	269	i 8 55	+ 1	i 17 6	+63	i 9 52	pP	22·5
Bombay		53·1	270	i 8 59	− 1	e 16 7	− 6	e 9 54	pP	—
Sverdlovsk		53·3	320	i 8 51	−10	i 16 20?	+ 4	i 9 56	pP	—
College		58·4	30	i 9 38	0	e 17 30	+ 6	i 10 14	pP	e 26·8
Grozny		65·5	307	e 10 26	+ 1	e 18 59?	+ 6	—	—	—
Moscow		66·0	322	10 27	− 1	19 2	+ 3	11 21	pP	—
Tiflis		66·8	306	i 10 33	0	i 19 11	+ 3	11 27	pP	—
Piatigorsk		67·1	309	e 10 36	+ 1	—	—	—	—	—
Riverview		68·0	162	e 10 30	−10	i 19 30	+ 7	i 20 33	sS	e 29·5
Sotchi		69·5	310	e 10 47	− 3	—	—	—	—	—
Melbourne	E.	70·4	168	—	—	i 19 57	+ 6	—	—	—
Yalta		72·7	312	11 7	− 2	—	—	—	—	—
Upsala		73·5	331	e 11 10a	− 3	e 20 22	− 4	e 14 20	PP	e 42·5
Scoresby Sund		76·3	351	—	—	21 2	+ 6	—	—	—
Ksara		76·7	301	i 11 31	0	—	—	i 12 28	pP	—
Istanbul		77·6	311	11 36	0	—	—	14 36	PP	—
Copenhagen		78·3	330	i 11 40	0	21 22	+ 4	12 21	pP	—
Potsdam	Z.	80·1	327	i 11 50a	0	—	—	i 12 47a	pP	e 45·5
Ogyalla		80·3	321	—	—	e 21 56	+17	e 26 55	SS	—
Collmberg		80·8	325	i 11 54	+ 1	e 21 49	+ 5	e 12 37	pP	—
Prague		80·9	324	—	—	e 21 47	+ 2	—	—	e 38·5
Shasta Dam		81·6	47	i 11 59	+ 1	—	—	e 12 37	pP	—
Jena		81·7	325	e 11 59	+ 1	e 22 0	+ 7	e 12 2	P	—
Hungry Horse		81·8	38	i 12 0	+ 1	e 22 3	+ 9	e 12 39	pP	—
Cheb		81·9	325	—	—	e 22 4	+ 9	e 23 13	PS	—
Helwan		81·9	300	i 11 59	0	21 56	+ 1	12 50	pP	i 41·8
Mineral	Z.	82·3	47	i 12 2	+ 1	—	—	i 12 41	pP	—
De Bilt		83·9	329	i 12 9a	− 1	i 22 18	+ 3	i 15 26	PP	e 40·5
Reno	Z.	83·9	47	i 12 12k	+ 2	—	—	i 12 50k	pP	—
Triest		84·1	321	i 12 14	+ 3	i 22 16	− 1	i 16 4	PP	—
Stuttgart		84·3	325	i 12 12	0	e 22 17	− 2	e 12 48	pP	e 44·5
Strasbourg		85·2	326	i 12 16a	0	e 22 34	+ 6	e 12 59	pP	38·5
Zürich		85·6	325	e 12 20a	+ 2	e 22 27	[+ 5]	e 13 4	pP	—
Salo		85·8	323	e 12 17	− 2	e 22 40	+ 6	—	—	—
Basle		86·0	325	e 12 20	0	e 22 34	− 2	e 12 57	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha	z.	86·3	49	i 12 23	+ 2	—	—	i 13 2	pP	—
Kew		86·6	332	e 12 22	− 1	e 22 42	+ 1	e 23 46	PS	e 38·5
Paris		87·4	328	i 12 27	0	e 22 57?	+ 8	i 13 9	pP	e 51·5
Rathfarnham Castle		87·5	336	e 12 28	+ 1	22 37	−13	—	—	—
Pasadena	z.	88·1	51	i 12 31	+ 1	—	—	e 13 7	pP	—
Riverside	z.	88·7	51	e 12 35	+ 2	—	—	e 13 14	pP	—
Overton	z.	89·0	47	i 12 37	+ 3	—	—	i 13 16	pP	—
Boulder City		89·2	48	e 12 37	+ 2	—	—	e 13 16	pP	—
Clermont-Ferrand		89·4	326	i 12 37	+ 1	24 28	sS	e 16 13	PP	36·5
Pierce Ferry		89·6	47	e 12 37	0	—	—	i 13 18	pP	—
Tucson		94·1	48	i 13 0	+ 2	—	—	i 13 39	pP	—
Granada		99·2	324	—	—	31 0	SS	—	—	53·2
Bogota	z.	137·1	37	i 19 6	[+ 6]	—	—	—	—	—
La Paz		157·4	52	19 38	[+ 5]	—	—	—	—	—

Additional readings and note :—
New Delhi iN =18m.11s., iSSSN =21m.1s.
Tashkent PP =10m.24s.
Obi-garm epP* =9m.15s.
Stalinabad epP* =9m.14s., iPP =9m.55s.
Sverdlovsk iS_eS =18m.29s.
College i =9m.50s., esS =19m.7s.
Moscow epP* =11m.7s., iS_eS =20m.13s.
Riverview eE =21m.38s., eSSE? =23m.40s., eSSSE =27m.16s.
Upsala ePPP?E =16m.18s., eSE =20m.46s., and 22m.7s., eE =24m.30s.?, eN =31m.30s.? and 37m.0s.
Ksara PP =14m.29s.
Copenhagen SS =22m.30s., 27m.35s.
Potsdam iZ =12m.51s.a and 14m.59s.
Collmberg eE =11m.57s. and 12m.8s., esSE? =23m.15s.
Hungry Horse i =30m.28s.
Helwan PPZ =15m.12s., pPPZ =16m.6s., eZ =17m.3s., sSN =23m.12s. L is given as P of a succeeding shock.
De Bilt iZ =16m.22s., e =23m.25s.
Triest iPS =23m.30s.
Stuttgart ePS =23m.13s., eSS =28m.0s., e =29m.6s.
Strasbourg e =12m.33s., esP =13m.16s., esPP =16m.33s., e =19m.37s. and 22m.27s., i =23m.38s., esS =23m.43s., 23m.47s., and 23m.50s., eSS =28m.21s., esSS? =29m.16s., eSSS? =32m.39s.
Zürich ePP =15m.27s.
Paris i =12m.32s., isPP =16m.53s., ePPS =25m.1s.
Clermont-Ferrans e =15m.14s., e =25m.26s. and 30m.28s.
Tucson e =16m.19s.
Long waves were also recorded at Almeria, Alicante, and Bergen.

March 19d. Readings also at 1h. (near La Paz), 2h. (Zürich), 3h. (Boulder City, Pierce Ferry, and near Balboa Heights), 4h. (near Klyuchi), 6h. (College), 8h. (Hungry Horse and near College), 11h. (Tucson, Overton, Pierce Ferry, Shasta Dam, near Kobe, and near Istanbul), 13h. (Pasadena, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 14h. (Istanbul, near Apia, near Obi-garm and Stalinabad), 15h. (Pasadena, Tinemaha, Tucson, Boulder City, Overton (2), Pierce Ferry, Hungry Horse, College, Paris, and Stuttgart), 17h. (Hungry Horse, Calcutta and near College), 23h. (Hungry Horse and Overton).

March 20d. Readings at 1h. (near Andijan, Murgab, Obi-garm, and Stalinabad), 2h. (Samarkand, Tashkent, and Tchimkent), 4h. (near Klyuchi), 5h. (Samarkand, near Obi-garm, Stalinabad, and near College), 6h. (Ksara, Sverdlovsk, Moscow, Obi-garm, Stalinabad, College, and Hungry Horse), 8h. (near Samarkand, Tashkent, Tchimkent, Obigarm, Stalinabad, and near Granada), 10h. (Tinemaha, Frunse, and near Andijan), 11h. (La Paz, College, Zi-ka-wei, and Nanking), 12h. (Hungry Horse, De Bilt, and Paris), 13h. (College and Hungry Horse), 14h. (College and Hungry Horse), 16h. (Overton, and near College), 17h. (Hungry Horse and near Mizusawa), 18h. (Hungry Horse, Overton, Istanbul, Stuttgart, and near Messina), 19h. (Andijan, Frunse, Murgab, Obi-garm, Stalinabad, Tashkent, Tchimkent, near Almata, Weston, College, Hungry Horse (2), Shasta Dam (2), Boulder City, Pierce Ferry (2), Overton, Tucson (2), near Haiwee, Tinemaha, Pasadena, and Riverside ; three separate shocks), 20h. (College), 21h. (Andijan, Samarkand, near Obi-garm and Stalinabad), 23h. (Overton, Pierce Ferry, Shasta Dam, and Hungry Horse).

March 21d. Readings at 0h. (Hungry Horse), 2h. (Overton and near Istanbul), 3h. (near College), 5h. (near Boulder City and Pierce Ferry), 8h. (Fresno, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Branner, Mineral, near Lick and Reno), 10h. (Tucson, Boulder City, Overton, Pierce Ferry (2), and Hungry Horse), 11h. (Pasadena, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Victoria, and College (2)), 12h. (Istanbul and Sofia), 14h. (College), 15h. (Copiapo, La Paz, La Plata, Santa Lucia, Mount Wilson, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and Hungry Horse), 17h. (Pasadena, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse (2), near Tacubaya and Puebla), 19h. (Pierce Ferry), 20h. (near Almeria), 21h. (near Stalinabad and near Malaga), 22h. (College, near Obi-garm and Stalinabad), 23h. (Frunse and near Almata).

March 22d. 2h. 10m. 10s. Epicentre 38°·8N. 25°·3E. (as on 1949, Jan. 14d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia		4·2	339	e 1 7	0	e 2 9	S*	i 2 16	S_g	—
Bucharest	N.	5·6	6	e 1 45	P*	i 3 10	S_g	e 1 52	P_g	—
Helwan	Z.	10·3	149	—	—	e 4 7	−23	—	—	e 5·9
Stuttgart		15·3	316	e 3 36	− 3	—	—	—	—	e 8·3
Strasbourg		16·0	314	i 3 54	+ 6	e 5 1	?	i 4 3	PP	e 7·8
Paris		19·2	309	i 4 26	− 2	e 8 3	+ 4	—	—	e 10·8
Tamanrasset	Z.	23·2	236	e 5 6	− 3	—	—	i 5 25k	PP	—

Additional reading :—
Sofia i = 2m.22s.
Long waves were also recorded at several other European stations.

March 22d. 18h. 44m. 0s. Epicentre 44°·4N. 6°·4E.

Intensity VI-VII at Le Lauzet ; VI at Ubaye and St. Vincent-les-Forts ; V at Le Vernet and Méolans ; IV at Barcelonnette, Pontis, and Savines ; III at Ebrun. Epicentre as adopted, Macroseismic Area, 1800sq.km.

J. P. Rothé and N. Dechevoy.
La Séismicité en France de 1940 a 1950. Annales de l'Institut de Physique du Globe de Strasbourg,3e partie Géophysique. New Series T. VII. Le Puy, 1954, p. 55, Macroseismic Chart, p. 54.

$A = +·7123$, $B = +·0799$, $C = +·6973$; $\delta = -2$; $h = -3$;
$D = +·111$, $E = -·994$; $G = +·693$, $H = +·078$, $K = -·717$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Salo	3·1	68	e 1 11	P_g	e 1 41	S_g	—	—	—
Basle	3·2	15	e 1 5	P_g	e 1 56	S_g	—	—	—
Chur	3·3	42	e 1 2	P*	e 1 46	S_g	—	—	—
Zürich	3·3	27	e 0 59	P*	e 1 51	S_g	e 1 6	P_g	—
Strasbourg	4·3	12	e 1 24	P_g	e 2 9	S_g	e 1 29	P_g	e 2·7
Stuttgart	4·8	23	e 1 28?	P*	e 2 39	S_g	e 1 26	P_g	—
Paris	5·2	330	e 1 21	0	e 2 19	− 3	i 1 31	P*	—
Triest	5·4	74	e 0 8	?	e 0 47	?	—	—	—

Additional readings :—
Strasbourg e = 1m.41s., eS = 2m.13s., eS_g = 2m.25s.
Stuttgart e = 2m.21s. and 2m.46s., eS_g? = 2m.53s.
Paris eS? = 2m.41s., eS_g? = 2m.57s.
Long waves were recorded at Collmberg and Jena.

March 22d. Readings also at (Hungry Horse, Overton, Pierce Ferry, College, and near La Paz), 1h. (Overton, Pierce Ferry, Shasta Dam, Hungry Horse, near Obi-garm and Stalinabad), 2h. (Mizusawa, Batavia, Hungry Horse, Boulder City, near Obi-garm and Stalinabad), 4h. (La Paz), 12h. (Apia, Pasadena, Tinemaha, College, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 14h. (Pretoria), 16h. (near Alicante), 17h. (Hungry Horse), 18h. (Almata, Frunse, Murgab, Obi-garm, Stalinabad, Sverdlovsk, and Ksara), 19h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City (2), Overton, Pierce Ferry (2), Shasta Dam, Hungry Horse, Logan, La Paz (3), and near Malaga), 20h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Mineral, Reno, Shasta Dam, Hungry Horse, Logan, Ottawa, Weston, and Tamanrasset), 22h. (Pretoria, and near Almata).

March 23d. 6h. 36m. 33s. Epicentre 2°·8S. 143°·1E.

$A = -·7987$, $B = +·5997$, $C = -·0485$; $\delta = -9$; $h = +7$;
$D = +·600$, $E = +·800$; $G = +·038$, $H = -·029$, $K = -·999$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		26·3	160	i 5 36	− 3	i 10 10	− 1	i 6 15	PP	i 13·1
Riverview		31·8	167	i 6 28a	0	e 11 35	− 3	—	—	e 15·9
Batavia		36·3	264	i 7 7	0	i 12 52	+ 4	—	—	—
Auckland	N.	44·7	143	—	—	e 19 27?	SSS	—	—	e 25·6
Apia		45·9	107	8 30	+ 4	—	—	—	—	—
Vladivostok		46·8	349	e 8 31	− 2	i 15 23	− 1	e 10 31	PP	—
Bombay	E.	72·3	291	e 11 32	+ 3	e 20 52	0	—	—	—
Frunse		76·3	315	e 12 1	+ 9	—	—	—	—	—
Andijan		77·4	313	e 11 59	+ 1	e 21 54	+ 5	—	—	—
Obi-garm		78·9	311	12 4	− 3	—	—	—	—	—
Stalinabad		79·5	311	i 12 9	− 1	22 13	+ 2	—	—	—
Tchimkent		79·7	314	e 12 14	+ 3	—	—	—	—	—
College		83·8	24	i 12 29	− 3	—	—	e 15 43	PP	—
Sverdlovsk		88·2	327	—	—	23 34	− 4	—	—	—
Shasta Dam		95·2	50	e 13 25	− 2	—	—	—	—	—
Grozny		97·3	313	e 19 37	PPP	—	—	—	—	—
Tinemaha	z.	98·6	54	e 13 57	+15	—	—	—	—	—
Pasadena	z.	98·8	56	e 13 42	− 1	—	—	—	—	—
Leninakan		98·8	311	e 17 56	PP	—	—	e 19 35	PPP	—
Riverside	z.	99·5	56	e 13 45	− 1	—	—	—	—	—
Hungry Horse		100·6	41	e 13 48	− 3	—	—	—	—	—
Ksara		105·8	304	e 18 42	PP	e 28 38	PPS	—	—	—
Stuttgart	z.	119·6	327	e 18 51	[− 1]	—	—	—	—	—
Kew		121·7	333	—	—	e 42 0?	SSS	e 60 27?	Q	e 67·4
Tamanrasset	z.	134·4	301	e 19 20	[0]	e 22 55	PKS	e 21 49	PP	—
La Paz	z.	143·7	123	19 56k	[+19]	—	—	—	—	—

Additional readings :—
Brisbane iPN = 5m.39s., eSN = 10m.13s.
Riverview eSN = 11m.40s., iE = 11m.56s. and 14m.45s.
Vladivostok iPS = 15m.52s.?, SS = 19m.4s.?
College ePPP = 17m.41s.
Hungry Horse e = 17m.13s. and 22m.57s.
Long waves were also recorded at Wellington, Tucson, Paris, and De Bilt.

March 23d. 9h. 30m. 6s. Epicentre 19°·1N. 67°·1W. (as on 1944, Aug. 9d.).

$A = +·3680$, $B = -·8711$, $C = +·3252$; $\delta = -1$; $h = +5$;
$D = -·921$, $E = -·389$; $G = +·127$, $H = -·300$, $K = -·946$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		1·2	128	i 0 48	P_g	i 1 4	S_g	—	—	e 1·2
Bogota	z.	15·9	206	i 3 51	+ 4	i 6 37	− 7	—	—	—
Philadelphia		21·9	344	e 5 0	+ 3	e 9 3	+ 9	—	—	e 11·0
Fordham		22·4	348	e 5 5	+ 3	i 9 8	+ 4	—	—	—
Weston		23·5	353	i 5 14	+ 2	i 9 18	− 5	i 5 43	PP	—
Harvard		23·6	353	e 5 17	+ 4	e 9 29	+ 4	—	—	e 15·9
Ottawa	z.	27·2	347	e 5 51	+ 4	e 11 28	+63	—	—	—
St. Louis		28·0	319	i 5 50	− 5	e 10 32	− 6	—	—	e 13·5
Tucson		41·3	298	e 7 47	− 2	—	—	—	—	—
Logan		44·1	312	e 8 7	− 5	—	—	—	—	—
Pierce Ferry		44·4	303	i 8 13	− 1	—	—	—	—	—
Overton	z.	44·9	304	i 8 17	− 1	—	—	—	—	—
Boulder City		45·1	303	i 8 18	− 2	—	—	—	—	—
Riverside	z.	46·9	300	i 8 33	− 1	—	—	—	—	—
Pasadena	z.	47·6	300	i 8 39	0	—	—	i 8 54	pP	—
Hungry Horse		47·7	320	i 8 39	− 1	—	—	—	—	—
Tinemaha	z.	48·0	303	i 8 41	− 2	—	—	i 8 53	pP	—
College		69·0	334	e 11 10	+ 1	—	—	e 13 49	PP	—

Additional readings :—
Fordham i = 9m.22s.
Harvard i = 5m.30s., 9m.37s., and 9m.46s.
St. Louis e = 11m.0s.
Long waves were also recorded at Bermuda and La Paz.

March 23d. Readings also at 0h. (near Andijan, Frunse, Murgab, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 1h. (Andijan and near Stalinabad), 2h. (Manzanillo, Tacubaya, Tucson, Zagreb, Florence, Bologna, Salo, Prato, Stuttgart, near Rome and Triest), 3h. (Collmberg), 4h. (Tinemaha, Shasta Dam (2), and Hungry Horse (2)), 5h. (Helwan, Ksara, and Perth), 7h. (near Mizusawa), 9h. (Pierce Ferry, Hungry Horse, and College), 10h. (Pierce Ferry, Shasta Dam, Hungry Horse, near Sofia and near Batavia), 12h. (Malaga), 13h. (New Delhi), 14h. (Hungry Horse and Poona), 18h. (Copenhagen, near Algiers and near Tucson), 22h. (Ksara, Pretoria, La Paz, and near Hungry Horse), 23h. (College (2) and De Bilt).

March 24d. 2h. 46m. 45s. Epicentre 46°·2N. 7°·9E.

Intensity V in the Mischabel group and the Matter Valley ; IV-V in the Rhone Valley ; and IV in the Saas Valley. Macroseismic radius 25km. Epicentre as adopted.

E. Wanner.
Jahresbericht des Erdbebendienstes der Schweiz im Jähre, 1949, Zürich, 1950, p. 2, macroseismic chart, fig. 1.

$A = +\cdot6880$, $B = +\cdot0955$, $C = +\cdot7194$; $\delta = 0$; $h = -4$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel	1·0	321	e 0 22	+ 1	i 0 35	− 1	—	—	—
Zürich	1·3	22	i 0 24	− 1	e 0 42	− 2	—	—	—
Basle	1·4	351	e 0 27	0	e 0 46	0	—	—	—
Salo	1·9	108	e 0 42	P_g	1 4	S_g	—	—	—
Strasbourg	2·4	358	e 0 49	P_g	e 1 22	S_g	—	—	e 1·6
Stuttgart	2·7	19	e 0 44?	− 1	e 1 17	− 2	e 0 59	P_g	—

Additional readings :—
Stuttgart e = 1m.25s., iS_gZ = 1m.30s.

March 24d. 19h. 26m. 17s. Epicentre 31°·8S. 14°·0W. Given by Strasbourg.

$A = +\cdot8262$, $B = -\cdot2060$, $C = -\cdot5244$; $\delta = +4$; $h = +1$;
$D = -\cdot242$, $E = -\cdot970$; $G = -\cdot509$, $H = +\cdot127$, $K = -\cdot852$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pretoria	Z.	37·3	91	i 7 13?	− 3	—	—	—	—	—
La Paz		51·2	275	9 9	+ 2	—	—	—	—	24·2
Tamanrasset	Z.	57·4	22	i 9 50k?	− 3	—	—	—	—	—
Bogota		67·6	292	e 11 2	+ 1	—	—	—	—	33·7
Helwan	Z.	74·9	40	e 11 47	+ 3	e 22 8	PS	—	—	—
Rome		77·3	20	e 12 1	+ 3	e 21 45	− 3	e 15 5	PP	—
Clermont-Ferrand		78·7	13	i 12 11	+ 5	—	—	—	—	41·7
Ksara		80·4	41	e 12 13	− 2	e 22 59	PS	—	—	—
Triest	N.	81·1	19	e 11 59	−19	—	—	—	—	—
Basle		81·3	15	e 12 19	− 1	—	—	—	—	—
Zürich		81·4	15	e 12 18	− 2	—	—	—	—	—
Paris		81·6	11	e 12 19	− 2	—	—	i 15 29?	PP	e 43·7
Strasbourg		82·4	15	e 12 19	− 6	—	—	—	—	—
Stuttgart		82·8	16	e 12 24	− 3	—	—	—	—	e 40·7
Jena	N.	85·4	17	e 12 40	0	—	—	—	—	—
Collmberg		86·1	18	e 12 43	− 1	—	—	—	—	—
Pierce Ferry		115·3	298	e 19 10	PP	—	—	—	—	—
Hungry Horse		119·3	311	e 18 55	[+ 4]	—	—	—	—	—
Shasta Dam		123·0	301	e 19 2	[+ 3]	—	—	—	—	—

Additional readings :—
Tamanrasset i = 9m.58s.k and 10m.15s.a.
Helwan eZ = 12m.0s. and 22m.57s.
Paris i = 12m.26s.
Strasbourg e = 12m.29s. and 12m.46s.
Stuttgart eZ = 12m.32s. and 12m.36s.
Jena eN = 12m.44s. and 13m.6s.
Collmberg eEZ = 12m.48s.
Long waves were also recorded at De Bilt and Kew.

March 24d. 20h. 56m. 53s. Epicentre 41°·3N. 126°·0W.
(given by Bulletin of Seismological stations of Northern California).

A = −·4429, B = −·6096, C = +·6575 ; δ = +8 ; h = −2 ;
D = −·809, E = +·588 : G = −·386, H = −·532, K = −·753.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ukiah		3·0	136	e 0 49	− 1	i 0 59	P_g	—	—	i 1·2
Mineral		3·5	104	i 0 55	− 2	i 1 43	+ 3	—	—	—
Berkeley		4·5	139	i 1 12k	+ 1	i 2 7	+ 2	i 1 33	P_g	—
San Francisco		4·5	141	i 1 14	+ 3	i 2 9	+ 4	—	—	—
Branner		4·9	141	i 0 17	−60	i 2 20	+ 5	—	—	—
Santa Clara		5·0	140	e 1 20	+ 2	e 2 34	S*	—	—	e 2·9
Reno		5·1	108	i 1 20a	0	i 2 27	+ 7	i 1 36	P_g	—
Lick		5·2	138	i 1 22	+ 1	i 2 27	+ 5	i 1 39	P_g	—
Fresno		6·6	131	i 1 43	+ 2	i 3 15	S*	i 1 51	P*	—
Seattle		6·9	22	e 1 42	− 3	e 2 48	−17	—	—	e 3·8
Victoria		7·4	13	i 1 47k	− 5	3 20	+ 2	i 2 23	P_g	i 4·0
Tinemaha		7·4	123	e 1 57	+ 5	i 3 39	S*	—	—	—
Haiwee	Z.	8·1	127	e 2 7	+ 5	—	—	—	—	—
Santa Barbara	Z.	8·4	142	e 2 14	+ 8	—	—	—	—	—
Pasadena		9·5	137	i 2 22	+ 2	i 4 15	+ 5	—	—	—
Riverside	Z.	10·0	134	i 2 29	+ 2	—	—	—	—	—
Boulder City		10·2	118	i 2 34	+ 3	i 4 20	− 7	—	—	—
Pierce Ferry		10·7	115	i 2 41	+ 3	—	—	—	—	e 4·5
Salt Lake City		10·7	88	e 2 22	−16	e 4 20	−19	—	—	e 4·8
Butte	N.	10·8	60	e 2 32	− 7	e 4 42	0	—	—	i 5·3
Palomar	N.	10·8	135	i 2 40	+ 1	—	—	—	—	—
Hungry Horse		11·0	46	e 2 32	−10	e 4 42	− 5	—	—	e 5·4
Bozeman		11·7	63	e 2 45	− 6	i 5 4	0	—	—	i 5·9
Tucson		15·1	122	e 3 40	+ 4	e 6 48	+23	—	—	e 7·8
Rapid City	E.	17·0	73	i 3 55	− 6	e 6 19	−51	i 4 12	PP	e 7·0
Saskatoon		17·1	45	3 58	− 4	7 14	+ 2	4 11	PP	8·8
Sitka		17·3	344	i 3 53	−11	i 7 12	− 4	—	—	i 7·9
Chihuahua		20·6	122	e 4 52	+ 9	e 8 56	SS	e 9 36	SSS	e 12·5
Lubbock		20·6	101	4 45	+ 2	—	—	—	—	—
Lincoln	E.	22·1	81	i 4 56	− 3	(e 9 12)	+14	—	—	e 9·2
College		26·7	340	i 5 39	− 4	e 10 24	+ 7	—	—	e 11·7
Little Rock		27·2	94	i 5 50	+ 3	i 10 37	+12	—	—	—
Chicago		28·6	75	e 5 59	− 1	e 10 43	− 5	e 6 49	PP	e 13·8
Manzanillo		28·9	134	e 8 37	?	e 12 55	SS	—	—	e 17·8
Tacubaya		31·6	125	e 6 43	+17	—	—	e 14 0	SSS	16·0
Mobile		32·2	97	6 31	− 1	11 58	+13	—	—	—
Puebla		32·5	124	e 7 43	PP	e 13 56	SS	—	—	e 18·5
Cleveland		33·1	75	e 6 36	− 4	e 11 53	− 6	e 7 41	PP	e 14·6
Honolulu		33·4	243	—	—	e 11 55	− 8	—	—	e 14·0
Columbia		36·0	87	—	—	e 12 43	− 1	—	—	e 15·0
Ottawa		36·3	66	7 3k	− 4	12 47	− 1	8 22	PP	17·6
Philadelphia		38·1	75	e 7 17	− 5	e 13 4	−12	e 8 42	PP	e 16·0
Shawinigan Falls	N.	38·1	64	e 7 18	− 4	—	—	—	—	19·1
City College	N.Y.	38·7	73	e 7 26	− 1	e 13 26	+ 1	e 8 54	PP	e 16·4
Fordham		38·8	73	i 7 27	− 1	i 13 33	+ 7	—	—	19·9
Seven Falls	E.	39·3	63	7 28	− 4	13 37	+ 3	8 57	PP	21·1
Harvard		39·9	70	i 7 36	− 1	e 13 46	+ 3	—	—	e 19·1
Weston		40·2	70	i 7 37	− 3	e 13 39	− 9	i 9 9	PP	20·3
Halifax		44·8	64	9 59	PP	14 55	0	17 59	SS	22·4
Bermuda		49·0	80	e 8 57	+ 7	e 16 2	+ 7	e 10 48	PP	e 22·3
Ivigtut		49·3	39	e 8 53	0	e 15 55	− 4	19 19	SS	23·1
San Juan		55·6	95	i 9 42	+ 2	e 17 19	− 6	e 11 38	PP	e 27·4
Scoresby Sund		56·1	24	9 42	− 1	17 27	− 5	21 19	SS	—
Bogota		59·0	114	i 10 5	+ 1	i 18 17	+ 7	e 11 31	PP	28·1
Vladivostok		70·6	311	e 11 17	− 2	i 20 31	− 2	e 21 1	PS	—
Bergen	N.	71·1	24	—	—	e 20 32	− 6	e 28 27	SSS	32·1
Aberdeen	E.	71·2	29	—	—	i 20 27	−13	i 28 15	SSS	e 32·0
Rathfarnham Castle		72·4	34	e 11 27	− 3	20 57	+ 4	—	—	—
Durham	N.	73·2	31	—	—	—	—	i 16 12	PPP	—
Upsala		74·8	19	—	—	e 21 17	− 3	e 25 55	SS	e 34·1
Kew		76·2	32	i 11 50	− 2	e 21 35	− 1	e 14 45	PP	e 32·1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk		77·1	332	e 11 56	− 1	21 42	− 4	e 26 0	SS	—
Copenhagen		77·1	24	—	—	i 21 43	− 3	e 26 39	SS	—
De Bilt		77·8	29	e 12 1	0	i 21 58	+ 5	e 26 43	SS	e 33·1
La Paz		78·5	124	e 12 15	+11	i 22 3	+ 2	i 15 24	PP	39·6
Paris		79·4	33	e 12 6	− 3	e 22 7	− 3	i 12 33	pP	e 39·1
Potsdam	z.	80·2	25	e 12 12	− 2	—	—	e 30 54	SSS	e 35·9
Jena	z.	81·0	26	e 12 14	− 4	—	—	—	—	—
Collmberg		81·1	25	e 12 15	− 3	e 22 25	− 3	e 27 31	SS	e 40·3
Strasbourg		81·6	29	e 12 21	0	e 22 35	+ 2	e 15 10	PP	38·1
Lisbon		81·8	45	12 46	+24	22 35	0	—	—	33·6
Cheb		82·0	26	e 12 35	+12	e 22 22	−15	—	—	—
Stuttgart		82·0	28	e 12 21	− 2	e 22 32	− 5	e 12 41	PcP	42·1
Clermont-Ferrand		82·1	34	e 12 25	+ 1	e 22 45	+ 7	e 12 47	pP	36·6
Sverdlovsk		82·1	357	e 12 20	− 4	i 22 32	− 6	e 15 26	PP	—
Basle		82·4	30	e 12 28	+ 3	e 22 24	−17	—	—	—
Prague		82·6	25	e 12 26	0	e 22 39	− 4	—	—	—
Moscow		82·9	10	e 12 28?	0	22 29?	− 7	—	—	—
Zürich		83·0	30	e 12 27	− 1	e 22 43	− 4	—	—	—
Toledo		83·5	42	e 12 22	− 9	e 22 46	− 6	35 10	Q	39·5
Tortosa		85·0	38	e 14 46	?	22 58	[− 3]	15 43	PP	e 40·1
Salo		85·2	29	e 12 38	− 1	e 23 9	0	—	—	—
Barcelona		85·2	37	—	—	—	—	e 34 59	Q	e 42·7
Malaga	z.	85·7	44	i 12 42k	0	i 23 19	+ 5	i 13 5	pP	42·3
Granada		85·8	43	i 12 55k	+13	i 23 22	+ 7	28 58	SS	41·3
Triest		86·3	28	e 13 2	+17	i 23 24	+ 4	e 16 16	PP	e 37·1
Alicante		86·4	40	e 12 46	+ 1	e 23 3	[− 7]	16 24	PP	e 40·7
Bologna		86·4	30	e 13 12	+27	e 23 31	+10	—	—	—
Almeria		86·6	42	e 12 52	+ 6	23 28	+ 5	16 16	PP	44·0
Florence	N.	87·0	30	e 13 7?	+19	e 23 28	+ 1	—	—	—
Rome		89·1	30	e 12 57	− 1	e 23 49	+ 3	e 29 35	SS	—
Yalta		92·8	14	e 13 11	− 5	e 25 31	PS	—	—	—
Tashkent		96·6	349	e 13 50	+17	i 24 6	[− 4]	e 26 6	PS	—
Baku		98·6	3	—	—	e 24 55	−14	—	—	—
Stalinabad		99·4	348	e 13 43	− 3	e 24 27	[+ 3]	—	—	—
Tamanrasset	z.	102·0	45	e 18 1	PP	—	—	e 18 16	PKP	—
Ksara		103·4	16	18 35	PP	28 13	PPS	—	—	—
Helwan		106·2	20	e 19 1	PP	e 24 55	[− 1]	e 27 53	PS	—
Riverview		106·6	239	—	—	e 34 0	SS	e 44 43	Q	e 49·7
New Delhi	N.	107·2	338	—	—	e 23 10	?	—	—	e 52·9
Calcutta	E.	109·0	326	e 20 38	?	e 25 40	{−18}	—	—	—
Hyderabad	N.	117·3	333	—	—	e 29 51	PS	—	—	—
Bombay		117·6	340	e 18 15	[−33]	e 26 41	{−17}	—	—	—
Pretoria	z.	153·4	60	e 20 8	[+16]	—	—	—	—	—

Additional readings :—
Mineral iE =59s.
Berkeley iE =1m.19s. and 1m.25s., iZ =2m.10s. and 2m.41s., eE =3m.38s.
Branner iE =20s.
Reno iZ =1m.25s.k, iN =1m.32s., iE =1m.55s., iZ =1m.59s., iN =2m.4s.
Lick eN =2m.36s., eE =2m.48s.
Salt Lake City e =3m.18s.
Butte eN =3m.58s.
Bozeman e =3m.59s., i =4m.14s.
Tucson i =4m.3s. and 4m.24s., e =5m.4s. and 7m.40s.
Rapid City eE =5m.17s.
Saskatoon PPP =4m.19s., SS =7m.48s.
College e =7m.2s. and 7m.6s.
Manzanillo e =13m.19s.
Tacubaya eSS =14m.15s.
Ottawa SS =15m.13s.
Fordham i =7m.46s.
Seven Falls PPPE =9m.42s., SSE =16m.49s.
Bermuda eSS =19m.32s.
Ivigtut 20m.55s.
San Juan ePPP =12m.47s., e =17m.41s., eSS =21m.26s.
Bogota eSSEN =22m.22s.
Upsala eSN =21m.7s.?, eSSSN =29m.7s., eSSSE =29m.37s.

Continued on next page.

Kew ePPPZ =17m.37s., eSSEN =26m.25s., eSSS?N =30m.1s.
Copenhagen 29m.55s.
De Bilt iP =12m.18s.
La Paz iPZ =12m.28s., iSSN =27m.19s.
Paris iP =12m.9s., ePP =15m.4s., e =17m.39s., eS =22m.11s., eSS =27m.7s.?, eQ = 36·1m.
Potsdam eZ =12m.24s., iZ =12m.31s.
Jena eZ =12m.17s., eN =12m.32s.
Collmberg eE =12m.42s.
Strasbourg e =12m.40s., 12m.44s., and 13m.52s., ePP? =15m.49s., ePPP =17m.36s., ePS =23m.22s., ePPS =23m.47s., eSS? =27m.29s., eSS =27m.42s., eSSS =31m.25s., eSSSS? =35m.42s., e =36m.9s.
Stuttgart ePS =23m.25s., eSS =27m.43s., eSSS =31m.49s., eQ =35·1m.
Clermont-Ferrand esP? =12m.54s., ePP =15m.54s., ePPS =23m.52s., eSS =27m.57s.
Sverdlovsk PS =23m.24s.
Tortosa PPP?N =18m.13s., PSEN =23m.54s., SS?E =24m.22s., SSS?E =31m.58s.
Malaga ePPZ =16m.11s., PPPZ =18m.19s., isSZ =24m.5s.
Granada SSS =32m.13s.
Triest eSKS =23m.12s., iPS =24m.14s., iPPS =24m.57s., eSS =29m.44s.
Alicante PPP =18m.7s., S_cS =22m.55s., PS =24m.7s., PPS =27m.37s., SS =28m.29s., Q =35m.45s.
Almeria PPP =18m.14s., SKKS =23m.20s., PS =24m.26s., SS =29m.20s., SSS = 32m.56s.
Rome e =13m.12s., eSSS =33m.1s.
Tashkent eSSS =35m.5s.
Calcutta eE =31m.40s.
Long waves were also recorded at Apia, Auckland, Wellington, La Plata, Woodstock, Reykjavik, Istanbul, Jersey, Neuchatel, and Zagreb.

March 24d. 21h. 40m. 54s. Epicentre 41°·3N. 126°·0W. (as at 20h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mineral	E.	3·5	104	i 0 56	− 1	i 1 36	− 4	—	—
Berkeley		4·5	139	i 1 10k	− 1	e 2 6	+ 1	—	—
Branner		4·9	141	i 1 16	− 1	i 2 16	+ 1	—	—
Reno		5·1	108	e 1 32	+12	i 2 26	+ 6	e 1 46	P_g
Lick	Z.	5·2	138	i 1 21	0	i 2 23	+ 1	—	—
Tinemaha	Z.	7·4	123	i 1 58	+ 6	i 3 36	+18	—	—
Haiwee	Z.	8·1	127	e 2 1	− 1	—	—	—	—
Mount Wilson	Z.	9·4	136	i 2 20	+ 2	—	—	—	—
Riverside	Z.	10·0	134	i 2 28	+ 1	—	—	—	—
Pierce Ferry		10·7	115	i 1 1	?	—	—	—	—
Hungry Horse		11·0	46	e 2 32	−10	—	—	—	—
Tucson		15·1	122	e 3 39	+ 3	—	—	—	—

Additional readings :—
Berkeley iZ =1m.16s. and 2m.2s.
Reno eN =2m.18s., eE =2m.21s., iE =2m.31s., iN =2m.54s.
Tucson i =3m.57s.

March 24d. Readings also at 1h. (Weston and near Istanbul), 2h. (Hungry Horse), 4h. (near Ferndale), 5h. (Boulder City, Shasta Dam, Hungry Horse, and College), 6h. (Andijan, Samarkand, near Stalinabad and Obi-garm), 9h. (Shasta Dam), 11h. (College), 12h. (Samarkand, near Murgab, Obi-garm (3), Stalinabad, and Tashkent), 14h. (Andijan, Obi-garm. and near Stalinabad), 15h. (near Klyuchi), 16h. (near Andijan, Murgab, Obi-garm, Samarkand, and Stalinabad), 17h. (Andijan, Samarkand (2), near Obi-garm (2), Stalinabad (2), Overton, Pierce Ferry, Tucson, Salt Lake City, Mineral, Reno, near Butte, and near Hungry Horse), 18h. (near La Paz), 19h. (La Paz and near Tucson), 21h. (Harvard, Pierce Ferry, and near Mineral), 23h. (Mount Wilson, Riverside, Tinemaha, Tucson, Overton (2), and Hungry Horse).

March 25d. Readings at 0h. (Boulder City, Butte, Hungry Horse, Overton, Pierce Ferry, Rapid City, Salt Lake City, Tucson, Pasadena, Riverside, Santa Barbara, Tinemaha, Berkeley, Mineral, Branner, Lick, Fresno, San Francisco, and Ottawa), 1h. (near Obi-garm), 2h. (Hungry Horse, Pierce Ferry, Salt Lake City, Tucson, Pasadena, Riverside, Tinemaha, Mineral, Berkeley, Lick, Reno, Triest, Istanbul, Kew, De Bilt, Rome, Salo, Messina, Potsdam, Stuttgart, Strasbourg, Paris, and Clermont-Ferrand), 3h. (De Bilt), 7h. (near Santa Lucia), 10h. (near Andijan, near Obi-garm, and near Mizusawa), 11h. (Samarkand (2), near Stalinabad (2), Obi-garm (2), and near Mizusawa), 12h. (near Balboa Heights), 13h. (near Obi-garm), 16h. (near Murgab, Obi-garm, and Andijan), 17h. (College), 20h. (near Granada, near Irkutsk, near Obi-garm, Andijan, and Stalinabad). 21h. (near Malaga), 22h. (near Granada), 23h. (Boulder City).

March 26d. 2h. 28m.5s. Epicentre 25°·1N. 109°·7W. (as on 1940, June 3d.).

$A = -·3056$, $B = -·8536$, $C = +·4219$; $\delta = +2$; $h = +3$;
$D = -·941$, $E = +·337$; $G = -·142$, $H = -·397$, $K = -·907$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		7·1	354	i 1 46	− 2	i 3 20	+10	i 2 4	P*	i 3·7
Palomar	N.	10·3	325	e 2 33	+ 1	—	—	—	—	—
Tacubaya		11·3	118	2 47	+ 1	—	—	—	—	i 6·4
Pasadena		11·6	325	e 2 50	0	—	—	—	—	e 5·6
Pierce Ferry		11·6	342	i 3 49	+59	e 5 25	+24	—	—	i 6·0
Boulder City		11·7	339	e 3 51	+60	—	—	—	—	e 6·4
Overton	Z.	12·1	342	i 2 58	+ 1	—	—	—	—	i 7·2
Tinemaha		14·0	331	e 3 24k	+ 2	—	—	i 3 45	PPP	—
Fresno	N.	14·5	326	e 3 30	+ 2	—	—	—	—	—
Lick	Z.	15·9	325	i 3 47	0	—	—	—	—	—
Berkeley		16·6	323	e 3 59a	+ 3	—	—	—	—	e 8·4
Logan		16·7	355	e 3 55	− 2	e 7 12	+ 9	i 4 15	PP	e 9·2
Reno		16·7	332	e 4 1k	+ 4	—	—	i 4 22	PPP	e 9·5
Mineral	Z.	18·2	330	i 4 18	+ 2	—	—	—	—	—
Butte	N.	21·0	357	e 4 46	− 1	—	—	—	—	e 12·1
St. Louis		21·3	46	e 4 49	− 1	e 8 43	0	—	—	e 11·0
Hungry Horse		23·5	354	i 5 8	− 4	—	—	—	—	—
Ottawa		34·0	45	e 7 44	PP	—	—	—	—	17·4

Additional readings :—
Tucson i = 2m.16s. and 2m.52s.
Reno iE = 4m.41s.
St. Louis iS = 8m.49s.
Long waves were also recorded at Paris, Kew, Bozeman, Chicago, Lincoln, Philadelphia Weston, Saskatoon, and Seven Falls.

March 26d. Readings also at 0h. (Helwan), 2h. (Istanbul), 3h. (Belgrade). 5h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Tinemaha, and near Istanbul (2)), 6h. (near Obi-garm), 7h. (Brisbane and College (2)), 8h. (Riverview), 10h. (near Obi-garm), 12h. (Hungry Horse (2), Pierce Ferry, Shasta Dam, and near Klyuchi), 13h. (Boulder City and Pierce Ferry), 14h. (near Istanbul), 15h. (College, Hungry Horse, Pierce Ferry, and near Fort de France), 16h. (Boulder City, College, Hungry Horse, Pierce Ferry, Tucson, Tinemaha (2), Ottawa, near Tacubaya, Oaxaca and Puebla), 17h. (Klyuchi, near College and near Tucson), 19h. (Mount Wilson, Riverside, near Boulder City and near Andijan), 21h. (Samarkand (2), near Obi-garm (2), and near Stalinabad (2)).

March 27d. 6h. 34m. 1s. Epicentre 3°·1N. 127°·8E.

Felt at Morotai Epicentre 3°·5N. 127°·5E. (Pasadena).

Quarterly Seismic Bulletin, Batavia, January-March, 1949, p.3.

$A = -·6120$, $B = +·7890$, $C = +·0538$; $\delta = -4$; $h = +7$;
$D = +·790$, $E = +·613$; $G = -·033$, $H = +·043$, $K = -·998$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		22·9	246	i 5 5	− 1	i 9 6	− 7	—	—	12·3
Zi-ka-wei		28·6	349	e 5 59	− 1	i 10 59	+11	i 6 13	?	—
Nanking		30·0	344	e 5 4	−68	i 10 6	−64	6 9	PP	—
Koti		30·6	9	6 21	+ 3	11 26	+ 6	7 35	PPP	13·7
Owase		31·8	13	e 6 31	+ 3	10 51	−47	7 37	PP	13·7
Nagoya		33·0	15	e 6 40	+ 1	e 12 11	+14	e 8 6	PPP	14·2
Tokyo		34·3	18	7 10	+20	12 32	+15	8 40	PPP	—
Perth		36·7	197	(7 5)	− 5	(12 44)	−10	(8 49)	PPP	—
Sendai		37·0	18	7 14	+ 1	13 0	+ 1	17 35	S_cS	—
Mizusawa		37·9	17	7 20	0	13 20	+ 7	—	—	22·0
Brisbane		38·9	144	i 7 21	− 8	i 13 13	−15	i 9 3	PP	i 22·3
Vladivostok		40·0	5	i 7 39	+ 1	i 13 50	+ 6	—	—	—
Sapporo		41·6	15	7 57	+ 6	14 14	+ 6	—	—	—
Calcutta	E.	42·8	300	i 8 5a	+ 4	i 14 23	− 3	i 10 3	PPP	20·3
Riverview		42·8	152	i 7 57a	− 4	i 14 15	−11	i 8 10	pP	e 18·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Melbourne	E.	43·7	160	i 8 10	+ 2	i 14 14	−25	i 10 12	PPP	—
Colombo	E.	47·9	276	8 41	− 1	15 21	−18	—	—	24·3
Kodaikanal	E.	50·4	281	i 8 55	− 6	i 15 59	−15	10 52	PP	24·2
Hyderabad	N.	50·4	290	9 7	+ 6	16 10	− 4	11 19	PP	23·6
Irkutsk		52·8	342	i 9 17	− 2	16 44	− 3	11 35?	PP	—
New Delhi	E.	54·3	304	e 9 44	+14	i 17 10	+ 3	i 21 53	?	25·4
Poona		54·9	290	e 9 32	− 3	i 17 18	+ 2	i 12 57	PPP	23·0
Bombay		56·0	291	e 9 40	− 3	i 17 16	−14	11 58	PP	26·0
Auckland	N.	59·1	137	10 4	0	17 5	−66	—	—	26·5
Klyuchi		59·2	20	e 10 4?	− 1	e 18 18?	+ 6	—	—	—
Kaimata	N.E.	60·1	144	10 18	+ 7	—	—	—	—	—
Almata		60·2	320	i 10 13?	+ 1	18 20?	− 5	—	—	—
Arapuni	E.	60·3	138	10 29	+16	14 29	?	(20 29)	?	20·5
Murgab		60·3	313	10 9?	− 4	18 23?	− 3	—	—	—
Wellington		61·4	141	10 29	+ 9	18 29	−11	12 50	PP	29·0
Frunse		61·6	318	e 10 24	+ 2	e 18 41?	− 2	—	—	—
Tuai	N.	61·7	138	9 50	−32	18 46	+ 2	e 10 21	P	—
Semipalatinsk		61·8	328	e 10 33?	+10	—	—	—	—	—
Apia		62·2	107	e 10 25	− 1	e 18 59	+ 8	e 13 30	PP	e 26·0
Andijan		62·3	315	e 10 24	− 2	—	—	—	—	—
Obi-garm		63·5	312	i 10 32	− 2	i 18 59	− 8	—	—	—
Stalinabad		64·1	312	i 10 36	− 2	i 19 10	− 4	—	—	—
Tashkent		64·6	315	i 10 40?	− 1	i 19 20?	− 1	i 13 13	PP	—
Tchimkent		64·8	316	i 10 41	− 2	i 19 24	+ 1	—	—	—
Samarkand		65·8	312	i 10 47	− 2	i 19 29	− 6	—	—	—
Ashkabad		71·9	309	11 26	− 1	—	—	—	—	—
Honolulu		74·4	69	e 11 47	+ 5	e 21 14	− 2	e 22 7	PPS	e 34·4
Sverdlovsk		75·1	328	i 11 42	− 4	i 21 14	−10	i 14 33	PP	—
Baku		78·8	311	—	—	22 5	+ 1	—	—	—
Tananarive		81·8	250	e 12 16	− 6	i 22 31	− 4	i 12 34	P_cP	e 39·3
Grozny		82·1	313	i 12 23	− 1	i 22 37	− 1	—	—	—
Erevan		82·9	310	12 38	+10	i 22 46	0	—	—	—
Leninakan		83·4	311	e 12 36?	+ 6	22 58	S_cS	—	—	—
Piatigorsk		84·1	314	12 24?	−10	22 43	−15	—	—	—
College		84·8	25	i 12 35	− 2	i 22 54	[− 6]	i 15 35	PP	e 36·5
Sotchi		86·5	313	e 12 44	− 2	23 8	[− 3]	e 12 52	P_cP	—
Theodosia		89·5	315	e 13 14	+14	23 54?	+ 4	—	—	—
Ksara		89·9	303	i 13 0	− 2	i 24 0	+ 6	—	—	—
Simferopol		90·4	315	12 31?	−33	23 36?	[+ 1]	—	—	—
Yalta		90·4	314	i 16 17?	PP	i 22 51	?	—	—	—
Sitka		91·1	32	—	—	i 24 20	+16	—	—	e 41·8
Helsinki		93·7	331	e 13 33	+13	e 23 45	[− 9]	e 17 15	PP	e 42·0
Helwan		94·0	300	i 13 17	− 4	24 35	+ 5	17 14	PP	—
Istanbul		94·6	311	e 13 32	+ 8	—	—	e 17 16	PP	—
Bucharest		96·2	315	e 16 10	?	i 24 49	+ 1	e 24 7	SKS	36·0
Upsala		97·3	331	e 12 59?	−37	i 24 56	− 2	i 17 41	PP	e 41·0
Sofia		98·5	313	—	—	i 24 17	[− 3]	—	—	—
Skalnate Pleso		99·0	321	e 13 29	−15	e 25 21	+ 9	—	—	—
Victoria		100·0	40	—	—	e 24 43	{−11}	e 28 23	PPS	48·0
Raciborzu		100·1	322	e 13 51?	+ 2	e 25 28	+ 7	e 17 39	PP	—
Kalossa		100·6	318	e 14 5	+14	e 25 22	− 3	e 24 30	SKS	e 51·0
Ogyalla		100·7	319	e 14 32	+40	—	—	e 18 8	PP	—
Copenhagen		101·4	328	e 13 54	− 1	24 31	[− 3]	i 18 16	PP	—
Potsdam		102·3	325	e 17 20	?	e 24 47	[+ 9]	i 18 22	PP	48·0
Prague		102·4	323	e 14 10	+11	e 25 53	+13	—	—	—
Ukiah		102·6	48	e 20 8	PPP	e 27 32	PS	—	—	e 47·3
Bergen		102·7	334	e 15 41	?	24 39	[− 1]	18 21	PP	39·0
Collmberg		102·8	324	e 14 9	+ 8	e 24 41	[+ 1]	e 18 26	PP	e 46·0
Zagreb		102·8	318	e 13 52	− 9	e 24 40	[0]	e 18 40	PP	e 50·0
Taranto		103·4	312	14 11	+ 7	24 36	[− 7]	18 29	PP	—
Mineral		103·5	47	e 14 5	+ 1	—	—	18 29	PP	—
Cheb		103·6	323	14 19	+15	—	—	e 18 15	PP	—
Berkeley		103·7	50	e 14 19	+14	i 25 1	[+16]	i 18 21	PKP	e 46·7
Jena		103·7	323	e 14 11	+ 6	e 24 47	[+ 2]	e 18 31	PP	e 45·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		103·8	350	14 4	− 1	24 50	[+ 5]	18 37	PP	—
Santa Clara		104·1	50	e 18 33	PP	e 24 39	[− 7]	e 33 35	SSP	e 48·0
Lick	z.	104·3	50	i 14 22	+14	i 30 16	?	i 18 26	PP	e 48·7
Triest		104·3	318	e 14 21	+13	i 24 43	[− 4]	e 18 41	PP	e 51·0
Reno		105·1	48	e 14 25	+14	i 24 31	[−20]	e 18 35	PP	e 56·0
Messina		105·4	311	e 18 40	PP	e 25 3	[+11]	—	—	—
Catania		105·9	310	e 16 59?	?	—	—	—	—	—
Fresno	z.	105·9	50	e 14 24	P	i 24 29	[−26]	e 18 46	PP	e 49·3
Hungry Horse		105·9	37	e 14 14	P	e 28 9	PS	e 18 19	PP	—
Padova		105·9	317	e 18 35	PP	24 59	[+ 4]	—	—	—
Stuttgart		106·0	323	e 14 12a	P	e 24 48	[− 7]	e 18 30	PP	55·0
Bologna		106·3	317	e 14 27	P	e 25 6	[+10]	e 18 51	PP	e 52·0
Salo		106·4	319	e 14 29	P	i 25 4	[+ 7]	e 18 50	PP	e 50·5
Rome		106·4	315	e 14 12	P	e 24 53	[− 4]	e 18 48	PP	e 52·0
Chur		106·6	321	e 18 5	[−21]	e 24 59	[+ 1]	—	—	e 39·2
Florence		106·6	317	e 14 28	P	i 25 3	[+ 5]	i 18 57	PP	—
Prato		106·7	317	e 14 39	P	—	—	i 17 59	?	—
De Bilt		106·8	327	e 14 15	P	i 24 55	[− 4]	e 18 46	PP	e 49·0
Strasbourg		107·0	323	e 14 18	P	i 24 59	[0]	e 18 47	PP	50·0
Tinemaha	z.	107·0	50	e 14 19	P	—	—	e 18 42	PP	—
Zürich		107·0	322	e 14 22a	P	e 24 57	[− 2]	e 18 7	PKP	—
Basle		107·5	322	e 14 31	P	e 25 9	[+ 7]	e 28 6	PS	—
Pavia	z.	107·5	319	e 17 59?	[−29]	—	—	—	—	—
Aberdeen	E.	107·7	333	e 14 18	P	i 25 5	[+ 3]	i 18 52	PP	e 47·5
Butte	N.	107·8	39	e 19 3	PP	e 37 31	SSS	—	—	e 51·9
Pasadena		107·9	52	e 14 34	P	e 25 17	[+14]	e 18 26	PKP	i 44·7
Neuchatel		108·1	321	e 17 56	[−33]	e 28 17	PS	—	—	—
Saskatoon		108·4	32	—	—	e 25 9	[+ 4]	e 33 36	SS	47·0
Riverside	z.	108·6	52	e 14 43	P	—	—	e 29 55	PKKP	—
Bozeman		108·9	39	e 16 47	?	e 26 49	S	—	—	e 45·0
Durham		108·9	331	e 17 38	?	i 25 16	[+ 8]	i 28 34	PS	—
Edinburgh		108·9	332	e 18 55	PS	24 59	[− 9]	e 21 13	PPP	50·4
Reykjavik		109·3	347	—	—	e 25 16	[+ 7]	e 28 19	PS	e 52·1
Boulder City		109·9	50	e 14 32	P	e 28 48	PS	i 14 56	pP	—
Paris		109·9	325	e 14 29	P	25 14	[+ 2]	i 18 23	PKP	e 51·0
Logan		110·0	43	e 18 17	[−16]	e 28 31	PS	e 21 14	PPP	e 46·8
Kew		110·1	328	e 14 31	P	e 26 19	{+13}	e 19 8	PP	e 54·0
Salt Lake City		110·4	44	e 19 5	PP	e 26 13	{+ 5}	e 21 29	PPP	e 45·2
Pierce Ferry		110·5	49	e 14 18	P	e 28 52	PS	e 18 48	PKP	—
Clermont-Ferrand		111·1	321	e 14 37	P	i 22 31	PKS	i 18 50	PP	51·0
Rathfarnham Castle		112·0	332	e 14 57	P	—	—	19 23	PP	—
Jersey	E.	112·3	327	e 15 19	?	e 26 29	{+ 8}	e 28 59?	PS	—
Barcelona		113·7	318	e 19 42	PP	—	—	—	—	e 52·1
Tucson		114·3	52	i 18 42	[0]	e 26 45	{+10}	e 14 59	P	e 47·0
Rapid City	E.	114·6	37	e 19 35	PP	e 30 9	PPS	e 22 12	PPP	—
Algiers		115·1	313	e 14 28	P	25 39	[+ 7]	e 29 24	PS	56·0
Tortosa		115·1	318	19 56	PP	29 21	PS	30 32	PPS	e 50·0
Ivigtut		115·8	357	e 19 49	PP	26 51	{+ 5}	e 25 44	SKS	62·0
Alicante		116·9	316	19 0	[+13]	29 29	PS	19 57	PP	e 54·1
Tamanrasset	z.	118·1	298	e 18 47	[− 2]	i 29 58	PS	i 15 36k	?	—
Toledo		118·6	319	e 19 3	[+13]	e 25 45	[0]	i 29 56	PS	e 50·9
Almeria		119·0	315	i 19 0	[+ 9]	25 54	[+ 8]	i 20 28	PP	51·1
Granada		119·7	316	i 19 0k	[+ 8]	i 25 48	[− 1]	19 58k	pPKP	i 61·6
Malaga	z.	120·5	316	e 18 59	[+ 5]	i 25 59	[+ 7]	i 20 39a	PP	71·8
Lisbon		122·5	320	19 5	[+ 7]	25 54	[− 4]	20 40	PP	61·1
Chicago		125·0	32	e 21 1	PP	e 37 47	SS	e 30 39	PS	e 53·9
St. Louis		125·9	36	e 19 0	[− 4]	i 28 7	{+14}	i 21 9	PP	—
Shawinigan Falls	N.	127·3	17	e 20 6	[+59]	—	—	—	—	—
Ottawa		127·4	20	19 5k	[− 2]	26 13	[0]	32 51	PPS	61·5
Seven Falls	E.	127·4	15	19 6	[− 1]	27 54	{− 9}	21 7	PP	54·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Cleveland	N.	128·2	28	i 19 17	[+ 8]	—	—	i 21 22	PP		—
Tacubaya		128·7	62	i 19 27	[+17]	e 26 14	[− 2]	i 21 11	PP		51·8
Pennsylvania	E.	130·4	26	e 21 34	PP	e 28 31	{+ 9}	e 33 34	PPS		—
Harvard		131·3	18	i 19 15	[+ 1]	e 28 39	{+11}	e 21 33	PP		e 66·0
Halifax		131·4	10	22 52	PKS	26 24	[+ 1]	e 39 24	SSP		—
Weston		131·5	18	e 19 9	[− 6]	i 22 47	PKS	e 21 19	PP		54·0
Fordham		132·0	21	e 19 19	[+ 3]	e 28 40	{+ 8}	e 21 31	PP		65·0
Mobile		132·0	42	19 19	[+ 3]	40 0	SSP	21 57	PP		—
Philadelphia		132·2	23	e 21 32	PP	e 26 37	[+12]	i 22 42	PKS		e 54·8
Columbia		134·2	33	e 22 49	PKS	e 33 13	PPS	e 38 49	SS		e 56·9
Bermuda		142·8	17	e 19 37	[+ 2]	e 46 59	SSS	e 22 44	PP		e 59·8
Santa Lucia		145·2	152	e 19 57	[+17]	—	—	23 12	PP		—
La Plata	E.	147·9	171	19 23	[−21]	—	—	(19 54)	PKP_2		19·9
San Juan		154·6	31	e 19 48	[− 6]	e 27 1	[+ 2]	i 24 13	PP		e 72·1
Bogota		156·8	70	e 20 5	[+ 8]	e 26 56	[− 5]	i 24 24	PP		86·0
La Paz		159·6	132	i 19 59a	[− 1]	i 26 59	[− 5]	i 24 1	PP		74·4
Fort de France		160·2	25	—	—	i 42 29	?	e 53 39	?		—

Additional readings and notes :—
Nanking iP =5m.14s., pP? =5m.55s., 6m.4s., SS =12m.4s.
Kôti PPP =7m.57s., SS =12m.50s.
Tokyo PPP =9m.25s., SS =14m.36s.
Perth SSS =(15m.39s.), readings increased by 5 minutes.
Mizusawa SE =13m.26s.
Brisbane iSSN =16m.3s.
Calcutta iSSSE =17m.43s.
Riverview iE =9m.9s., iN =9m.12s., iPPN =9m.39s., iP_cPZ =9m.50s., iP_cPN =9m.53s., iPPP =10m.6s., eEN =15m.11s., iN =17m.30s., iZ =17m.33s., iS_cSE =17m.51s., iSSSZ =18m.3s., iSSSE =18m.8s., iSSSN =18m.11s.
Kodaikanal SSE =19m.21s.
Hyderabad SSN =19m.2s.
Irkutsk SS =20m.23s.
Poona ePE =9m.35s., iPPN =11m.29s., iSN =16m.59s., iSE =17m.3s., iN =17m.42s., iS_cSN =19m.25s., eSSN =20m.44s.
Bombay SSE =21m.2s., SSN =21m.9s.
Auckland PPN =11m.17s., $S_cS?N$ =18m.59s., SSSN =23m.19s.
Kaimata iNE =10m.24s.
Wellington iZ =11m.25s., e =11m.36s., iZ =13m.46s. and 14m.4s., PPP =14m.19s., iZ =14m.53s., PS =18m.59s., SS =22m.20s., e =22m.59s., i =25m.27s.
Tuai eN =10m.34s.
Apia eN =10m.39s., eNZ =11m.2s.
Tashkent eS_cS =20m.35s.?
Honolulu i =11m.59s., 12m.38s., e =17m.11s. and 27m.17s.
Sverdlovsk iP_cP =12m.0s., iPPP =16m.33s.?, iPS =22m.3s., eSS =26m.24s., SSS =29m.47s.
Tananarive i =12m.43s., ipP? =13m.1s., e =16m.3s., eS =22m.22s., $iS_cS?$ =22m.58s., iPS =23m.17s., eSS =27m.33s.
College i =14m.37s., e =15m.35s.
Helsinki ePS =25m.40s., e =27m.43s., eSS =31m.30s.
Helwan iZ =13m.31s., and 18m.14s., SKSEZ =23m.51s., PSE =25m.59s., PPSE =26m.41s., SSE =31m.11s.
Bucharest eSN =24m.11s., iE =24m.18s., and 24m.58s., iN =25m.0s.
Upsala iPP?E =17m.9s., iPPE =17m.21s., ePPPE =19m.40s., SKS?E =23m.54s., eSKS =24m.8s., ePKKP?N =29m.59s., eSSE =31m.59s.?, eN =34m.35s., eSSSE =35m.59s.?, eN =38m.59s.?!
Raciborzu eEN =14m.1s., eN =18m.51s., eEN =19m.9s. and 22m.7s., eE =22m.46s. and 24m.16s., eN =24m.32s.
Kalossa eEN =18m.41s.
Copenhagen PS =27m.1s.
Potsdam iPPPZ =20m.15s., iPSZ =27m.11s., iPSE =27m.14s., and other readings without phase.
Bergen PPN =18m.13s., SKSE =24m.43s., SEN =25m.46s., eE =27m.16s., eEN =28m.15s., eN =30m.19s., SSN =32m.1s.?, eE =32m.39s.
Collmberg eE =14m.15s., 14m.37s., and 15m.30s., ePPPE =20m.33s., eSKSE =24m.33s., eSSE =33m.4s., eE =34m.16s., eSSSE =37m.18s., eN =39m.17s.
Zagreb i =24m.48s., iS =25m.57s., eSS =33m.47s., e =41m.59s.?
Taranto SKKS =24m.49s., eSS? =31m.29s., SSS =38m.11s.
Berkeley iPZ =14m.27s., iPKPZ =18m.31s., iPPN =19m.5s., and other readings without phase.
Jena ePZ =14m.17s., ePN =14m.23s., eN =14m.30s., ePKP?E =17m.26s., ePKP?NZ =17m.35s., eN =19m.4s., eSKS?N =24m.41s., eS?N =25m.59s., ePS?N =27m.19s., ePS?E =27m.29s.
Scoresby Sund PS =27m.53s., SS =33m.23s.

Continued on next page.

Santa Clara eE =33m.59s., eSSE =35m.37s.
Triest e =17m.50s., iSKKS =25m.24s., iS =26m.5s., iPS =27m.37s., eSS =33m.27s., i =34m.13s., eSSS =38m.1s.
Reno eE =14m.45s., eN =15m.7s., eE =18m.29s., iE =19m.6s., iZ =19m.9s., eQEZ = 49m.5s.
Fresno ePN =15m.26s., iN =30m.27s.
Hungry Horse i =14m.27s.
Stuttgart i =14m.36s.k, e =19m.59s., ePPP =20m.49s., eS =26m.19s., ePS =27m.39s., ePPS =28m.39s., eSS =33m.29s., eSSS =37m.53s., e =42m.59s., eQ =50·0m.
Bologna eZ =18m.3s., e =19m.36s., eSS? =33m.48s.
Salo iSKKSE =26m.18s., iN =26m.21s., iE =26m.28s.
Rome e =25m.23s. and 28m.25s., eSS =33m.49s.
Florence eN =15m.20s.
De Bilt ePKP? =17m.59s., ePS =27m.59s.?, eSS =33m.59s.?
Strasbourg ePKP? =18m.17s., iPP =18m.55s. and 19m.0s., iPPP =21m.14s. and 21m.19s., iSKP =22m.7s., eSKS =25m.19s., eS? =25m.55s., iS? =25m.58s., and 26m.29s., iPS =28m.1s., iPPS =28m.47s. and 28m.51s., ePKKS? =33m.5s., iSS = 33m.59s. and 34m.11s., iSSS =37m.28s. and 37m.41s., iSSSS? =43m.7s. and 43m.39s. Many other readings without phase.
Tinemaha iPPZ =19m.2s., ePKKPZ =29m.58s.
Zürich eS =26m.19s.
Basle ePKP =17m.59s., eS =26m.31s.
Aberdeen ePPE =17m.19s., iPPPE =19m.51s., iPPSE =28m.15s., iE =29m.1s. and 35m.23s., iSSSE =38m.56s.
Pasadena iPZ =14m.40s., iPP?Z =18m.43s., ePPPZ =21m.8s., iSN =26m.42s., iPSZ = 28m.2s., iPPSE =29m.17s., ePKKPZ =29m.51s., eSSE =33m.35s., ePKP,PKPZ = 37m.49s., eSSSN =38m.23s.
Saskatoon e =40m.59s.?
Durham iN =17m.54s., iEN =19m.14s.
Edinburgh PS =28m.14s., PPS =29m.17s., SS =34m.3s., e =35m.40s.
Reykjavik eEN =29m.48s., eSSN =34m.51s., eEN =38m.44s.
Boulder City ePKP =18m.30s., iPP =18m.48s., e =29m.42s.
Paris iP =14m.43s., iPP =19m.10s., i =19m.49s. and 20m.48s., iPPP =21m.32s., S = 26m.49s., PS =28m.27s., PPS =29m.30s., PKKS? =33m.44s., SS? =35m.14s., SSS =38m.44s.
Logan e =22m.0s., 27m.0s., 36m.8s., 41m.5s., and 41m.22s.
Kew ePSEZ =28m.34s., ePPSEZ =29m.35s., eQE =50·0m.
Salt Lake City i =21m.51s., eSP =28m.19s.
Pierce Ferry e =14m.34s.
Clermont-Ferrand iPP =19m.16s., iPPP =21m.49s., iSKS =25m.29s., iSP =28m.42s., iPPS =30m.0s., iSS =35m.3s., eSSS =39m.16s.
Jersey eE =15m.59s.? and 43m.57s.
Tucson i =19m.3s., ePP =19m.35s., iPP =19m.57s., eSKS? =25m.25s., e =25m.39s., ePS =28m.37s., eSS =35m.19s., eSSS =39m.15s.
Rapid City eE =20m.53s. and 28m.35s., eSSSE =40m.17s.
Algiers PP =19m.9s., e =19m.23s., i =20m.8s., PKS =22m.12s., SKS =25m.9s., SSP = 34m.59s.
Tortosa SKPE =22m.48s., SSE =35m.32s., SSSE =40m.2s.
Ivigtut S =27m.47s., PS =29m.23s., PPS =30m.53s., SS =35m.43s., SSS =40m.17s.
Alicante PPP =22m.41s., PKS =25m.41s., SKKS =27m.5s., PPS =30m.55s., SS = 35m.57s., SSS =39m.41s., Q =48m.5s.
Tamanrasset iPKP?Z =18m.56s.k, ePPZ =20m.14s., iPPPZ =22m.36s.a, iZ =24m.5s. and 24m.54s.
Toledo ePPZ =20m.56s., eZ =22m.48s., eN =35m.56s., iN =41m.9s.
Almeria PKS =22m.37s., PPP =23m.0s., SKKS =27m.22s., PS =30m.8s., PPS = 31m.38s., SS =36m.56s., SSS =41m.16s.
Granada sPKP =20m.10s.a, iPP =20m.25s., pPP =20m.58s., sPP =21m.25s., PPP = 22m.58s., pPPP =23m.25s., SKKS =27m.13s., S =27m.58s., sS =29m.25s., PPS = 30m.25s., iSS =35m.58s., SSS =39m.43s., Q =58·4m.
Malaga QZ =62m.57s.
Lisbon PKPEZ =19m.11s., PP =20m.50s., PPP? =23m.24s., E =27m.37s. and 30m.5s., SPZ =30m.21s., iPSE =30m.28s., PPS?E =32m.4s., PPS?N =32m.15s., SS?E = 38m.5s., SSS =41m.29s., Q?E =47m.53s.
Chicago eS? =29m.4s., e =32m.4s.
St. Louis iSKP =22m.12s., iSP =31m.39s., iPPS =32m.55s., i =37m.57s.
Ottawa e =20m.59s., PP =22m.21s., e =38m.19s., SS =40m.59s., SSS =47m.47s.
Seven Falls eE =29m.24s., PSE =31m.21s., eE =33m.54s., and 36m.48s., SSE = 38m.26s., eE =41m.10s.
Cleveland eN =21m.54s.
Tacubaya i =22m.14s. and 22m.35s., e =25m.6s. and 27m.23s., ePS =31m.47s., iPPS = 32m.50s., 51m.12s.
Pennsylvania eE =22m.46s., iE =38m.38s.
Harvard iPKS =22m.45s., eSS =39m.17s., eS_cS,S_cS? =41m.9s.
Halifax e =33m.0s.
Weston iSKS =31m.29s., SS =39m.22s.
Fordham iPKP =19m.22s., iSKP =22m.48s., iSS? =41m.34s.
Mobile PPP =24m.59s., eS =30m.15s., SSS =45m.39s.
Philadelphia e =28m.35s., eSP =31m.44s., eSS =39m.11s.

Continued on next page,

Bermuda eSKS? =26m.11s., e =30m.4s. and 34m.24s., eSS =41m.29s.
Santa Lucia 20m.30s., 20m.41s., 21m.4s., e =24m.42s., 24m.59s.?
San Juan i =21m.15s. and 22m.5s., e =24m.47s. and 38m.7s., eSS =43m.11s., eSSS? = 49m.40s.
Bogota iPKP$_2$ =20m.49s., e =33m.6s., ePSKS =34m.59s., eSS =44m.19s.
La Paz iSSN =44m.39s.
Long waves were also recorded at Lincoln and Seattle.

March 27d. 11h. 45m. 26s. Epicentre 5°·4S. 151°·3E. (as on 17d.).

A = −·8737, B = +·4784, C = −·0878 ; δ = −7 ; h = +7.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·4	175	i 4 54	− 8	i 8 52	−12	i 5 13	PP	i 11·3
Riverview		28·6	180	e 5 56	− 4	e 10 36	−12	—	—	e 14·8
Wellington		41·7	154	—	—	e 14 9	− 1	—	—	21·1
Vladivostok		51·1	342	e 9 10	+ 4	i 16 48	+24	e 20 36	SS	—
Irkutsk		69·6	331	—	—	e 20 46	PS	—	—	—
Bombay		80·8	290	e 12 4	−13	e 22 31	+ 6	—	—	—
College		82·7	22	e 12 28	+ 1	—	—	i 12 40	P_cP	—
Andijan		84·9	312	e 12 41	+ 3	e 23 13	+ 7	—	—	—
Obi-garm		86·6	310	e 12 50	+ 4	—	—	—	—	—
Stalinabad		87·3	310	i 12 53	+ 3	e 23 17	[+ 1]	23 33	S	—
Tashkent		87·3	312	e 12 53	+ 3	e 23 19	[+ 3]	i 23 35	S	—
Mineral	z.	91·0	49	i 13 8	+ 1	—	—	—	—	—
Pasadena		93·2	56	i 13 18	+ 1	—	—	i 13 34	?	—
Tinemaha		93·4	53	i 13 20a	+ 2	—	—	—	—	—
Riverside	z.	93·9	56	i 13 21a	0	—	—	i 13 36	?	—
Palomar	z.	94·3	57	e 13 21	− 2	—	—	—	—	—
Sverdlovsk		94·6	327	—	—	e 24 15?	{0}	—	—	—
Boulder City		96·1	54	e 13 31	0	—	—	i 13 45	?	—
Overton	z.	96·4	54	e 13 33	+ 1	—	—	—	—	—
Pierce Ferry		96·8	54	e 13 32	− 2	—	—	e 13 48	?	—
Hungry Horse		96·9	41	e 13 32	− 2	—	—	i 13 36	?	—
Tucson		99·3	57	e 13 48	+ 3	—	—	—	—	e 45·8
Ksara		113·9	304	19 45	PP	29 47	PS	—	—	—
Triest		125·3	324	e 19 10	[+ 7]	e 31 3	PS	e 21 1	PP	—
Stuttgart		125·9	329	e 19 6	[+ 2]	—	—	e 21 3	PP	e 63·6
Strasbourg		126·7	330	e 19 8	[+ 2]	e 43 34?	SSS	e 21 7	PP	60·6
Weston		127·0	38	e 19 7	[+ 1]	—	—	—	—	e 63·6
Rome		128·2	321	e 22 30	PKS	e 33 12	PPS	—	—	—
La Paz		135·5	120	19 22	[0]	—	—	—	—	—
Tamanrasset	z.	142·6	302	i 19 36k	[+ 1]	e 23 32	PKS	—	—	—

Additional readings :—
Brisbane iZ =5m.10s.
Riverview iZ =6m.12s., eZ =11m.9s., eE =11m.26s.
Tashkent eSeS =23m.50s., ePS =24m.48s.
Triest ePPS? =32m.8s.
Stuttgart eZ =23m.40s.
Strasbourg ePPP =23m.41s., e =28m.34s.?
Long waves were also recorded at other European stations and at Arapuni, Auckland, and Berkeley.

March 27d. 20h. 33m. 58s. Epicentre 3°·1N. 127°·8E. (as at 6h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		40·0	5	i 7 43	− 5	i 13 52	+ 8	e 17 50	SSS	—
Calcutta	E.	42·8	300	e 8 9	+ 8	e 13 19	−67	—	—	—
Riverview		42·8	152	e 9 53	P_cP	i 17 42	SS	—	—	e 24·9
Kodaikanal	E.	50·4	281	e 8 19	−42	—	—	—	—	—
Irkutsk		52·8	342	9 20	+ 1	16 51	+ 4	e 11 34	PP	—
Bombay		56·0	291	e 9 25	−18	—	—	e 9 33	P	—
Obi-garm		63·5	312	i 10 27	− 7	e 19 4	− 3	—	—	—
Stalinabad		64·1	312	i 10 35	− 3	e 19 16	+ 2	—	—	—
Tashkent		64·6	315	e 10 39	− 2	23 23?	SS	12 53	PP	—
Samarkand		65·8	312	e 10 42?	− 7	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sverdlovsk		75·1	328	11 42	− 4	e 21 22	− 2	—	—	—
Baku		78·8	311	e 12 7	+ 1	e 22 9?	+ 5	—	—	—
Grozny		82·1	313	e 12 24	0	e 22 34	− 4	—	—	—
Leninakan		83·4	311	e 12 41	+11	e 22 55	+ 4	—	—	—
Sotchi		86·5	313	e 12 43	− 3	—	—	—	—	—
Moscow		87·6	326	e 12 56	+ 5	e 23 28	− 4	—	—	—
Ksara		89·9	303	i 13 3	+ 1	e 24 4	+10	—	—	—
Yalta		90·4	314	e 13 2	− 2	e 23 38	[+ 3]	—	—	—
Helwan	z.	94·0	300	13 21	0	—	—	e 17 9	PP	—
Triest		104·3	318	e 18 38	PP	—	—	—	—	—
Hungry Horse		105·9	37	e 14 42	P	—	—	e 14 47	P	—
Stuttgart		106·0	323	e 18 32?	[+ 7]	e 26 21	+11	e 18 49	PP	e 57·0
Rome		106·4	315	e 18 44	PP	—	—	—	—	—
Overton	z.	110·0	49	e 18 56	PP	—	—	—	—	—
Kew		110·1	328	—	—	e 29 46	PPS	—	—	e 59·0
Bogota		156·8	70	i 20 36	PKP_3	—	—	—	—	—
La Paz		159·6	132	20 20	PKP_3	—	—	—	—	76·0

Additional readings :—
Riverview eZ = 11m.30s., eS?E = 17m.49s., eQE = 22m.14s.
Irkutsk eSS = 21m.0s.?
Tashkent S_cS = 20m.21s.?
Helwan eZ = 13m.43s.
Long waves were also recorded at Wellington, Tucson, Weston, Seven Falls, and at other European stations.

March 27d. Readings also at 1h. (near Bogota), 2h. (College, Boulder City, Overton, Pierce Ferry, Tucson, Pasadena, Riverside, Palomar, Tinemaha, and Stuttgart), 3h. (Kew, near Obi-garm and Stalinabad), 4h. (Ksara, Bombay, Calcutta, Kodaikanal, and New Delhi), 5h. (Overton), 6h. (near Bologna and Florence), 7h. (Ottawa, Stuttgart, near Bologna, Florence, and near Tacubaya), 8h. (Tacubaya, Palomar, Tchimkent, Samarkand, near Obi-garm, Stalinabad, Stuttgart, Padova, Salo, near Bologna (2) and Florence), 9h. (near Bologna (2), and near Tacubaya), 10h. (near Bologna and near Obi-garm), 11h. (near Tacubaya), 16h. (College), 17h. (near Tucson), near Grozny, Erevan, Piatigorsk, Leninakan, and Sotchi), 19h. (Ferndale), 22h. (Hungry Horse and near College), 23h. (Auckland, Tashkent, Obi-garm, Stalinabad, Samarkand, Frunse, and near Andijan).

March 28d. 6h. Undetermined shock.

Tamanrasset Z = 32m.51s.
Stuttgart eZ = 33m.54s., 34m.9s., 35m.45s., and 47m.52s., eL = 80m.
Strasbourg e = 33m.56s., e? = 34m.45s. and 60m.30s., e = 73m.30s. and 75m.0s., L = 85m.
Vladivostok eP = 42m.9s.
Andijan eP = 43m.46s.
Stalinabad iP = 43m.48s., iS = 51m.8s.
Tashkent eP = 43m.49s.?, eP_cP = 44m.57s., ePP = 45m.37s., eS = 51m.16s.?
Obi-garm iP = 43m.53s.
Shasta Dam i = 44m.26s.
Sverdlovsk eP = 45m.2s.
Hungry Horse iP = 45m.13s.
Samarkand ePP = 45m.41s.
College e = 47m.40s.
Pierce Ferry iP = 49m.31s.
Long waves were also recorded at Clermont-Ferrand, De Bilt, Potsdam, and Rome.

March 28d. 12h. 50m. 33s. Epicentre 13°·3N. 120°·4E. (as on 1944, Aug. 14d.).
A = −·4926, B = +·8397, C = +·2287 ; δ = +5 ; h = + 6 ;
D = +·863, E = +·506 ; G = −·116, H = +·197, K = −·974.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		23·6	216	i 5 12	− 1	i 9 12	−13	—	—	—
Vladivostok		31·3	17	e 6 20	− 4	—	—	—	—	—
Calcutta	E.	31·8	291	e 6 44	+16	i 11 40	+ 2	e 7 58	PPP	—
Colombo	E.	40·4	265	7 37	− 4	13 47	− 3	—	—	21·4
Hyderabad	N.	40·6	281	e 7 48	+ 5	13 54	0	17 2	SS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk		41·0	345	7 44	− 2	13 55	− 4	e 9 50	PcP	—
New Delhi	N.	42·9	298	—	—	i 14 14	−13	i 17 34	SS	—
Poona	E.	45·0	283	e 8 16	− 3	i 14 49	− 9	—	—	18·5
Bombay		45·9	283	e 8 27	+ 1	i 15 10	− 1	—	—	21·6
Almata		47·7	318	e 8 44?	+ 4	—	—	—	—	—
Murgab		48·1	311	8 44	+ 1	15 39	− 3	—	—	—
Frunse		49·2	316	e 9 1	+ 9	—	—	—	—	—
Andijan		50·0	312	—	—	e 16 5	− 4	e 18 47?	ScS	—
Obi-garm		51·3	309	i 9 3	− 5	i 16 20	− 6	—	—	—
Stalinabad		52·0	309	i 9 11	− 2	i 16 32	− 4	—	—	—
Tchimkent		52·4	314	e 9 16	0	16 39?	− 3	—	—	—
Samarkand		53·6	310	e 9 38?	+13	—	—	—	—	—
Riverview		55·3	149	—	—	e 17 17	− 4	e 17 34	PS	e 24·4
Ashkabad		60·1	306	e 10 11	0	—	—	—	—	—
Sverdlovsk		62·6	328	i 10 25	− 3	i 18 50	− 6	e 19 5	PS	—
Grozny		69·9	312	e 11 23	+ 8	e 21 10	S_eS	—	—	—
Sotchi		74·2	312	e 11 29	−11	—	—	—	—	—
Moscow		75·0	325	e 11 43	− 2	e 21 16	− 7	—	—	—
Yalta		78·1	313	e 12 7	+ 5	—	—	—	—	—
Ksara		78·2	302	e 11 40	−23	e 21 57	0	i 12 6	P	—
College		78·8	26	e 12 4	− 2	—	—	—	—	—
Istanbul		82·4	310	e 12 11	−14	e 22 33	− 8	—	—	—
Helwan		82·7	299	e 12 27	0	e 22 41	− 3	e 23 25	PS	—
Upsala		84·9	330	—	—	e 22 52	−14	e 22 55	S	e 36·5
Copenhagen		88·9	328	—	—	23 24	−20	—	—	41·5
Jena		91·1	323	e 13 8	0	—	—	—	—	—
Triest		91·9	318	e 13 22	+11	i 23 58	{+ 3}	i 23 37	SKS	—
Scoresby Sund		92·5	349	20 27	?	23 43	[− 4]	25 33	PS	—
Stuttgart		93·5	321	e 13 17	− 2	e 23 45	[− 8]	e 17 5	PP	e 49·4
Salo		94·0	318	e 13 20	− 1	e 23 44	[−12]	—	—	—
Rome		94·1	315	e 13 16	− 6	i 23 51	[− 5]	30 57	SS	—
De Bilt		94·5	326	—	—	e 31 27?	SSP	—	—	e 47·4
Strasbourg		94·5	322	e 13 23	0	e 24 32	− 2	e 17 13	PP	44·4
Aberdeen	E.	95·3	333	—	—	—	—	e 42 39	Q	e 50·2
Paris		97·4	323	i 13 36	− 1	—	—	i 17 34	PP	e 51·4
Clermont-Ferrand		97·6	320	e 13 54	+16	—	—	e 17 44	PP	42·0
Kew		97·6	327	e 13 32	− 6	e 23 54	[−21]	e 36 0	SSS	e 50·4
Pretoria	Z.	97·6	246	e 13 37	− 1	—	—	—	—	—
Hungry Horse		102·0	33	e 13 55	− 2	—	—	—	—	—
Granada		107·3	316	—	—	35 27	?	—	—	56·7
Overton	Z.	108·4	44	e 19 4	PP	—	—	—	—	—
Boulder City		108·5	45	e 15 6	P	—	—	—	—	—
Pierce Ferry		108·9	44	e 18 52	PP	—	—	—	—	—
Tucson		113·3	46	e 19 24	PP	—	—	e 19 48	PP	e 56·0

Additional readings :—
Irkutsk ePP = 9m.35s.?
New Delhi iN = 17m.54s.
Poona iE = 8m.33s. and 9m.0s.
Bombay eSN = 15m.7s.
Riverview eSS?E = 21m.46s.
Sverdlovsk iS_eS = 20m.11s.
Helwan eZ = 12m.44s.
Stuttgart eZ = 13m.35s., e = 20m.57s.
Rome eP?Z = 13m.30s., i = 24m.16s., PS = 25m.36s.
Strasbourg e = 13m.29s., 13m.39s., 22m.54s., and 23m.27s., ePS = 25m.43s., eSS = 31m.11s., L? = 42·4m.
Paris i = 13m.49s.
Kew eSSSEN = 40m.42s., eE = 44m.36s.
Long waves were also recorded at Weston, La Plata, and other European stations.

March 28d. Readings also at 0h. (Batavia, Samarkand, near Obi-garm and Stalinabad), 3h. (Ksara, Grozny, Sverdlovsk, Obi-garm, Stalinabad, and Vladivostok), 5h. (Ksara), 7h. (Kew), 8h. (La Paz), 10h. (College and Tucson), 13h. (Hungry Horse and Pierce Ferry), 15h. (Overton), 16h. (Tucson (2), Boulder City (3), Pierce Ferry (3), Shasta Dam (5), Ukiah, Hungry Horse (3), College, Salt Lake City, and near Obi-garm), 17h. (Shasta Dam and Hungry Horse), 18h. (Tucson, Overton, Pierce Ferry (2), Shasta Dam (2), Salt Lake City, Ukiah, Hungry Horse (2), Jena, and Stuttgart), 19h. (Kew, Riverside, Tucson (4), Boulder City (3), Overton (2), Pierce Ferry (4), Ukiah (2), Fresno, Santa Clara, Shasta Dam (4), Seattle, Victoria, Hungry Horse (4), College (3), Rapid City (3), Bozeman, Butte, Logan, Salt Lake City, Saskatoon, Lincoln, Ottawa, and Seven Falls), 20h. (Paris, Philadelphia, Chicago, Salt Lake City, Hungry Horse (2), and College), 21h. (near Rome), 22h. (near Andijan), 23h. (Tucson, Boulder City, Pierce Ferry, Shasta Dam, Ukiah, Salt Lake City, Hungry Horse, and near Messina).

March 29d. 2h. 53m. 37s. Epicentre 2°·2N. 126°·9E. (as on 1945, Feb. 6d.).

Doubtful identification.

$A = -\cdot6000$, $B = +\cdot7991$, $C = +\cdot0382$; $\delta = +2$; $h = +7$;
$D = +\cdot800$, $E = +\cdot600$; $G = -\cdot023$, $H = +\cdot031$, $K = -\cdot999$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		41·0	6	e 7 45	− 1	i 13 52	− 7	—	—	—
Riverview	E.	42·5	149	—	—	e 14 56	+34	e 17 58	SS	e 22·2
Andijan		62·3	316	e 10 25	− 1	—	—	—	—	—
Obi-garm		63·4	313	e 10 36	+ 2	—	—	—	—	—
Stalinabad		64·1	313	e 10 35	− 3	—	—	i 20 19	S_eS	—
Samarkand		65·7	313	e 10 33	−15	—	—	—	—	—
Sverdlovsk		75·3	329	11 40	− 7	21 21	− 5	—	—	—
Grozny		82·0	313	e 12 28	+ 5	—	—	—	—	—
Leninakan		83·3	311	e 12 41	+11	—	—	—	—	—
Moscow		87·8	326	e 12 58	+ 6	e 23 38?	+ 4	—	—	—
Ksara		89·6	304	e 13 3	+ 2	e 23 59	+ 8	—	—	—
Kew		110·4	328	e 11 6	?	e 23 42	?	—	—	e 58·4

Riverview gives also eN = 15m.0s.
Long waves were also recorded at Batavia, Wellington, Potsdam, De Bilt, Paris, and Clermont-Ferrand.

March 29d. Readings also at 0h. (Hungry Horse and Pierce Ferry), 1h. (near Obi-garm), 2h. (Collmberg, Belgrade, and Shawinigan Falls), 3h. (Ksara and Hungry Horse), 6h. (Boulder City), 8h. (near Hungry Horse), 9h. (College, Hungry Horse, and Pierce Ferry), 10h. (Belgrade), 11h. (Belgrade and near Obi-garm), 12h. (Overton, near Stalinabad and Obi-garm), 15h. (Harvard, Hungry Horse, near Berkeley, Branner, Lick, and San Francisco), 18h. (near Obi-garm and Stalinabad), 21h. (College), 22h. (Tucson, Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse).

March 30d. 14h. 47m. 43s. Epicentre 17°·0S. 177°·0W. (as on 1948, July 24d.).

$A = -\cdot9556$, $B = -\cdot0501$, $C = -\cdot2906$; $\delta = +13$; $h = +5$;
$D = -\cdot052$, $E = +\cdot999$; $G = +\cdot290$, $H = +\cdot015$, $K = -\cdot957$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		6·0	60	1 24	− 8	—	—	—	—	e 3·6
Auckland	N.	21·1	198	3 57	−51	i 8 38	− 1	i 5 0	P	9·7
Arapuni	E.	22·0	195	—	—	9 29	+33	—	—	—
Wellington		25·2	195	5 38	+ 9	9 43	− 9	6 5	pP	12·3
Kaimata	NE.	27·3	200	5 52	+ 4	—	—	—	—	—
Brisbane		29·6	244	i 6 7	− 2	e 10 58	− 6	i 7 10	PP	i 13·1
Riverview		33·1	233	—	—	i 12 3	+ 4	i 12 22	sS	e 14·9
Batavia		75·0	269	i 11 41	− 4	i 21 32	+ 9	—	—	—
Berkeley	E.	75·0	42	—	—	i 22 27	+ 4	—	—	e 31·0
Pasadena		75·6	47	e 11 50	+ 2	—	—	—	—	e 31·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		76·0	324	i 11 52	+ 1	e 21 31	− 3	—	—	—
Palomar	z.	76·1	48	i 11 53	+ 2	—	—	—	—	—
Riverside	z.	76·1	48	e 11 53	+ 2	—	—	—	—	—
Shasta Dam		76·5	39	i 11 55	+ 1	—	—	—	—	—
Mineral	z.	76·8	40	i 10 11	?	—	—	—	—	—
Tinemaha	z.	77·1	44	e 11 57	0	—	—	—	—	—
Reno	z.	77·5	43	e 12 5	+ 6	—	—	—	—	—
Boulder City		78·9	47	e 11 56	−11	—	—	—	—	—
Pierce Ferry		79·6	47	e 12 7	− 3	—	—	—	—	—
Tucson		80·0	51	e 12 13	0	e 23 24	PS	e 15 38	PP	e 36·8
Logan		83·8	43	e 12 43	+11	—	—	—	—	—
College		84·6	12	e 12 33	− 3	e 23 47	PS	—	—	e 36·6
Tacubaya		84·6	68	i 12 34	− 2	e 22 30	−33	e 15 10	PP	—
Hungry Horse		85·8	36	i 12 41	− 1	—	—	—	—	—
Irkutsk		96·5	322	e 13 52	+20	24 43	− 8	—	—	—
St. Louis		98·0	52	e 13 41	+ 2	e 25 7	+ 3	e 26 50	PS	—
Calcutta	E.	100·5	291	e 18 57	?	e 27 2	PS	—	—	—
La Paz		102·4	113	e 13 25	−34	—	—	18 49	PP	48·3
Colombo	E.	104·5	273	17 17?	?	27 39	PS	—	—	53·3
Kodaikanal	E.	107·7	276	e 18 54	PP	—	—	—	—	—
New Delhi	N.	111·6	294	—	—	e 26 54	{+38}	e 45 46	Q	e 58·5
Bombay		114·0	284	e 19 35	PP	—	—	—	—	—
San Juan		114·5	77	e 14 51	P	e 25 46	[+16]	e 29 9	PS	e 53·3
Bermuda		117·5	62	—	—	e 29 47	PS	—	—	e 58·8
Stalinabad		119·2	305	e 18 55	[+ 4]	e 36 42	SS	e 20 11	PP	—
Sverdlovsk		121·6	327	—	—	36 58	SS	—	—	—
Ivigtut		123·0	27	—	—	25 29	[−31]	—	—	58·3
Scoresby Sund		124·4	11	20 59	PP	—	—	—	—	—
Copenhagen		140·7	353	22 59	PP	—	—	—	—	68·3
Durham		142·1	4	e 23 15	PKS	e 26 5	[−38]	—	—	—
Collmberg		144·9	348	e 19 38	[− 1]	—	—	—	—	e 72·3
De Bilt		144·9	357	e 19 42	[+ 3]	—	—	e 42 17?	SSP	e 65·3
Kew		145·5	3	i 19 41	[+ 1]	—	—	e 25 50	PPP	e 68·3
Prague		145·8	348	e 19 42	[+ 1]	—	—	—	—	e 56·3
Ksara		146·1	306	(i 19 45)	[+ 4]	(36 11)	PPS	—	—	—
Istanbul		147·2	322	i 19 50	[+ 7]	—	—	i 23 15	PKS	—
Stuttgart		147·9	353	e 19 48	[+ 4]	—	—	e 68 17?	Q	e 72·3
Paris		148·3	2	e 19 52	[+ 7]	43 17?	SSP	e 26 33	PPP	e 69·3
Strasbourg		148·3	354	e 19 50	[+ 5]	e 31 21	PKKS	e 42 56	SS	64·3
Basle		149·3	355	e 19 52	[+ 6]	e 28 19	?	—	—	—
Zagreb	z.	149·3	342	e 19 53	[+ 7]	—	—	—	—	—
Zürich		149·4	354	e 19 53	[+ 7]	—	—	—	—	—
Chur		149·8	353	e 19 51	[+ 4]	—	—	—	—	—
Neuchatel		149·9	355	e 19 55	[+ 8]	—	—	—	—	—
Triest		150·1	346	e 20 3	[+15]	i 29 21	{−58}	e 23 36	PKS	—
Salo		150·8	349	e 19 55k	[+ 6]	—	—	e 23 27	PP	—
Helwan		151·1	302	e 19 57	[+ 8]	—	—	e 23 50	PP	—
Clermont-Ferrand		151·3	0	e 19 54	[+ 5]	e 44 2	PSS	e 23 35	PP	70·3
Pavia	z.	151·4	350	e 19 57	[+ 7]	—	—	—	—	—
Padova		151·6	347	e 20 53	[+63]	—	—	e 23 33	PP	—
Florence		152·4	347	e 20 1	[+10]	e 25 44?	?	—	—	—
Prato		152·4	347	e 19 59	[+ 8]	—	—	—	—	—
Rome		153·9	344	e 20 9	[+16]	—	—	e 24 17	PKS	—
Tortosa		156·2	4	20 38	PKP_3	27 42	PS	24 3	PKS	e 67·3
Toledo		156·4	14	20 7	[+10]	—	—	e 24 12	PP	77·8
Alicante		158·5	7	19 44	[−15]	26 54	[− 9]	—	—	e 75·8
Granada		159·1	15	i 19 32a	[−28]	44 41	SS	24 29	PP	78·0
Almeria		159·7	12	19 32	[−28]	43 34	SS	23 38	PKS	80·7
Tamanrasset	z.	173·8	338	e 20 16	[+ 5]	e 21 45	PKP_3	e 25 39	PP	—

Additional readings and note :—
Apia eZ = 1m.37s.
Auckland i = 4m.3s., S?N = 7m.56s.
Wellington PPZ = 6m.22s., P_cP = 6m.41s., i = 11m.41s.
Brisbane i = 6m.25s., iSN = 11m.2s., iSSE = 12m.36s.

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Riverview iSSSN? =14m.29s.
Berkeley eN =22m.41s.
Reno eE =12m.9s.
Pierce Ferry i =13m.10s.
Tucson e =12m.17s., 12m.26s., 12m.46s., 13m.24s., 15m.31s., and 19m.0s.
Logan e =14m.33s.
Tacubaya esS =23m.28s., e =27m.4s.
Hungry Horse i =14m.2s.
St. Louis e =28m.32s., i =37m.15s.
New Delhi eN =31m.54s.
San Juan e =20m.40s.
Collmberg eE =19m.42s.
Ksara readings reduced by 30m.
Stuttgart iPKPZ =19m.54s.k, eZ =20m.8s., 20m.39s., and 21m.54s.
Paris iPKP =19m.56s., i =20m.10s., 20m.54s., 21m.54s., and 21m.59s., e =28m.31s., and 32m.16s.
Strasbourg e =20m.40s., 21m.35s., 21m.39s., 31m.25s., and 32m.37s., eSSS? =48m.47s.
Zagreb e =19m.56s., eE =20m.3s.
Zürich e =20m.46s.
Triest ePKP$_2$ =20m.43s., ePP =22m.54s., iPS =33m.59s.
Salo eZ =20m.47s.
Helwan eZ =20m.11s. and 20m.25s.
Clermont-Ferrand e =22m.2s., Q =62·3m.
Tortosa pPP?EN =25m.35s., SSSE =50m.26s.
Toledo eZ =20m.31s.
Granada PKP$_2$ =20m.44s.k.
Almeria PKP$_2$ =20m.7s., PPP =27m.18s., PPS =36m.48s.
Long waves were also recorded at Honolulu, Tananarive, and other American and European stations.

March 30d. Readings also at 0h. (Frunse, Samarkand, Tchimkent, near Andijan, Murgab, Obi-garm, Stalinabad, near Basle and Zürich), 1h. (near Tucson), 2h. (near Balboa Heights), 3h. (Collmberg, Stuttgart, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 5h. (La Paz, Balboa Heights, Bogota, Bermuda, San Juan, Palomar, Tucson, Boulder City (2), Pierce Ferry (2), Hungry Horse, and near Granada), 7h. (Klyuchi), 8h. (Palomar, Tucson, Boulder City, Pierce Ferry, Hungry Horse, College, Almata, Murgab, and Stalinabad), 9h. (Santa Lucia, Mount Wilson, Palomar, Riverside, Tinemaha (2), Tucson, Boulder City, Pierce Ferry, Hungry Horse, and College), 10h. (Hungry Horse), 11h. (near College), 12h. (Ivigtut, Reykjavik, Kew, Paris (2), Messina, Frunse, Tchimkent, near Andijan, Murgab, and Stalinabad), 13h. (De Bilt, Clermont-Ferrand, Scoresby Sund, and College), 14h. (Kew and Paris), 15h. (Hungry Horse and near Zürich), 18h. (Hungry Horse, Strasbourg, and Stuttgart), 19h. (De Bilt, Kew, Paris, Potsdam, and Overton), 20h. (Pretoria, Scoresby Sund, Ottawa, Philadelphia, Bozeman, Butte, Logan, Rapid City, Fresno, Overton, Mineral, Shasta Dam, Reno, Hungry Horse, Saskatoon, Seattle, Victoria, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, and near Almata), 21h. (Stuttgart, Strasbourg, Kew, New Delhi, Ashkabad, Grozny, near Almata, Andijan, Frunse, Murgab, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 22h. (near Samarkand, Andijan, Obi-garm, and Stalinabad), 23h. (Murgab, Samarkand, near Andijan), Obi-garm, Stalinabad, and near Klyuchi).

March 31d. 21h. 40m. 2s. Epicentre 5°·4S. 151°·3E. (as on 27d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·4	175	i 4 56	− 6	i 8 55	− 9	—	—	—
Riverview		28·6	180	e 6 13	+13	i 10 40	− 8	e 6 51	PP	e 14·5
Auckland	N.	38·3	149	e 9 58?	?	—	—	—	—	—
Arapuni	E.	39·6	149	—	—	e 17 58?	Q	—	—	—
Andijan		84·9	312	i 12 39	+ 1	e 22 58	− 8	—	—	—
Stalinabad		87·3	310	i 12 48	− 2	e 23 17	[+ 1]	—	—	—
Shasta Dam		90·5	49	i 13 34	+29	—	—	—	—	—
Mineral	z.	91·0	49	i 13 6	− 1	—	—	—	—	—
Reno	z.	92·3	50	e 13 14a	+ 1	—	—	—	—	—
Pasadena		93·2	56	i 13 17	0	—	—	i 13 38	pP	—
Tinemaha		93·4	53	i 13 18	0	—	—	—	—	—
Riverside	z.	93·9	56	i 13 20a	− 1	—	—	i 13 41	pP	—
Palomar		94·3	57	i 13 24	+ 1	—	—	—	—	—
Sverdlovsk		94·6	327	e 13 23	− 1	e 23 42	[−17]	e 17 16	PP	—
Boulder City		96·1	54	i 13 30	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Overton	z.	96·4	54	e 13 31	− 1	—	—	i 16 52	PP	—
Pierce Ferry		96·8	54	i 13 33	− 1	—	—	—	—	—
Hungry Horse		96·9	41	i 13 33	− 1	—	—	—	—	—
Tucson		99·3	57	i 13 46	+ 1	—	—	—	—	e 43·4
Ksara		113·9	304	e 19 31	PP	28 47	PS	—	—	—
Scoresby Sund		114·5	357	—	—	29 34	PS	36 4	SS	56·0
Pretoria	z.	116·9	238	i 18 47	[0]	—	—	—	—	—
Ottawa	z.	122·7	37	e 18 56	[− 2]	—	—	—	—	—
Triest		125·3	324	e 19 43	[+40]	e 30 58	PS	—	—	—
Stuttgart		125·9	329	e 19 4	[0]	—	—	e 21 0	PP	e 65·0
Strasbourg		126·7	330	i 19 7	[+ 1]	e 30 58	PS	i 21 6	PP	e 62·0
Chur		126·9	327	(e 19 7)	[+ 1]	—	—	—	—	—
Weston		127·0	38	e 19 5	[− 1]	—	—	—	—	—
Salo		127·2	326	e 19 6	[− 1]	—	—	—	—	—
Basle		127·5	329	—	—	e 27 58	(− 5)	e 36 54	?	—
Kew		128·1	337	e 19 2	[− 6]	e 22 24	PKS	e 43 16	SSS	e 64·0
Rome		128·2	321	e 22 24	PKS	—	—	e 41 58?	SSS	—
Paris		129·0	333	i 19 10	[0]	e 22 28	PKS	e 21 23	PP	e 69·0
Clermont-Ferrand		130·9	331	e 19 17	[+ 3]	e 22 45	PKS	e 21 35	PP	70·0
La Paz	z.	135·5	120	i 19 14	[− 8]	i 23 12	PKS	—	—	—
Tamanrasset	z.	142·6	302	e 19 34	[− 1]	—	—	—	—	—
Fort de France		146·7	71	e 19 53	[+11]	—	—	—	—	—

Additional readings :—
Brisbane iN = 5m.25s., iZ = 5m.28s.
Riverview iN = 8m.20s., iNZ = 11m.3s., eQEN = 11m.16s.
Reno eE = 13m.40s.
Sverdlovsk ePS = 25m.30s.?, eSS = 31m.22s.
Stuttgart eZ = 19m.16s. and 24m.28s.
Strasbourg e = 21m.22s. and 33m.58s.
Chur reading has been increased by 8m.
Weston e = 19m.19s.
Salo e = 20m.5s.
Kew eEN = 36m.5s., eE = 41m.28s.
Long waves were also recorded at Seven Falls, Philadelphia, Bermuda, Wellington, and other European stations.

March 31d. Readings also at 1h. (Granada and near Almeria), 2h. (near Messina), 3h. (near Messina and near Tananarive), 7h. (Samarkand, near Obi-garm and Stalinabad), 9h. (Tacubaya, Shasta Dam, and Hungry Horse), 13h. (Florence), 14h. (Durham and near Stalinabad), 16h. (Santa Lucia), 18h. (College, near Andijan, Samarkand, and Stalinabad), 19h. (Logan), 20h. (College), 21h. (Overton, Pierce Ferry, Shasta Dam, Reno, Berkeley, near Branner and Lick), 22h. (Hungry Horse).

The scanned images of the bulletins of the International Seismological Summary (ISS) have been obtained thanks to funding provided by the US National Science Foundation through grant EAR-9725140 (Villaseñor et al., 1997) and collected by SGA Storia Geofisica Ambiente (Bologna) on behalf of the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

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A digital hypocenter file of the ISS (Villaseñor and Engdahl, 2005) can be obtained from the USGS web site: http://earthquake.usgs.gov/scitech/iss/

Villaseñor, A., and E.R. Engdahl, *A digital hypocenter catalog for the International Seismological Summary,* Seism. Res. Lett., vol. 76, no. 5, pp. 554-559, 2005.

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